

キジムシロ属 *Leptostylae* 節 (バラ科) の分類学的研究

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Taxonomic studies of genus *Potentilla*
section *Leptostylae* (Rosaceae)
(キジムシロ属 *Leptostylae* 節 (バラ科) の分類学的研究)

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SUMMARY

Genus Potentilla section Leptostylae (Rosaceae) is taxonomically studied. This paper consists of three parts.

In the first part morphological characters are examined to clarify the distinction between section Leptostylae and section Closterostylae. As a result, it was revealed that the features of stipules of radical leaves and branching of derivation of flowering stems well delimit these two sections. A new circumscription of the two sections is proposed.

In the second part the species occur in the Himalaya and adjacent regions formerly included in section Closterostylae, named P. lineata group, are revised. Potentilla festiva Soják, P. josephiana H. Ikeda et H. Ohba, P. lineata Trev., P. fallens Card. and P. polyphylla Wall. ex Lehm. are recognized. Potentilla josephiana is a new name for P. fulgens Wall. ex Hook. var. intermedia Hook. f. Four varieties are recognized in P. polyphylla: var. polyphylla; var. himalaica H. Ikeda et H. Ohba, var. nov.; var. interrupta (Yü et C. Li) H. Ikeda et H. Ohba, stat. & comb. nov.; and var. barbata Lehm. A polyploid series is found in this group. Four putative hybrids between the species are also recognized.

In the third part section Leptostylae in Himalaya, Tibet, SW China and Burma is revised, except the species treated in the second part. 19 species and 14 varieties are recognized. Two new species are described: P. turfosoides H. Ikeda et H. Ohba; and P. wenchuensis H. Ikeda et H. Ohba. Four new varieties are described: P. peduncularis D. Don var.

stenophylloides H. Ikeda et H. Ohba; P. cardotiana Hand.-Mazz. var. nepalensis H. Ikeda et H. Ohba; P. commutata Lehm. var. maior H. Ikeda et H. Ohba; and P. leuconota D. Don var. omeiensis H. Ikeda et H. Ohba. Eight new combinations are proposed: P. microphylla D. Don var. tapetodes (Soják) H. Ikeda et H. Ohba and luteopilosa (Yü et C. Li) H. Ikeda et H. Ohba; P. stenophylla (Franch.) Diels var. taliensis (W. W. Smith) H. Ikeda et H. Ohba and cristata (Fletcher) H. Ikeda et H. Ohba; P. turfosa Hand.-Mazz. var. gracillima (Yü et C. Li) H. Ikeda et H. Ohba; P. glabriuscula (Yü et C. Li) Soják var. oligandra (Soják) H. Ikeda et H. Ohba; P. peduncularis D. Don var. vittata (Soják) H. Ikeda et H. Ohba and shweliensis (Fletcher) H. Ikeda et H. Ohba. Chromosome numbers of 12 species are counted and a polyploid series is found.

GENERAL INTRODUCTION

Potentilla is one of the most diversified genera in Rosaceae and known about 500 species distributed in temperate to arctic or alpine regions of the Northern Hemisphere and some in the Southern Hemisphere (Mabberley 1987). Wolf (1908) proposed an infrageneric system of Potentilla and it is the only system of the whole genus. Wolf classified Potentilla into two sections, Trichocarpae and Gymnocarpae. Furthermore he established two subsections in Trichocarpae and four subsections in Gymnocarpae: Closterostylae, Conostylae, Gomphostylae and Leptostylae. Yū and Li (1980) raised Wolf's sections and subsections to subgenera and sections.

Though Wolf recognized only four species from Himalaya and one from SW China, the present center of distribution of section Leptostylae is the alpine zones of Himalaya and SW China (Rousi 1965).

The Himalayan flora is, generally regarded as a part of Sino-Himalayan Floristic Region (Kingdon-Ward 1972). The floristic relationship between Himalaya and SW China is close in the alpine species (Ohba 1982). As shown by Yū and Li (1985), numerous Himalayan species of Leptostylae extend their ranges to SW China, particularly Yunnan and Sichuan. However, the taxonomical studies of Himalayan Potentilla has been focused on the species recognition in floras of limited Himalayan areas, and the detailed comparison throughout the distribution range has not been done.

In species level Potentilla is taxonomically a difficult genus. The main reasons are due to the wide range of variations of morphological characters, frequency of hybridization between species, and apomictic reproduction. The lack of ample materials and information about these amplifies the taxonomic confusion, and induces obscurity of delimitation of species.

This study aims to establish the system of section Leptostylae and the recognition of the species in the region from Himalaya to SW China through Tibet, Assam, and Burma. For the purposes, I have carried out the following works: 1) distinction between Leptostylae and Closterostylae, 2) a taxonomical revision of the species of section Closterostylae distributed in Himalaya and adjacent regions, and 3) a taxonomical revision of section Leptostylae.

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CONTENTS

SUMMARY

GENERAL INTRODUCTION

ACKNOWLEDGEMENT

Part 1. Distinction between section *Leptostylae* and section

Closterostylae

INTRODUCTION	2
MATERIALS AND METHODS	3
OBSERVATION	4
a. Development of pistils	4
b. Stipules of radical leaves	6
c. Branching of flowering stems	7
DISCUSSION	8
TAXONOMIC TREATMENT	10
REFERENCES	12

Part 2. A systematic revision of *Potentilla lineata* and allied species (Rosaceae) in the Himalaya and adjacent regions

INTRODUCTION	1
MATERIAL AND METHODS	2
RESULT AND DISCUSSION	3
I. Morphology of the five species of the <i>P. lineata</i> group	4
1. Stipules of radical leaves	4
2. Base of uppermost leaflet pair	5
3. Hairiness of peduncles	5
4. Hairiness of lower surface of leaf	5
5. Stigma	5

6. Other	6
II. Chromosome numbers	6
TAXONOMIC TREATMENT	6
<u>Potentilla lineata</u> and allied species in the Himalaya and adjacent regions	6
Key to species	7
Description of species	8
1. <u>P. festiva</u> Soják	8
2. <u>P. josephiana</u> H. Ikeda et H. Ohba	12
3. <u>P. lineata</u> Trev.	15
4. <u>P. fallens</u> Card.	26
5. <u>P. polyphylla</u> Wall. ex Lehm.	28
Putative hybrids in Nepal Himalaya	41
1. <u>P. x polyjosephiana</u> H. Ikeda et H. Ohba	42
2. Putative hybrid of <u>P. lineata</u> and <u>P. festiva</u>	44
3. Putative hybrid of <u>P. lineata</u> and <u>P. polyphylla</u>	45
4. Putative hybrid of <u>P. festiva</u> and <u>P. polyphylla</u>	46
REFERENCES	48

Part 3. A systematic revision of genus Potentilla L. section

Leptostylae (Rosaceae)

I. INTRODUCTION	1
II. HISTORY	2
III. MATERIALS AND METHODS	5
IV. RESULTS AND DISCUSSIONS	5
A. Comparisons of morphological characters	5
1. Life forms based on the branching pattern	5
2. Stipules of radical leaves	8

3. Stipules of cauline leaves	8
4. Inflorescence	9
5. Number of stamens	9
B. Chromosome numbers	10
V. SYSTEMATIC TREATMENTS	12
Key to the subsection, series and species of section	
Leptostylae	12
Species of section Leptostylae in Himalaya, Tibet, SW	
China and Burma	14
Description of species	16
A. Subsection Microphyllae	16
i. Series Lineatae H. Ikeda et H. Ohba	16
ii. Series Microphyllae Yū et C. Li	16
1. <i>P. microphylla</i> D. Don	16
2. <i>P. aristata</i> Soják	22
3. <i>P. stenophylla</i> (Franch.) Diels	24
4. <i>P. turfosa</i> Hand.-Mazz.	32
5. <i>P. turfosooides</i> H. Ikeda et H. Ohba	34
6. <i>P. makaluensis</i> H. Ikeda et H. Ohba	36
7. <i>P. glabriuscula</i> (Yū et C. Li) Soják	38
iii. Series Pedunculatae Yū et C. Li	41
8. <i>P. peduncularis</i> D. Don	41
9. <i>P. contigua</i> Soják	49
10. <i>P. cardotiana</i> Hand.-Mazz.	51
11. <i>P. tristis</i> Soják	54
12. <i>P. commutata</i> Lehm.	56
iv. Series Leuconotae H. Ikeda et H. Ohba	59
13. <i>P. leuconota</i> D. Don	59

14. <i>P. montisvictoriae</i> H. Ikeda et H. Ohba	64
15. <i>P. wenchuensis</i> H. Ikeda et H. Ohba	65
B. Subsection <i>Leptostylae</i>	67
v. Series <i>Leptostylae</i>	67
16. <i>P. anserina</i> L.	67
17. <i>P. gombalana</i> Hand.-Mazz.	69
vi. Series <i>Smithianae</i> H. Ikeda et H. Ohba	71
18. <i>P. smithiana</i> Hand.-Mazz.	72
19. <i>P. taronensis</i> Wu ex Yü et C. Li	72
VI. REFERENCES	74
APPENDIX	

Part 1

Distinction between section *Leptostylae* and
section *Closterostylae*

INTRODUCTION

Section *Closterostylae* was characterized by the basal and spindle-shaped styles, and section *Leptostylae* by the lateral and rod-shaped styles (Wolf 1908). Yü & Li (1980, 1985) raised Wolf's sections and subsections to subgenera and sections.

In *Closterostylae* Wolf (1908) recognized only two species, *P. polyphylla* and *P. lineata* (as *P. fulgens*) from Himalayan region. Kalkman (1968) noted the relationship between *P. polyphylla* in *Closterostylae* and SE Asian species of *Leptostylae*, and wrote: "I do not see sufficient reason to separate them so widely". Ikeda & Ohba (1993) revised the Himalayan species of *Closterostylae*, and noticed that *P. polyphylla* var. *interrupta* has styles of which the position and shape show an intermediate state between *Closterostylae* and *Leptostylae* (Ikeda & Ohba 1993). It is possible that the Himalayan species of *Closterostylae* are closely related to those of *Leptostylae*.

In order to clarify the distinction between these two sections, the position and shape of styles and other morphological characters are observed.

MATERIALS AND METHODS

Development of pistils were observed by a light microscope and a scanning electron microscope (SEM). Flowering buds of *P. polyphylla* Wall. ex Lehm. (section *Closterostylae*), *P. peduncularis* D. Don (sect. *Leptostylae*) and *P. sundaica* (Bl.) Wight et Arn. (sect. *Potentilla*) from young stage to anthesis were collected and fixed in 50% FAA (formalin-acetic acid-50% alcohol) in the field. For preparing the observation of light microscope, the fixed samples were dehydrated through a *t*-butyl alcohol series, and embedded in Paraplast with a melting point 56-58° C. The samples were sectioned with a rotary microtome following standard paraffin methods. Sections cut at about 6-10 μ m thickness were stained with safranin and fast green FCF, and mounted with Entellan. For preparing the observation of scanning electron microscope, the samples were dehydrated in an ethanol series and dried by applying critical-point methods. Calyces, epicalyces, petals and stamens of the samples were removed and mounted on stubs with double-sided scotch tape. Such samples were coated with gold and observed using a SEM (HITACHI S-700).

Pistils of ten species of *Closterostylae* and eighteen species of *Leptostylae* were taken from herbarium specimens and observed under a binocular microscope and drawn by the aid of

camera lucida after boiling in water (Table 1).

Stipules of radical leaves were observed by a binocular microscope and a light microscope. Petioles with stipules of all the species listed in Table 1 were observed under a binocular microscope after boiling in water. These of P. leuconota D. Don and P. microphylla D. Don (these in section Leptostylae), P. arguta Pursh (American species, sect. Closterostylae), P. lineata (Himalayan species, sect. Closterostylae) and P. freyniana Bornm. (sect. Potentilla) were sectioned, stained and observed by light microscope through the methods mentioned above from fixed samples in FAA (P. microphylla, P. freyniana and P. lineata) and from herbarium specimens (P. leuconota and P. arguta).

Branching and derivation of flowering stems of the species listed in Table 1 were examined by herbarium specimens.

OBSERVATION

a. Development of pistils

1. Potentilla polyphylla

In young flowering buds pistils formed on a dome-shaped receptacle and arranged from bottom to top spirally (Fig. 1a). In this stage, pistil primordia are hemispheric and styles could not be recognized (Fig. 1c).

Then, the pistils elongated longitudinally. The upper part was slightly constricted. The slender parts inclined towards center of the receptacle (Figs. 1b & 1d), and became a style. The inclination in upper parts of pistils was caused by increasing of the number of cells at dorsal region of the pistils.

Being pistils bigger, the styles were apparently differentiated from ovaries, and situated at upper part of ventral side of the ovaries (Fig. 2a). Epidermal cells of the styles swelled and elongated (Fig. 2c).

At anthesis the top of styles inflated and has stigmatic papilla. The ovaries grew remarkably in longitudinal direction and the epidermis of styles swelled remarkably at middle portion. As a result, the styles became basal and spindle-shaped (Figs. 2b & 2d).

2. Potentilla peduncularis

Initial stage of development of the pistils was the same as P. polyphylla (Fig. 3). The styles were situated at upper part of ventral side of the ovaries (Fig. 4a). In longitudinal direction the growth of ovaries was not conspicuous, and the epidermal cells did not swell. The styles became lateral and rod-shapes (Figs. 4b & 4d).

3. Potentilla sundaica

Initial stage of development of the pistils was the same as P. polyphylla and P. peduncularis (Fig. 5). The styles were

situated at upper part of ventral side of the ovaries (Fig. 5a). The epidermal cells of styles swelled (Fig. 6a), especially at the base (Figs. 6b & 6c). The swollen part of the styles very closed to the ovaries (Figs. 6c & 6d).

b. Stipules of radical leaves

The stipules of radical leaves were highly connate to the petioles. Four types of the auricles were recognized in Leptostylae and Closterostylae (Figs. 7 & 8).

A-type. The auricles are situated at lateral side of the petioles (Fig. 7a).

B-type. Two auricles are situated at adaxial side of the petioles and not connate at base (Fig. 7b).

C-type. Two auricles are situated at adaxial side of the petioles and connate each other on their inner side (Fig. 8a).

D-type. Single auricle is situated at adaxial side of the petiole (Fig. 8b).

Figure 9 shows the cross section of petiole base of P. freyniana, in sect. Potentilla with A-type stipules. In cross section the petiole narrowed gradually towards both sides and the stipular part was not distinguished from the petiole proper (Figs. 9a, 9b). Sclerenchymatous cell layer was formed at the lateral side of the petiole and the inner side of base of auricles (Figs. 9c-9f). Figure 10 shows the cross section of the petiole base of P. arguta, an American species of

sect. *Closterostylae*, with A-type stipules (Fig. 10). This species was similar to *P. freyniana* in the stipule morphology.

Figure 11 shows the cross section of the petiole base of *P. leuconota*. Himalayan species of *Leptostylae* with C-type stipules. At lower part the petioles were semi-orbicular in cross sections. The narrow, lateral portion was regarded as a part of stipules, and not distinguished from the petiole proper (Figs. 11a & 11b). In the upper portion sclerenchymatous cells were found at the base of stipules (Figs. 11c-f). The stipules were situated at adaxial portion of the petioles (Figs. 11g-p).

Figure 12 shows cross section of the petiole base of *P. microphylla*. Himalayan species of *Leptostylae* with B-type stipules. The anatomical features were similar to those of *P. leuconota*. Two auricles were situated at adaxial side of the petiole and free from the base (Fig. 12f).

Figure 13 shows cross section of the petiole base of *P. lineata*. Himalayan species of *Closterostylae* with B-type stipules. The anatomical features were similar to those of *P. leuconota* and *P. microphylla*, but the auricles overlapped (Fig. 13f).

c. Branching of flowering stems

There were found two types of branching in the species of *Leptostylae* and *Closterostylae* (Fig. 14). The species of

Closterostylae except for the Himalayan species had aerial, simple stems terminating a flower or an inflorescence. The aerial stems were directly derived from the main stems (Fig. 14, upper). The Himalayan species of Closterostylae as well as the species of Leptostylae had aerial stems similar to those mentioned above. But the stems were appeared from the axils of rosulate leaves and the main stems did not elongate and remained through several years (Fig. 14, lower).

DISCUSSION

The position and the shape of styles are mainly decided in the final stage of development of pistils. The basal style as observed in *P. polyphylla* is derived from the differences of the number of cells between dorsal and ventral side of ovaries and also remarkable elongation of the ovaries. The spindle-shaped styles depends on the size of epidermal cells. In *P. polyphylla* the epidermal cells swelled remarkably at the middle part of the styles. While in the rod-shaped styles of *P. peduncularis* the epidermal cells did not conspicuously swell.

Figure 15 shows the pistils of 28 species of Leptostylae and Closterostylae. Pistils of Closterostylae except the

Himalayan species are a-e, the Himalayan species in Closterostylae f-j and Leptostylae k-ab. Figure 15 indicates that the styles can not be clearly separated into two or several groups by the differences of the position (basal or lateral) and the shape (spindle- or rod-shaped). It is obvious that Closterostylae and Leptostylae can not be distinguished by the differences in position and shape of styles.

Figure 16 is the schematic figure of the four types of stipules. Shaded parts indicate the auricles. Auricles of A-type are located at the lateral side of petioles. The species in Closterostylae except for the Himalayan species have A-type stipules. In B-, C- and D-types, the auricles are located at the adaxial side of petioles. B-, C- and D-types are observed only in the species of Leptostylae and the Himalayan species of Closterostylae. Difference between A-type and other types is clear, and no intermediate state can be observed.

The close relationship between the species of Leptostylae and the Himalayan species of Closterostylae is indicated the derivation of the aerial stems. That is, they have the main stems which always remain near the ground, and the aerial stems terminating flowers elongate from the axils of rosulate leaves. Except for the Himalayan species, the species of Closterostylae have the main stem which directly become terminal flowers and some cauline leaves. There is no exception between these two types of derivation.

As conclusion the Himalayan species of *Closterostylae* are apparently more close to the species of *Leptostylae* than the remaining species of *Closterostylae*. Except these two, no other character applicable to infrageneric delimitation is found.

TAXONOMIC TREATMENT

According to the results, the Himalayan species previously classified in section *Closterostylae* are transferred to section *Leptostylae*. Differences between *Closterostylae* (emend.) and *Leptostylae* are shown in the following key.

Key to the sect. *Leptostylae* and sect. *Closterostylae*

1. Auricles of stipules of radical leaves located at the adaxial side of petioles; main stems always remain near the ground, aerial stems with terminal flowers elongate from the axils of rosulate leaves Sect. *Leptostylae*
1. Auricles of stipules of radical leaves located at the lateral side of petioles; main stems becoming aerial stems with terminal flowers Sect. *Closterostylae*

The species and a putative hybrid which are transferred to sect. *Leptostylae* are listed below.

1. *Potentilla fallens* Card. in Lecomte, Not. Syst. 3: 232 (1914). H. Ikeda & H. Ohba in Bot. J. Linn. Soc. 112: 174 (1993).
2. *Potentilla lineata* Trev. in Ind. Sem. Vatislav. 1822 (1822). H. Ikeda & H. Ohba in Bot. J. Linn. Soc. 112: 169 (1993).
3. *Potentilla josephiana* H. Ikeda et H. Ohba in Bot. J. Linn. Soc. 112: 168 (1993).
4. *Potentilla festiva* Soják in Candollea 43: 166 (1988). H. Ikeda & H. Ohba in Bot. J. Linn. Soc. 112: 166 (1993).
5. *Potentilla polyphylla* Wall. [Cat. 28, n. 1026 (1829), nom. nud.] ex Lehm., Pugill. 3: 13 (1831). H. Ikeda & H. Ohba in Bot. J. Linn. Soc. 112: 176 (1993).
var. *polyphylla*
var. *himalaica* H. Ikeda et H. Ohba in Bot. J. Linn. Soc. 112: 179 (1993).
var. *interrupta* (Yü et C. Li) H. Ikeda et H. Ohba in Bot. J. Linn. Soc. 112: 179 (1993).
var. *barbata* Lehm., Rev. Pot. 54 (1856). H. Ikeda & H. Ohba in Bot. J. Linn. Soc. 112: 182 (1993).
6. *Potentilla* x *polyjosephiana* H. Ikeda et H. Ohba in Bot. J. Linn. Soc. 112: 183 (1993).

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Table 1. Species and specimens examined¹.

Section *Closterostylae* except Himalayan species.

1. *P. arguta* Pursh
 Canada. Quebec, Ville-Marie (Marie-Victorin et al. 44956, 18 Aug. 1933, TI); Quebec - New Brunswick boundary (Rousseau 32340, 7 Aug. 1929, TI).
 N America. Pennsylvania, Bradford County, Wyalusing Rocks, along Susquehanna River, 0.5 mile NW of Wyalusing (Fosberg 15132, 8 June 1938, GH); Oklahoma, Comanche Co., Fort Sill (Clemens 11611, 25 May 1916, GH); New York State, Tioga County, Barton Tp., SW of Barton (Clausen et al. 7067, 12 June 1947, GH); S Dakota, Lawrence County, Tilford (Palmer 37325, 16 June 1929, GH); Wisconsin, Green County, 3 miles SW of Albany, 900 ft. (Barrell 25d-56, 8 Sept. 1956, GH); Colorado, Duray (Woodward s.n., May 1883, GH); loc. cit., Elpaso Co., Black Forrest 9 miles E of Monument (Weber & Jones 11575, 1 Aug. 1962, GH); S Conneticut, East Rock, New Haven (Eames s.n., 26 July 1896, GH); Illinois, Cook Co., Stony Island (Smith 5921, 25 June 1914, GH); Indiana, Lawrence County, 2 miles NW of Heltonville (Kriebel 5388, 29 June 1938, GH); Kansas, Chautauqua Co., Rocky Woods (Hitchcock 674 in 1896, GH); Aroostook Co., valley of Aroostook River (Williams et al. s.n., 16 July 1902, GH); Maryland, Baltimore County, Dulaney Valley Road, 2 miles N of Towson (Baltars 1520, 26 July 1957, GH); Massachusetts, Hampden County, Wilbraham, Wilbraham Mt. (Seymour 676, 26 July 1927, GH); Michigan, Keweenaw County, by Lake Superior, near Copper Harbor (Fernald & Pease 3377, 4 July 1934, GH); Gilsom (Fernald 90, 12 July 1899, GH); New Jersey, Ramapo Mts., near Mahway (Griscom 9200, 20 July 1919, GH); New Mexico, Colfax Co., 7500 ft. (John 86, June 1896, GH); Minneapolis, Duluth, Shester Park Hill at Skyline Parkway (Lakela 2572, 23 June 1938, GH); Montana, near Missonla (Collins s.n., 7 June 1918, GH); Saunders County, Nebraska 5 miles N of Valpariso (Birkholz 2311, 28 June 1968, GH).
2. *P. fussa* Nutt.
 N America. Wyoming, Big Horn Co., 10-15 miles east of Kane, 7500 ft. (Williams & Williams 3019, 19 June 1936, GH).
3. *P. glandulosa* Lindl.
 N America. Colorado, Clear Creek County, Brookvale, Rocky Mts. (Churchill s.n., 12 June 1918, GH); Wyoming, Park Co., Shoshone National Forrest, Crazy Woman Creek, 8000 ft. (Williams & Williams 3527, 12 July 1937, GH); Idaho, road to Red River Hot Springs, SE of Elk City (Jones 29, 15 June 1950, GH); Nevada, Washoe Co., 2 miles E of Incline, Lake Tahoe (Miller 149, 21 June 1937, GH); loc. cit., Humboldt Co., 1 mile N of Blue Lake, Pine Forrest Mts., 75 miles NW of Winnemucca., 8000 ft. (Cronquist 8658, 9 July 1959, GH); Montana, Ekalake (Lovisik 504, 3 July 1937, GH); NW America, between Pendleton and La Grande, Ore, summit of Blue Mts. (Thompson 4748, 14 June 1928, GH); California,

¹ Abbreviations are according to Index Herbariorum, Part 1 (Holmgren et al. 1990).

Table 1 (continued).

Monterey County, Pacific Grove (Heller s.n., 4 May 1903, GH); south Dakota, Custer County, 4 miles E. Custer (Stephens & Brooks 31610, 7 June 1969, GH); Utah, Salt Lake County, Wasatch Mts., Lambs Canyon, 8275 ft. (Vickery Jr. 2073, 10 May 1958, GH); Grant Co., Northrup Canyon, east wall Upper Grand Coulee (Gaines & Scheffer 574, 31 May 1951, GH);

4. P. oregana Nutt.
N America: Montana Carbon County, Beartooth Mts., 8500 ft. (Pennell et al. 23919, 2 Aug. 1938, GH).
5. P. rupestris L.
France. Pyrénées, Gedre (bordere s.n., June 1864, TI).
Sweden. Without precise locality (collector unknown s.n., TI); Upsala, Vestrogathia (collector unknown s.n., TI).
France. Without precise locality (collector unknown a.n., TI).
N America. S Idaho, Bithrort Mts. (Kriften 4860, July 1894, GH).

Himalayan species in sect. *Closterostylae*.²

1. P. fallens Card.
2. P. festiva Soják
3. P. josephiana H. Ikeda et H. Ohba
4. P. lineata Trev.
5. P. polyphylla Wall. ex Lehm.

Section *Leptostylae*.³

1. P. anserina L.
2. P. aristata Soják
3. P. cardotiana Hand.-Mazz.
4. P. commutata Lehm.
5. P. contigua Soják
6. P. glabriuscula (Yü et C. Li) Soják
7. P. gombalana Hand.-Mazz.
8. P. leuconota D. Don
9. P. makaluensis H. Ikeda et H. Ohba
10. P. microphylla D. Don
11. P. montisvictoriae H. Ikeda et H. Ohba
12. P. peduncularis D. Don
13. P. smithiana Hand.-Mazz.
14. P. stenophylla (Franch.) Diels
15. P. taronensis Wu ex Yü et C. Li
16. P. tristis Soják
17. P. turfosa Hand.-Mazz.
18. P. turfosoides H. Ikeda et H. Ohba
19. P. wenchuensis H. Ikeda et H. Ohba

² Examined specimens are listed in the second part.

³ Examined specimens are listed in the third part.

EXPLANATION OF FIGURES

- Fig. 1. Development of pistils of Potentilla polyphylla (1). Bars indicate 50 μ m.
- Fig. 2. Development of pistils of Potentilla polyphylla (2). Bars indicate 0.2 mm.
- Fig. 3. Development of pistils of Potentilla peduncularis (1). Bars indicate 50 μ m.
- Fig. 4. Development of pistils of Potentilla peduncularis (2). Bars indicate 0.2 mm.
- Fig. 5. Development of pistils of Potentilla sundaica (1). Bars indicate 50 μ m.
- Fig. 6. Development of pistils of Potentilla sundaica (2). Bars indicate 0.2 mm.
- Fig. 7. Stipules of radical leaves (1). Left: A-type (Potentilla arguta). Right: B-type (P. stenophylla var. stenophylla). Arrows indicate the base of stipules.
- Fig. 8. Stipules of radical leaves (2). Left: C-type (Potentilla leuconota var. leuconota). Right: D-type (P. glabriuscula var. glabriuscula). Between arrows indicate auricles.
- Fig. 9. Cross sections of stipules and petioles of Potentilla freyniana. Bars indicate 0.25 mm.
- Fig. 10. Cross sections of stipules and petioles of Potentilla arguta. Bars indicate 0.25 mm.
- Fig. 11. Cross sections of stipules and petioles of Potentilla leuconota. Bars indicate 0.25 mm.
- Fig. 12. Cross sections of stipules and petioles of Potentilla microphylla. Bars indicate 0.25 mm.
- Fig. 13. Cross sections of stipules and petioles of Potentilla lineata. Bars indicate 0.25 mm.
- Fig. 14. Branching of flowering stems. Upper: Closterostylae except Himalayan species. Lower: Leptostylae and Himalayan species in Closterostylae. Arrows in photographs indicate apex of the main stems. Ovals, circles and triangles indicate leaves, flowers and apex of the main stems respectively.

Fig. 15. Pistils of Leptostylae and Closterostylae. a-e. Closterostylae except Himalayan species. a. Potentilla fussa. b. P. rupestris. c. P. glandulosa. d. P. arguta. e. P. grexana. f-j. Himalayan species in Closterostylae. f. P. polyphylla. g. P. lineata. h. P. festiva. i. P. josephiana. j. P. fallens. k-ab. Leptostylae. k. P. leuconota. l. P. commutata. m. P. montisvictoriae. n. P. glabriuscula. o. P. turfosa. p. P. turfoides. q. P. wenchuensis. r. P. makaluensis. s. P. tristis. t. P. cardotiana. u. P. microphylla. v. P. aristata. w. P. stenophylla. x. P. anserina. y. P. peduncularis. z. P. contigua. aa. P. gombalana. ab. P. smithiana. Bar indicates 1 mm.

Fig. 16. Schematic figure of four types of stipules. a: A-type. b: B-type. c: C-type. d: D-type.

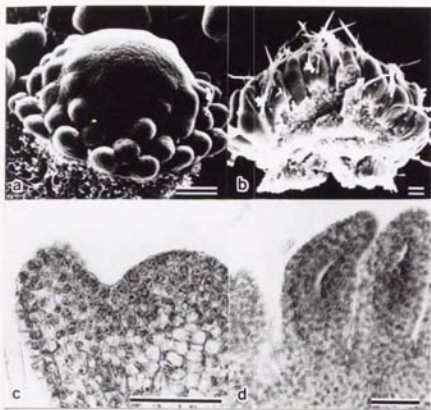


Fig. 1. Development of pistils of *Potentilla polyphylla* (1).
Bars indicate 50 μ m.

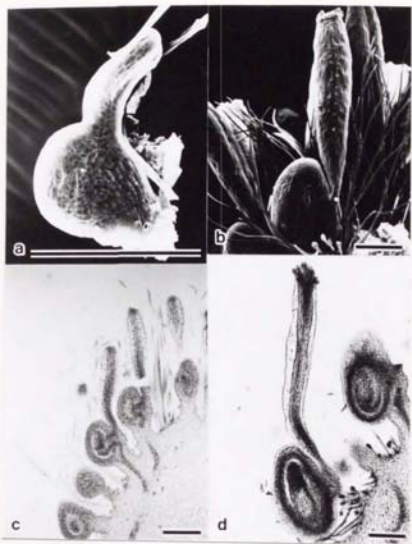


Fig. 2. Development of pistils of *Potentilla polyphylla* (2).
Bars indicate 0.2 mm.

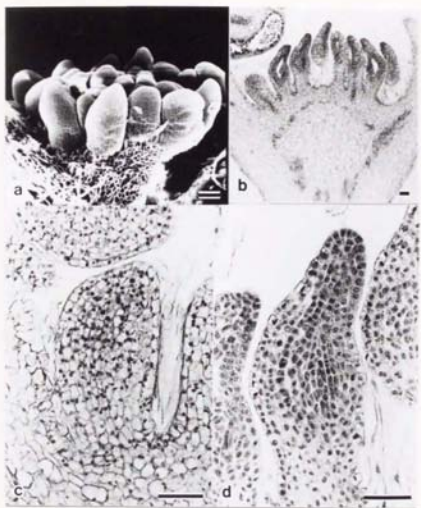


Fig. 3. Development of pistils of *Potentilla peduncularis* (1).
Bars indicate 50 μm .

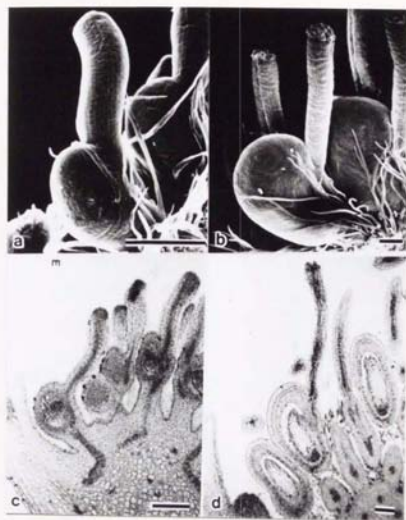


Fig. 4. Development of pistils of *Potentilla peduncularis* (2).
Bars indicate 0.2 mm.

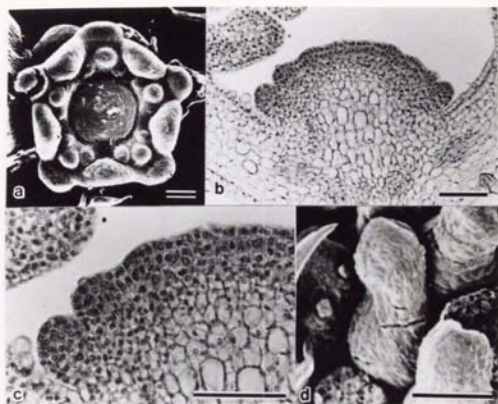


Fig. 5. Development of pistils of *Potentilla sundaica* (1).
Bars indicate 50 μ m.

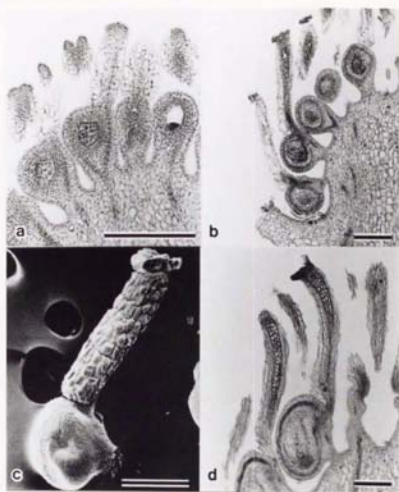


Fig. 6. Development of pistils of *Potentilla sundaica* (2).
Bars indicate 0.2 mm.

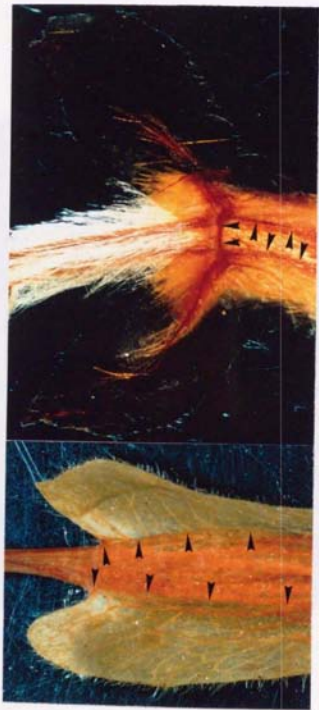


Fig. 7. Stipules of radical leaves (1). Left: A-type (*Potentilla araguta*). Right: B-type (*P. stenophylla* var. *stenophylla*). Arrows indicate the base of stipules.



Fig. 8. Stipules of radical leaves (2). Left: C-type (*Potentilla leuconota* var. *leuconota*). Right: D-type (*P. glaberrimula* var. *glaberrimula*). Between arrows indicate auricles.

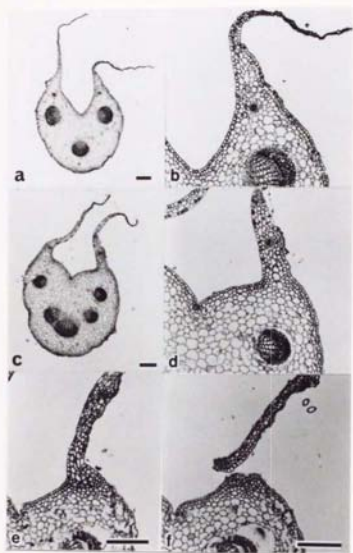


Fig. 9. Cross sections of stipules and petioles of *Potentilla freyniana*. Bars indicate 0.25 mm.

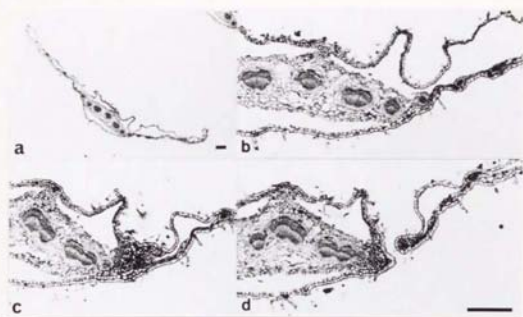


Fig. 10. Cross sections of stipules and petioles of Potentilla arguta. Bars indicate 0.25 mm.

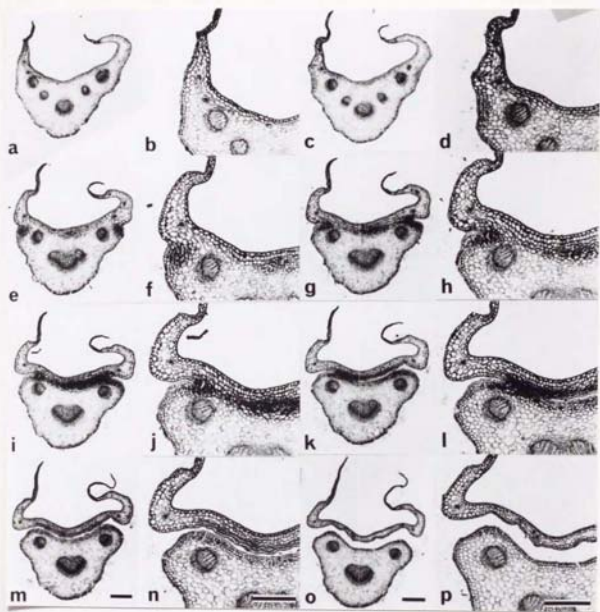


Fig. 11. Cross sections of stipules and petioles of *Potentilla leuconota*. Bars indicate 0.25 mm.

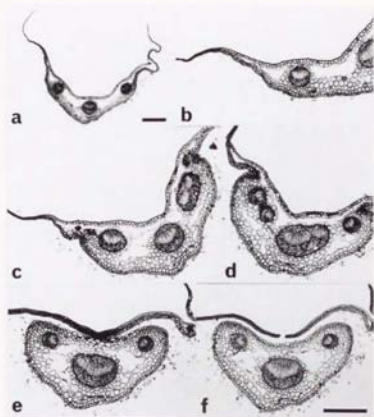


Fig. 12. Cross sections of stipules and petioles of *Potentilla micronhylla*. Bars indicate 0.25 mm.

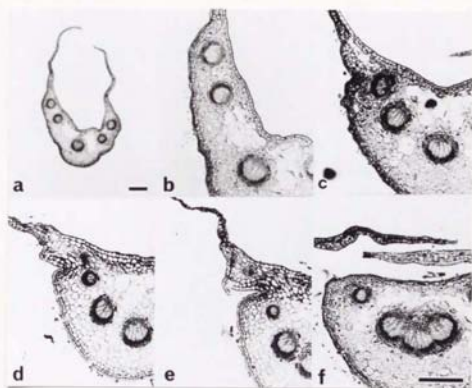


Fig. 13. Cross sections of stipules and petioles of *Potentilla lineata*. Bars indicate 0.25 mm.

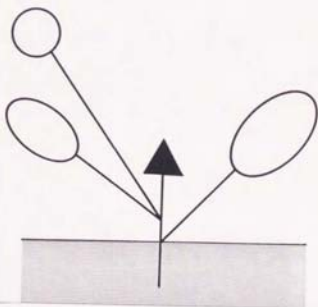
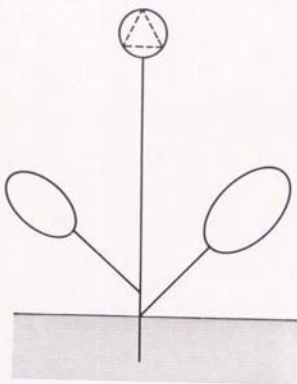


Fig. 14. Branching of flowering stems. Upper: Closterostylae except Himalayan species. Lower: Leptostylae and Himalayan species in Closterostylae. Arrows in photographs indicate apex of the main stems. Ovals, circles and triangles indicate leaves, flowers and apex of the main stems respectively.

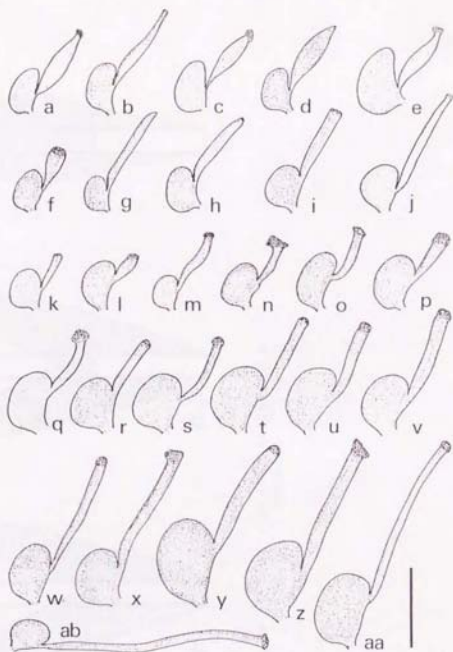


Fig. 15. Pistils of Leptostylae and Closterostylae. a-e. Closterostylae except Himalayan species. a. *Potentilla fussa*. b. *P. rupestris*. c. *P. glandulosa*. d. *P. arguta*. e. *P. oregana*. f-j. Himalayan species in Closterostylae. f. *P. polyphylla*. g. *P. lineata*. h. *P. festiva*. i. *P. josephiana*. j. *P. fallens*. k-ab. Leptostylae. k. *P. leuconota*. l. *P. commutata*. m. *P. montisvictoriae*. n. *P. glabriuscula*. o. *P. turfosa*. p. *P. turfosoides*. q. *P. wenchuensis*. r. *P. makaluensis*. s. *P. tristis*. t. *P. cardotiana*. u. *P. microphylla*. v. *P. aristata*. w. *P. stenophylla*. x. *P. anserina*. y. *P. peduncularis*. z. *P. contigua*. aa. *P. gombalana*. ab. *P. smithiana*. Bar indicates 1 mm.

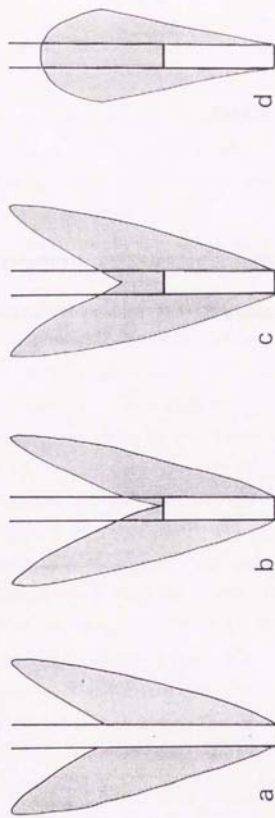


Fig. 16. Schematic figure of four types of stipules. a: A-type. b: B-type. c: C-type. d: D-type.

A systematic revision of Potentilla lineata and allied species (Rosaceae) in the Himalaya and adjacent regions

INTRODUCTION

Potentilla lineata Trev. and its allied species are characterized by the interrupted pinnate leaves and basistyls. According to Wolf (1908), these are classified in section Closterostylae, which is concentrated in the region from the Himalaya to SW China through Tibet, Yunnan, and in SE Asia in N Burma, Java and Borneo.

The species of the P. lineata group have been little studied and their circumscription is often very imperfectly understood. Lehmann (1856) recognized three species in this group, P. fulgens Wall. ex Hook. (= P. lineata Trev.), P. polyphylla Wall. ex Lehm. with β barbata which was published first as a species, P. barbata Wall. [Cat. Pl. 28, no. 1030 (1829), nom. nud.], and P. mooniana Wight. Hooker (1878) classified this group into two species, P. fulgens and P. mooniana, and treated P. polyphylla as a synonym of P. mooniana. He placed var. intermedia in P. fulgens, because the indumentum of the leaf beneath was intermediate between P. fulgens and P. mooniana. Wolf (1908) recognized P. fulgens with var. intermedia and P. polyphylla with var. barbata in this group, and treated P. mooniana as a synonym of P. polyphylla. He speculated that P. fulgens var. intermedia might be the result of hybridization between P. fulgens and P. polyphylla.

Ohashi (1979), in a list of Nepalese Potentilla, treated P. fulgens var. intermedia as a synonym of P. fulgens, and P.

mooniana and *P. polyphylla* var. *barbata* as synonyms of *P. polyphylla*. Yü & Li (1985) recognized three species in this group, *P. fulgens* with var. *acutiserrata* Yü et Li, *P. polyphylla* and *P. fallens* Card. *Potentilla fallens* was described from a specimen collected in Yunnan. Grierson & Long (1987) treated *P. lineata* var. *intermedia* as a minor variation of *P. lineata*.

Soják (1988b) suggested that *P. lineata* var. *intermedia* was identical with *P. interrupta* Yü et Li, which was classified in sect. *Leptostylae* by Yü & Li (1985).

Soják (1988a) described *P. festiva* on the basis of the connate auricles of the stipules and peduncles without glandular hairs versus the separate auricles of the stipules and glandular-hairy peduncles of *P. lineata*.

In spite of former studies, the knowledge of the species in this group is insufficient and a revision of their taxonomy is still needed. At present the variation and stability of characters of each species has not been accurately assessed. Chromosome numbers are also thought to be useful for recognizing species.

This paper aims to clarify the morphological and cytological features of each species of the *P. lineata* group in the Himalaya, Tibet and SW China mainly from our field research in Nepal Himalaya and also from examination of herbarium specimens.

MATERIAL AND METHODS

We have observed Potentilla at several localities in east and central Nepal, in particular, nearly 500 specimens collected from the Jaljale Himal of east Nepal, at elevations from 1900 m to 4200 m. Morphological characters and variation were studied from herbarium specimens at A, B, BM, DR, E, K, KYO, L, NY, P, PE, TI, TNS and US.

Chromosome numbers from root tips of 68 individuals collected from Nepal were counted. Root tips were pretreated in 2 mM 8-hydroxyquinoline solution for 2-3 hours and fixed in Newcomer's fluid in the field. Root tips were macerated in 1N HCl at 60°C for 10.5 minutes and stained with 2% lacto-propionic orcein and squashed for cytological observation.

The samples for scanning electron microscope were collected and fixed in FAA (formalin - acetic acid - 50 % alcohol) in the field. The fixed samples were dehydrated in an alcohol series and dried by applying critical-point methods. The dried samples were mounted on stubs with double sided scotch tape and coated with gold and observed using a scanning electron microscope (HITACHI S-700).

RESULT AND DISCUSSION

After comparisons of morphological characters, five species are recognized in the P. lineata group in the Himalaya and adjacent regions: P. festiva Soják; P. josephiana H. Ikeda et H.

Ohba; *P. lineata* Trev.; *P. fallens* Card; and *P. polyphylla* Wall. ex Lehm. *Potentilla josephiana* is a new name for *P. fulgens* var. *intermedia* Hook. f.

Four varieties are recognized in *P. polyphylla*: var. *polyphylla*; var. *himalaica* H. Ikeda et H. Ohba; var. *interrupta* (Yü et Li) H. Ikeda et H. Ohba; and var. *barbata* Lehm. Var. *himalaica* is a new variety and var. *interrupta* is a new status and combination for *P. interrupta* Yü et Li.

Potentilla polyphylla var. *kinabaluensis* (Stapf) Kalkman was described from Mt. Kinabalu, Borneo (Kalkman 1968). The variety is distributed out of Himalaya and adjacent regions and this time we could examine only one specimens of the variety.

Four putative hybrids between the species are also recognized.

I. Morphology of the five species of the *P. lineata* group

1. Stipules of radical leaves

Stipules of radical leaves of *Potentilla* are adnate with the petioles in lower half and free from the petioles in upper half. The free part of stipules are called as "auricles of stipules" and usually each leaf has two auricles. *Potentilla festiva* has auricles of the stipules connate from the base to the middle, at least basally (Fig. 1). On the other hand, *P. josephiana*, *P. lineata*, *P. polyphylla* and *P. fallens* have auricles of the stipules free from each other and not connate as in *P. festiva* (Fig. 2), though the basal parts sometimes overlap. There is no

intermediate state between them.

2. Base of uppermost leaflet pair

The base of the uppermost leaflet pair of *P. josephiana* is decurrent (Fig. 3) while that of *P. festiva*, *P. lineata*, and *P. polyphylla* are apparently cuneate (Fig. 4) and that of *P. fallens* is truncate to cordate. This character has been ignored, but well characterizes *P. josephiana*.

3. Hairiness of peduncles

Potentilla lineata and *P. fallens* have multicellular hairs with glandular tips and straight unicellular hairs on the peduncles (Fig. 5). The length of the glandular hairs is nearly the same or longer than the unicellular hairs. *Potentilla festiva*, *P. josephiana* and *P. polyphylla* usually have only unicellular hairs (Fig. 6) and occasionally also minute glandular hairs, but the length of the glandular hairs is much shorter than the unicellular hairs. These hair features are constant, and no intermediates are found.

4. Hairiness of lower surface of leaf

The lower surface of the leaves of *P. festiva* and *P. lineata* is sericeous, but strigose or villose in *P. josephiana*, *P. polyphylla* and *P. fallens*. In *P. polyphylla* hairiness varies from dense to sparse.

5. Stigma

Potentilla festiva, *P. josephiana*, *P. polyphylla* and *P. fallens* have inflated stigmas with numerous multicellular

papillae (Fig. 7). The stigma of *P. lineata* is smooth without multicellular papillae (Fig. 8).

6. Other

Variation of other morphological characters is noted in the description and notes under each species.

II. Chromosome numbers

Table 1 shows the chromosome numbers of the four species and three putative hybrids. The length of chromosomes were 2-5 um and all chromosomes have centromeres. Some chromosomes have satellites. Karyological studies could not be done.

The chromosome number is constant in each taxon and a polyploid series is found in this group. The somatic chromosome number of *P. lineata* is 14 (diploid) (Fig. 9), *P. festiva* and *P. polyphylla* are 28 (tetraploid) (Figs. 10 & 11), *P. josephiana* is 42 (hexaploid) (Fig. 12). The chromosome numbers remained the same in the varieties of *P. polyphylla*. The presumed hybrids show an intermediate number of chromosomes between the putative parents.

TAXONOMIC TREATMENT

Potentilla lineata and allied species in the Himalaya and adjacent regions

Perennial acaulescent herb with thick simple or sometimes branched rootstocks. Radical leaves imparipinnate, petiolate,

forming a rosette; lateral leaflets gradually reduced in size towards base, usually with alternating small leaflets. Stipules adnate to the petioles; auricles free or connate.

Peduncles from axils of radical leaves, with 2-5 cauline leaves. Cauline leaves imparipinnate. Stipules adnate to the petioles; auricles free, triangular to ovate, serrate.

Flowers in a dichasium, actinomorphic. Episepals 5, entire or serrate with 3-6 teeth. Sepals 5, entire or serrate with 2-3 teeth. Petals 5, spreading, bright yellow, oblong to broad obovate, apex round or retuse.

Stamens 20, in 3 whorls; alternipetalous ones 5, from the inner whole longer than others; oppositipetalous 5, from the middle whole the shortest; those located between petals and sepals 10, from the outer whole. Anthers globose, ellipsoid or ovoid, sub-basal, with 4 locules, yellow before dehiscence. Pistils crowded on receptacles. Ovaries ellipsoid to ovoid, smooth. Styles lateral to basal, slender or sometimes slightly swollen at middle. Stigmas slightly inflated and papillate or not inflated without papilla. Placenta located at ventro-lateral side near style base.

Key to species

- 1 Two auricles of stipules of radical leaves connate each other from the base to the middle 1 P. festiva
- 1 Two auricles of stipules of radical leaves free from each other

2 Base of uppermost leaflet pair decurrent

2 *P. josephiana*

2 Base of uppermost leaflet pair cuneate

3 Peduncles and hypanthia with multicellular hairs with glandular-tips

4. Stigma not inflated; leaves densely sericeous beneath; upper lateral leaflets with cuneate base

3 *P. lineata*

4. Stigma inflated; leaves sparsely strigose on lower surface; upper lateral leaflets with rounded base

4 *P. fallens*

3 Peduncles and hypanthia without such hairs; leaves sparsely strigose on lower surface; upper lateral leaflets with cuneate base

5 *P. polyphylla*

Description of species

1. *Potentilla festiva* Soják, *Candollea*, 43: 166 (1988).

TYPE: Nepal, Palpa, mittleres Langtang-Tal, *Andropogon-Drosera*-Weide, N-exponiert, 3500 m. G. & S. Mische 11013 in 1986 (PR).

Radical leaves oblanceolate, 4-15 cm long, 2-4 cm wide, 5-15 pairs of lateral leaflets with alternating small leaflets; petioles 1-2 cm long; base of uppermost leaflet pair cuneate. Leaflets sericeous beneath; terminal leaflet sub-sessile, oblong to narrowly obovate, 1-3 cm long, 0.5-1.2 cm wide, serrate with

18-38 teeth. Auricles of stipules connate in basal part.

Peduncles 5-25 cm long with unicellular hairs. Cauline leaves with 5-10 pairs of leaflets, upper 2-3 pairs without small leaflet. Auricles of stipules serrate with 5-15 teeth.

Pedicels 0.5-2 cm long with unicellular hairs. Flowers 0.7-1.2 cm across; hypanthia 4-8 mm across. Episepals oblong to obovate, 3-5 mm long, 1.5-3 mm wide, entire or with 3 teeth, apex acute or obtuse, sparsely strigose above, sericeous beneath. Sepals elliptic to ovate, 4-6 mm long, 2.5-4.5 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals oblong to elliptic with round apex, 5-7 mm long, 4-5.5 mm wide.

Long stamens 1.5-2 mm long; anthers globose to ellipsoid, 0.6-1 mm long, 0.4-0.9 mm wide. Ovaries ellipsoid, 0.6-0.8 mm long, 0.4-0.6 mm wide; styles 0.9-1.3 mm long, slender; stigmas slightly inflated. Chromosome number $2n=28$.

Distr. NW India, Nepal, Sikkim, Bhutan, Tibet, Yunnan and Szechuan.

Specimens examined

NW INDIA: Punjab, Kulu-Lahaul, Jarauri Pass, Drummond 22885, 28 VII, 1888 (E, K); Tehri and Garhwal, above Kharsiali, 8000-9000 ft., Duthie 1081, 28 VIII, 1883 (EM); Chychna Bhuaiik Ramueel, 9000-10000 ft., Madden's collector 114 (E).

NEPAL. W NEPAL: Doti District, Kapthad, 2880 m, Tabata et al. 1190, 14 VII, 1976 (KYO, TI); Gagiankt - Hunrigaon, SE of Jumla, 10500 ft., Polunin, Sykes & Williams 4876, 22 VII, 1952 (BM, A, E). C NEPAL: Langtang, SE Schiabru, 3380 m, Miehe & Miehe 1160, 27 IV, 1986 (BM); Sing Gompa - Gosainkund, 3200-4200 m, Kanai et al. s.n., 23 VIII, 1972 (TI); Bhanjeng - Dobato, 28°02'N 85°28'E, c. 3300 m, de Haas 2130, 9 VIII, 1974 (BM). E NEPAL: Rolwaling Khola, Beding - Na, 3600-4050 m, Ohba et al. 8351274, 4 IX, 1983 (TI); Rolwaling Himal, Ramgula, 3300 m, Yoda s.n., 8 VI, 1963 (KYO); Tate, 2800-3000 m, Zimmermann 773, 12 VI, 1952 (BM); Chitre - Dor, 2400-2600 m, Kanai et al. s.n., 6 VI, 1972 (TI); Hile - Shidua, 1900-2100 m, Ohba et al. 9132005, 12 VII, 1991 (TI); Shidua - Tute, 2200-2400 m, Ohba et al. 9132019, 13 VII, 1991 (TI); Tute - Tinjure Phedi, 2400-2600 m, Ohba et al. 9132025, 14 VII, 1991 (TI); Mangal Bare - Gupha Pokhari, 2700-2750 m, Ohba et al. 9132053 & 9132054, 16 VII, 1991 (TI); Gupha Pokhari - Angare Kharka, 2800 m, Ohba et al. 9132057 & 9132058, 17 VII, 1991 (TI); Angare Kharka - Chhippon, 2810 m, Ohba et al. 9132061, 18 VII, 1991 (TI).

SIKKIM: Darjeeling, Sandakphu - Garibans, 3000-2600m, Hara et al. 2628, 7 VI, 1960 (TI, BM); loc. cit., Senchal - Ghoom, 2400-2300 m, Hara et al. 15353, 6 VI, 1969 (TI, KYO); loc. cit., Chia Banjan - Phalut, 3100-3500 m, Hara et al. 633, 2 VI, 1960 (KYO).

BHUTAN: Dantang, 2900 m, Nakao 799, 5 VIII, 1958 (KYO);

Thausa Kha, Tang Chu, 9300 ft., Lyon 15010, 9 VI, 1969 (BM); W slope of Pole La, W of Tongsa, 27°32'N 90°12'E, c. 3300 m, Grierson & Long 2667, 11 VII, 1979 (E, K); Tributary valley, 2 km N of Byakar Dzong, Bumtang Chu, 27°34'N 90°43'E, c. 2740m, Grierson & Long 1796, 10 VI, 1979 (E).

SE TIBET: Below Yakla, Tibet side, 13500 ft., Cooper 642, 24 VIII, 1913 (BM, E); Kongbo Province, Sang La, 29°29'N 94°30'E, 12000 ft., Ludlow, Sherriff & Taylor 6252, 14 IX, 1938 (BM); loc. cit., Tsangpo Valley, Lusha Chu, 29°27'N 94°35'E, 12000 ft., Ludlow, Sherriff & Taylor 6252a, 19 IX, 1938 (E); Tsongju (Pasum Tso), 12000 ft., Ludlow, Sherriff & Elliot 15739, 17 IX, 1947 (BM, E).

YUNNAN: Soo-roo-la, Cham-pu-tung, 3500 m, Wang 66689, IX, 1935 (A); Wei-si Hsien, 3000 m, Wang 67660, VIII-IX, 1935 (A); loc. cit., Kang-pu, 3000 m, Wang 64541, VII, 1935 (A); Fang Yang Tchang, Delavay s.n., 10 VIII, 1889 (P); Tali Xian, E side of Diancang Shan mountain range, Vicinity of Yinglofeng, 25°42'N 100°07'E, Bartholomew et al. 869, 8 VII, 1984 (A, TI). SZECHUAN: Muli, Kulu, 3500 m, Yü 14236, 11 IX, 1937 (A, BM); loc. cit., Pai-li-mi, 3200 m, Yü 14354, 24 IX, 1937 (BM); Kangting, Soulié s.n., VI 6, 1891 (P); loc. cit., 9000-9500 ft., Fang 3573 & 3633, 25 & 27 IX, 1928 (E, US); loc. cit., Xin-Du-Qiao, 3500 m, Kuan et al. 696, 18 VII, 1963 (PE); loc. cit., Yulingkong, c. 2900 m, Smith 10762, 21 VII, 1934 (A, BM, E); Yü 7029, 12423 & 12821 (A). CULTIVATED. Bot. Gard. Dresden, Wolf s.n., VII, 1910 (DR).

Note: *Potentilla festiva* is well characterized by the connate auricles of the stipules; the auricles of the stipules are not connate in other species of the *P. lineata* group.

Fig. 15 shows the distribution of *P. festiva*.

The specimens from Bhutan were identified as *P. lineata*, *P. leuconota* or *P. peduncularis* by Grierson & Long (1987). We examined several specimens of this species from China which were identified as *P. fulgens* by Yü & Li (1985).

2. *Potentilla josephiana* H. Ikeda et H. Ohba, nom. nov.

BASIONYM: *P. fulgens* Wall. ex Hook. var. *intermedia* Hook. f., *Fl. Br. Ind.*, 2: 350 (1878).

TYPE: Sikkim, Jongri, 13000 ft. Clarke 26007 in 1875 (K-holo, BM-iso).

SYNONYM: *P. lineata* Trev. var. *intermedia* (Hook. f.) Dixit et Panigrahi, Proc. 4 Ann. Conf. Orissa Bot. Soc. 25 (1979).

Radical leaves oblanceolate, 4-20 cm long, 2-5 cm wide with 5-15 pairs of lateral leaflets with alternating small leaflets; petioles 2-5 cm long; base of uppermost leaflet pair decurrent. Leaflets villose beneath; terminal leaflet sessile, broad lanceolate to oblong, 1-3 cm long, 0.5-1 cm wide, serrate with 20-30 teeth. Auricles of stipules free.

Peduncles 5-35 cm long with unicellular hairs. Cauline

leaves with 5-12 pairs of leaflets, upper 1-2 pairs without small leaflet. Auricles of stipules serrate with 7-12 teeth.

Pedicels 2-4 cm long with unicellular hairs. Flowers 1-1.5 cm across; hypanthia 5-8 mm across. Episepals oblong to elliptic, 3-6 mm long, 2-4 mm wide, entire or with 3-6 teeth, apex acute to acuminate, villose on both side. Sepals ovate to broad ovate, 3-6 mm long, 3-5 mm wide, entire, apex acute to obtuse, lanate above, villose beneath and margin. Petals obovate to broad obovate with round apex, 5-10 mm long, 5-8 mm wide.

Long stamens 1.5-2 mm long; anthers globose, 0.6-1 mm long, 0.6-1 mm wide. Ovaries ellipsoid to ovoid, 0.5-1 mm long, 0.4-0.8 mm wide; styles 0.8-1.4 mm long, slender; stigmas slightly inflated. Chromosome number $2n=42$.

Distr. NW India, Nepal, Sikkim.

Specimens examined

NW INDIA: Sach Pass, Chamba, c. 9000 ft., Stewart 2564, 2 VII, 1917 (NY); Mussoorie, Kidar Kantha, 10000 ft., Drummond 24269, 13 VI, 1904 (E, K); Garhwal, Buhma - Bishtola, 3200 m, Rau 10242, 16 VI, 1959 (TI).

NEPAL. C NEPAL: Kali Gandaki, Tukucha, 12000 ft., Stainton, Sykes & Williams 1186, 16 VI, 1954 (BM, A, E). E Nepal: Janakpur Zone, Ramechhap Distr., Koshing Kharka - Thare Og, 4000-4150 m, Ohba et al. 8530416, 22 VII, 1985 (TI); loc. cit., Neju - E of Neju, c. 3650 m, Ohba & Wu 8530632, 31 VII, 1985 (TI); Arun

Valley, Barun Khola, N of Num, 11000 ft., Stainton 578, 8 VI, 1956 (BM, A, E); Around Cha Ding Kharka, Minaki et al. 9080300, 9 VIII, 1990 (TI); Chhippon - Gidde, 3500 m, Ohba et al. 9134064, 19 VII, 1991 (TI); Gidde - Khokling, 3400 m, Ohba et al. 9134071, 20 VI, 1991 (TI); Banduke - Jomle, Ohba et al. 9130236, 4 VIII, 1991 (TI); Jomle - Goja, Ohba et al. 9130244, 5 VIII, 1991 (TI); Shuwan Kharka - Topke Gola, Ohba et al. 9130300, 7 VIII, 1991 (TI); Topke Gola - Bomrang, Ohba et al. 9130322, 9 VIII, 1991 (TI); Thudam, 3400 m, Kanai et al. 1737, 25 VI, 1975 (TI); near Ghunsa, 3700 m, Nakao & Nishioka 468, 22 VI, 1962 (KYO); Yamatari glaciator, 3900 m, Nakao & Nishioka 155, 16 VI, 1962 (KYO).

SIKKIM: Darjeering, Sandakphu, 12000 ft., Gamble 9517, VII, 1881 (K); loc. cit., 3800-3900 m, Hara et al. 1336, 14 VII, 1969 (TI, KYO); Chiya Banjan - Phalut, 3100-3500 m, Hara et al. 633, 2 VI, 1960 (TI, KYO); Changu - Laghep, 11000 ft., Smith 3368, 11 VI, 1910 (E); Laghep, 9000 ft., Cooper 94, 1 VII, 1913 (E, A, BM); Jongri, 13000 ft., Clarke 26007 B, 15 X, 1875 (BM); loc. cit., 12000 ft., Clarke 25926 A, 15 X, 1875 (K); Thomson s.n. in 1857 (L).

E HIMALAYA: Gnathong, 13000 ft., Cave s.n., 20 IX, 1916 (E).

Note: *Potentilla josephiana* is a new name for *P. lineata* var. *intermedia*. In *P. josephiana* the base of the uppermost leaflet pair is decurrent and this character is not found in other species of the *P. lineata* group. The chromosome number of *P. josephiana* is $2n=42$, which is the highest number found in the

Himalayan *P. lineata* group. Hooker (1878) described this species as a variety of *P. lineata* and Wolf (1908) suggested that it was a hybrid between *P. fulgens* and *P. polyphylla*. We believe it to be an independent species because of the discontinuous characters and different chromosome number.

Fig. 16 (●) shows the distribution of *P. josephiana*.

3. *Potentilla lineata* Trev., Ind. Sem. Vatislav, 1822.

(1822)--Mabberley, Taxon, 33: 443 (1984)--Grierson & Long, Fl. Bhutan, 1: 571 (1987), pro major parte.

TYPE: Not seen.

SYNONYMS: *P. splendens* Wall. ex D. Don, Prodr. Fl. Nepal, 230

(1825), non Ramond (1809). TYPE: Nepal, Gosain Than. Wallich s.n. (BM).

P. fulgens Wall. ex Hook., Bot. Mag., 53: t. 2700 (1826). TYPE: same as *P. splendens* Wall. ex D. Don.

P. siemersiana Lehm., [Ind. Sem. Hort. Bot. Hamb. 8. (1821), nom. nud.] Pugill., 1: 31 (1828). TYPE: Not seen.

P. martini Lév., Bull. Soc. Bot. France, 57 (1908). TYPE: China, Kouy-Tcheou, Gan-pin. Martin 2900. 29 VII, 1898 (E).

P. fulgens Wall. ex Hook. var. *macrophylla* Card., Lecomte, Not. Syst., 3: 232 (1914). TYPE: Yunnan, Fang-Yang Tchang. Delavay s.n. 10 VIII, 1889 (P-lecto, selected here; NY-iso); Tibet, Yargong, province de Batang. Soulie 3152. June-July 1903 (P-iso).

P. siemersiana Lehm. var. *acutiserrata* Yü et Li, Acta Phytotax. Sin., 18 (1): 7, t. 1, f. 2 (1980). TYPE: Szechuan, Fengjie, alt. 2200 m. Chang 25268. 17 VI, 1958 (PE).

P. fulgens Wall. ex Hook. var. *acutiserrata* (Yü et Li) Yü et Li. In T. Yü, Fl. Reip. Popul. Sin., 37: 263, t. 39, f. 3 & 4 (1985).

Radical leaves oblanceolate, 4-30 cm long, 2-8 cm wide with 5-20 pairs of lateral leaflets with alternating small leaflets; petioles 2-5 cm long; base of uppermost leaflet pair cuneate. Leaflets sericeous beneath; terminal leaflet sub-sessile, oblong to broad obovate, 1.5-4 cm long, 0.8-1.5 cm wide, serrate with 20-40 teeth. Auricles of stipules free.

Peduncles 5-20 cm long, lower with unicellular hairs, upper with multicellular hairs with glandular tips and unicellular hairs. Cauline leaves with 5-13 pairs of leaflets, upper 1-2 pairs without small leaflet. Auricles of stipules serrate with 10-20 teeth.

Pedicels 2-4 cm long with multicellular hairs with glandular tips and unicellular hairs. Flowers 1-1.5 cm across; hypanthia 5-8 mm across. Episeals oblong to elliptic, 5-7 mm long, 3-6 mm wide, entire with acute apex, lanate above, sericeous beneath. Sepals elliptic to ovate, 5-9 mm long, 4-6 mm wide, entire or with 2-3 teeth, apex acute to obtuse, lanate above, sericeous beneath. Petals obovate to broad obovate with round or retuse

apex, 8-15 mm long, 7-13 mm wide, margin often recurved.

Long stamens 3-5 mm long; anthers ovoid, 1-1.3 mm long, 0.6-1.2 mm wide. Ovaries narrow ovoid, 1.2-2 mm long, 0.8-1.4 mm wide; styles 1.4-2 mm long, slender; stigmas not inflated.

Chromosome number $2n=14$.

Distr. NW India, Nepal, Sikkim, Bhutan, Tibet, Assam, N Burma, Yunnan, Szechuan, Kweichow, Hupei.

Specimens examined

NW INDIA: Chumba, Sora, 8000 ft., Clarke 24154 A, 8 X, 1874 (BM); Dalhousie, 6000 ft., Clarke 22894 B & 23218 B, 21 & 28 IX, 1874 (BM); loc. cit. 8000 ft., Clarke s.n., X, 1874 (DR); Parasher, Kulu, 2500 m, McBeath 1719, 21 X, 1985 (E); Simla, Dalhousie s.n. in 1831 (E); loc. cit., Dalhousie 123, 1 VIII, 1831, (E); loc. cit., Drummond, Kew nos. 20825 & 20830 in 1887 (E); loc. cit., collector unknown s.n., 25 VIII, 1831 (E); loc. cit., Theog, 8000 ft., Gaulb 1472 A, 29 IX, 1876 (K); loc. cit., Madden's collector s.n. (E); Chychna Binaik, 9000-10000 ft., Madden's collector 114 (E); loc. cit., 9500 ft., Madden's collector 118 (E); Simla - Nagkanda, 7000-8400 ft., Herb. Schlagintweit s.n., V, 1856 (BM); Bashahr, above Gaura, 8000 ft., Herb. Lace 5 B, X, 1891 (E); Fagu, Herb. Watt 7923, 8 VIII, 1890 (E); Jabberkhet, Raizada 231, IX, 1930 (NY); loc. cit., 7000 ft., Stewart 21007, 26 VII, 1944 (K, NY); Jabberkhet west, Landour, c. 7000 ft., Stewart 16710, 8 VIII, 1938 (NY); Jabberkhet ridges, c.

7000 ft., Stewart 14382, 16 VIII, 1934 (A, NY, US); Saharampoor, Jameson s.n. (E); Jaunsar, Konain, 7000 ft., Nand 195, IX, 1890 (E); loc. cit., 8000 ft., Raizada 7257, 19 IX, 1936 (E); Mussoorie, 6500 ft., Marten s.n., V, 1916 (BM); loc. cit., The Park, 6500 ft., Marten s.n., VIII, 1919 (E); Near Mussourie, King s.n., 9 VIII, 1869 (E, L); Deosari beyond Mussoorie, 7000 ft., Stewart 11325, 26-29 VIII, 1930 (NY); Garhwal, Herb. Falconer 379 (A, L, NY); loc. cit., Ringali, 7500 ft., Sahni 21841, 3 IX, 1955 (L); Pauri, 6000-8000 ft., collector unknown s.n., IX, 1885 (E); Passim - Kumaon, 6000-8000 ft., Herb. Reid. s.n. IX, 1885 (E); Kumaon, Wallich 1017 (BM, E, L); loc. cit., Blinkworth. s.n. (BM, NY); loc. cit., Nainital, 7000 ft., Strachey & Winterbottom 13 (A, BM); loc. cit., Kapoor s.n., 25 IX, 1955 (L); Hawulbaugh, Jameson 504, 22 VIII, 1851 (E); Tubur, Syabs?, 9000 ft., collector unknown s.n. (E); Daba Vagna, Barclay 146, 4 X, 1885 (BM); Sibuedi, 13000 ft., Herb. Watt 754 (E); Herb. Watt 8082, VIII, 1886 (E); Anderson 266, IX, 1855 (E); Stewart 103/B. 700/K & 735/GK (E); Herb. Royle s.n. (L); Herb. Lindley s.n. (L); Herb. Schlich s.n. (E); collector unknown s.n. (BM); collector unknown s.n., 25 VII, 1857 (A).

NEPAL. W NEPAL: Lisni Gad - Ganai Gad, 2060 m, Tabata et al. 1477, 23 VII, 1976 (TI, A, KYO); Lumla, 5500 ft., Flatt 71, 20 VI, 1969 (BM); Jumla, 9000 ft., Stainton, Sykes & Williams, 3098, 30 VIII, 1952 (BM, A, E). C NEPAL: Near Maikot, 8500 ft., Stainton, Sykes & Williams 4754, 8 X, 1953 (BM, A, E); Near Muna,

6000 ft., Stainton, Sykes & Williams 4479, 7 IX, 1954 (BM, A, E); Gurjang Klakrey, 8000-9000 ft., Dhwoj 584 in 1930 (BM, E); Ferra, 11000 ft., Dhwoj 651 in 1930 (BM); Lumle Agricultural Centre, 1695 m, Dawson 388 (BM); Suiket - Pathana, (Dhampus), 1230-2050 m, Ohba et al. 8350135, 7 VII, 1983 (TI); Khare Khola, Patala Pokhari - Phedi Kharka, 2100-4200 m, Ohba et al. 8332072, 13 IX, 1983 (TI); Yarsu - Kasigaon, 1700-2300 m, Namba 0930018, 30 IX, 1963 (KYO); Kasigaon, 2199 m, Nakao s.n., 2 VIII, 1953 (KYO, TNS); Shiupuri, 8000 ft., Fell 55, 19 VI, 1957 (BM); Kathmandu - Kakani, Hara et al. s.n., 20 VI, 1967 (TI); Kakani, 8000 ft., Polunin 1983, 1-8 IX, 1949 (BM); loc. cit., 2200 m, Hara et al. 6301275, 24 IX, 1963 (TI); Mulkharka - Chipu Danda, 2000 m, Malla & Kanai 673485, 20 VIII, 1969 (TI); Sanku, Codrington 54, 8-11 VII, 1956 (BM); Sim Bhanjang, 2500 m, Kanai 673332, 26 VII, 1969 (TI, KYO); Thankot, 5500 ft., Codrington 246 & 274, VIII, 1956 (BM); loc. cit., 5000-6000 ft., Codrington 3 in 1956 (BM); Pulchoke, 7000 ft., Schilling 573, 23 VII, 1965 (K); Kalingchok, Thala - Tale Bisauna, 2050-2750 m, Kanai et al. s.n., 10 IX, 1970 (TI); Sundarijal - Pati Banjang, 2100 m, de Haas 2036, 5 VIII, 1974 (BM); Sim Chotala - Gram, 1800 m, Kanai et al. 721680, 20 VIII, 1972 (TI); Langtang, Sing Gampa, 3290 m, Miehe & Miehe 15048, 10 X, 1986 (BM); loc. cit., W Scherpa, 2630 m, Miehe & Miehe 9956, 28 VIII, 1986 (BM); loc. cit., 2670 m, Miehe & Miehe 1627 & 1628, 8 V, 1986 (BM); loc. cit., Scherpa, 2600 m, Miehe & Miehe 1406, 4 V, 1986 (BM); loc. cit., E Scherpa, 2630 m, Miehe

& Miehe 2720, 2 VI, 1986 (BM); loc. cit., 2700 m, Miehe & Miehe 10220, 30 VIII, 1986 (BM); loc. cit., Pangsang Lekh, 3650 m, Miehe & Miehe 2099, 19 V, 1986 (BM); loc. cit., Langtang - Tangsep, 3180 m, Miehe & Miehe 3010, 7 VI, 1986 (BM); loc. cit., Palpa, 3560 m, Miehe & Miehe 10568, 2 IX, 1986 (BM); Gosain Than, Wallich s.n. (DR); loc. cit., Wallich s.n. in 1819 (A, BM, DR, E, K, US); Kadh, 5000 ft., Bistha 1735, 16 VII, 1964 (US); Chyaubas, 1950 m, Zimmermann 1085, 7 IX, 1954 (BM); Bulung, 2020 m, Zimmermann 1210, 13 IX, 1954 (BM). E NEPAL: Rolwaling Khola, Simigaon - Kyaiche, 1950-2700 m, Ohba et al. 8351153, 31 VIII, 1983 (TI); Rolwaling Himal, Ningare - Resingo, 1900 m, Yoda s.n., 22 IV, 1963 (KYO); Sagarmatha Zone, Solukhumbu Distr., Mopung - Thosa Kharka, 2800-3670 m, Ohba et al. 8530975 & 8581064, 21 VIII, 1985 (TI); Janakpur Zone, Dolakha Distr., Jiri - Shivalaya, 1800-2270 m, Ohba et al. 8530010, 4 VII, 1985 (TI); Khimti Khola, Jiri, 27°38'N 86°17'E, 8600 ft., Stainton 4643, 20 VI, 1964 (BM, TI); Dudh Kosi, Jorale, Miehe 821, 20 VIII, 1982 (BM); Junbesi to Taksindu, c. 8500 ft., Herb. Banerji s.n., 22 VII, 1966 (A); Everest region up from Kumjum, Miehe 878, 2 IX, 1982 (BM); Chittre, 27°06'N 87°25'E, 2200 m, Dobremez 1498, 16 VIII, 1972 (BM); Manga Deorali, 7700 ft., Banerji et al. 2687, 13 IX, 1964 (US); Mt. Makalu, Walung Chaur, 6400 ft., Ohsawa & Shakya 2527, 25 X, 1971 (TI); loc. cit., Yangle, 11000 ft., Ohsawa & Shakya 2762, 12 XI, 1971 (TI); Myagdi Distr., Ghodepani Deurali - Tikhedhunga, 2130 m, Suzuki et al. 8881769, 6 IX, 1988 (TI);

Koshi Distr., Banthanti - Godepani Deurali, 2600-3050 m, Suzuki et al. 8881284, 24 VIII, 1988 (TI); Arun valley, Jaljale Himal, Dhanrngaon - Hururu, 2000 m, Wraber 34427, 28 VIII, 1972 (BM); Dhankuta - Sinduwa, Togashi & Tuyama s.n., 22 X, 1963 (TI); Dhankuta - Murhay, Hara et al. 6306856, 23 X, 1963 (TI); Bilbatay Bhanjang, 2200 m, Hara et al. s.n., 26 X, 1963 (TI); Bilbatay Bhanjang - Hasi Sar, Hara et al. s.n., 27 X, 1963 (TI); Hati Sar - Minchin Dhap, Hara et al. 6306855, 28 X, 1963 (TI, KYO); Mangalbare, Hara et al. s.n., 28 X, 1963 (TI); Baroya Khimty, 2500 m, Hara et al. 6306859, 11 XI, 1963 (TI, A, KYO); loc. cit., 2500 m, Hara et al. s.n., 12 XI, 1963 (TI); Baroya Khimty - Thakma Khola, c. 2600 m, Hara et al. 6306857, 16 XI, 1963 (TI, KYO); Iladanda - Helok, c. 1700 m, Kanai et al. 6306858, 13 XI, 1963 (TI); Bhandukay, 2400 m, Hara et al. s.n., 15 XI, 1963 (TI); Diorali Bhanjang, Kanai et al. s.n., 17 XI, 1963 (TI); Birwa - Yektin, Hara et al. s.n., 28 XI, 1963 (TI); Chamtang - Ritak, 2100 m, Tabata et al. 11288, 9 VII, 1978 (KYO, TI); Hile - Shidua, 1900-2100 m, Ohba et al. 9131005, 12 VII, 1991, (TI); Shidua - Tute, 2200-2400 m, Ohba et al. 9131019, 13 VII, 1991 (TI); Tute - Tinjure Phedi, 2400-2600 m, Ohba et al. 9131025, 14 VII, 1991 (TI); Mangal Bare - Gupha Pokhari, 2700-2750 m, Ohba et al. 9131053 & 9131054, 16 VII, 1991 (TI); Singoa Kharka - Pahakhola, 3090 m, Ohba et al. 9130357, 11 VIII, 1991 (TI); collector unknown 1022 (E).

SIKKIM: Singalila Ridge, Rai 338, 21 VII, 1981 (B);

Darjeeling, 7000-13000 ft., Hooker f. s.n. (A, BM, L); loc. cit., 7000-13000 ft., Thomson s.n. in 1857 (E, L); loc. cit., Clarke 13341 A, 4 IX, 1870 (BM); loc. cit., 7000 ft., collector unknown 352, 16 VII, 1874 (E); loc. cit.? (as, Darschiling), Herb. Kuntze 6784, 20 XI, 1875 (NY); loc. cit., 7000 ft., Hallier s.n., VI, 1896 (L); loc. cit., Drummond 21038 in 1904 (E); loc. cit. 9000 ft., Reddome 2716 (BM); loc. cit., Cave s.n., IV, 1915 (BM); loc. cit., 6000 ft., Cave, s.n., 18 VIII, 1919 (A, E); loc. cit., 6000 ft., Herb. Krukoff s.n., 28 XII, 1937 (A, NY); loc. cit., East Birch Hill Road, 2200 m, Hara et al. 6907051, 5 VII, 1969 (TI, KYO); loc. cit., Tiger hill, 8000 ft., Herb. Ames 24340, 1 V, 1968 (A); loc. cit., Ghoom, 7500 ft., Cave s.n., 21 IX, 1918 (A, E); loc. cit., Senchal, 8000 ft., Anderson 486, VII, 1862 (A, E, NY); loc. cit., 2300 m, Hara s.n., 19 IX, 1964 (TI); loc. cit., Raman - Rimbick, 2300 m, Kanai et al. 721481, 5 VIII, 1972 (TI); loc. cit., Khursiong, 7000 ft., Clarke 36005 C, 28 IX, 1884 (BM); loc. cit., Briehl s.n. in 1903 (A); Lachung, 8610 ft., Pradhan, s.n., 8 VIII, 1943 (K).

BHUTAN: Timpu, 7500 ft., Cooper 3008, 11 X, 1914 (E, BM); loc. cit., Dotena, 8000 ft., Cooper 1553, 15 VII, 1914 (E); Tongsa - Uto La Road, 2000-2750 m, Kanai & Yamazaki s.n., 17 IV, 1967 (TI).

ASSAM: NW, Senge Dzong, Rankin & Pretzlik 113, 27 X, 1955 (BM); Nangthymai, Panigrahi 3321, 21 IX, 1956 (L); Khasi Hills, Mawphlang, c. 6000 ft., Chand 8000, 13 VIII, 1954 (L); Manipur,

Khongui, 6000 ft., Watt 6342, 9 IV, 1882 (E); Sirhoi, 6000 ft.,
Kingdon-Ward 17717, 19 VI, 1948 (A, BM); Jenkins s.n. (L).

HIMALAYA: Him. Bor. Occ., 7000-8000 ft., Thomson s.n., 6
VIII, 1847 (K, BM, A, E, L, NY); Wight s.n. (B); Sinebul, Ribu &
Rhomoo s.n., 26 I, 1912 (E); Ribu & Rhomoo s.n. (E); E Himalaya,
Herb. Griffith 2124 in 1861-1862 (DR).

TIBET: Batang, Yargong, Soulié 3152, VI-VII, 1903 (P).

YUNNAN: Mekong-Salween Divide, Tsai 57593 (A); Wei-se Hsien,
2300-2900 m, Tsai 59559, 59796, 59894, 63094, IX-XI, 1934 (A);
Shang-pa Hsien, 2000 m, Tsai 56529, 20 IX, 1933 (A); Chu-Hsiung,
To-Tsu, 1950 m, Li 0061, 20 IX, 1939 (PE); Chungtien, Wong, 2800
m, Yü 13469, 27 IX, 1937 (A, BM, E); loc. cit., Haba, 2200 m, Yü
13526, 9 IX, 1937 (A, BM, E); Chungtien plateau, 3000 m, Yü
13605, 4 X, 1937 (A, BM, E); loc. cit., 3100 m, Yü 13704, 13 X,
1937 (A, BM, E); Fang-Yang Tchang, Delavay s.n., 10 VIII, 1889
(P, NY); Chi-li-hsiang, Cheng-kiang, 1800 m, Wang 41533, 7 VIII,
1939 (A); Pin-chuan Hsien, 2400 m, Tsai 52990, 19 VII, 1933 (A);
Tali Hsien, 2500 m, Tsai 53828, 26 VII, 1933 (A); loc. cit., N
slope of San Yang Feng peak, 2500-3000 m, Kovama et al. 756, 8
IX, 1982 (KYO); loc. cit., E side of Diancang Shan mountain
range, 25°42'N 100°08'E, Bartholomew et al. 1017, 12 VII, 1984
(A, E, TI, US); Eastern flank of the Tali Range, 25°40'N, 9000-
10000 ft., Forrest 4411, VII, 1906 (E); La paturaga, Delavay
475, 4 VII, 1882 (P); Houny li pin, Delavay 476, 3 X, 1882 (P);
Pi-iou-se, 2000 m, Delavay 1994, 2 VII, 1885 (P); Kona la po,

3000 m, Delavay 1995, 5 VIII, 1885 (P); Shunning, Wamulung, 1680 m, Yü 16580, 7 VII, 1938 (A, E); Likian Hsien, 2700 m, Wang 71238, VII, 1935 (A); loc. cit., 2900 m, Schneider 2013, 27 VII, 1914 (A, US, K); loc. cit., 2900 m, Schneider 3174, X, 1914 (A, K); Eastern slopes of Likiang Snow Range, Yangtze watershed, Rock 11464 in 1923-24 (E); loc. cit., Rock 4774 & 4876 in 1922 (E, US); Xi Shan, near Dian Chi and Kunming, 2200 m, Reveal & Duke 5712, 8 VIII, 1981 (A); Kunming, 1800 m, Chiou 78907, VI, 1978 (TI); loc. cit., near Tsjung-chu-sh temple, 2100-2400 m, Murata & Yamazaki 8951, 10 X, 1979 (TI, BM); loc. cit., near Hua-ji-gou, Murata & Yamazaki 9316, 11 X, 1979 (TI); loc. cit., Xi Shang Gong Yuan, Xi Shan Qu, c. 2100 m, Koyama et al. 93, 29 VIII, 1982 (KYO); Tchong-chan, Ducloux 3309, 19 VII, 1909 (P); Haytien pries Piny, Ducloux 3310, VII, 1904 (P); San Chan pries, Ducloux 4363, 25 VIII, 1905 (P); Yo-lin-chan, Ducloux 7255 in 1910 (P, A); loc. cit., Ducloux 7380 in 1910 (P, BM, E); Ping-pien Hsien, 1400 m, Tsai 62414, 8 VII, 1934 (A); loc. cit., 1500 m, Tsai 61091, 21 VII, 1934 (A); Wen-shan-hsien, Loa-jiun-shan, 1800-2200 m, Feng 11124, 12 VIII, 1947 (A); Feng Chen Lin, 7000 ft., Henry 10723 (E, NY); Anty 434, 19 VII, 1898 (P); Cavalerie 4058, 18 VIII, 1918 (E); Maire 931 & 2592 (K, E); Tsai 57704 (A); Yü 7486 (A). SZECHUAN: Kiukiang, Valley, (Taron) Mt. Chingtinglaka, 1800 m, Yü 19496, 28 VII, 1938 (A, E); He-chang Hsien, 2450 m, Yü 1151, 6 VII, 1932 (A); Hsi-chang Hsien, 2600 m, Yü 1264, 10 VIII, 1932 (A); Huei-li Hsien, Yü 1595, 17 IX, 1932 (A); Muli, Kulu,

Pai-li-mi, 3200 m, Yü 14354, 24 IX, 1937 (A, E); Sunglingku, between Taining (Ngata) and Taofu (Dawo), c. 3800 m, Smith 12103, 12 IX, 1934 (NY); Pao Shan, Legendre 514, 26 VII, 1908 (P); Kangting, Banvalot & d'Orleans s.n. (P); loc. cit., c. 2800 m, Smith 10799, 29 VII, 1934 (BM). HUPEI: Fu-rien-jie, Zuao-pin, Su-guan, Yao-ziai-chan, 1500-1600 m, Li 6634, 26 IX, 1958 (PE). KWEICHOW: Gan-pin, Martin 2900, 29 VII, 1898 (E); Gan-chouen, Cavalerie 3837 in 1910 (P, E, K).

INDO-CHINA: Tonkin, Cha pa, d'Alleizette s.n., 27 VIII, 1909 (L); loc. cit., 1500 m, Petelot 3076, VII, 1927 (L, NY); loc. cit., Lao Kay, 1500 m, Vidal 1147 A, VIII, 1944 (L) Kanpetlet, 6000 ft., Unwin 3016, 14 IV, 1926 (E).

CULTIVATED. Bot. Gard. Dresden, Aus einem alten Herbar, s.n. (DR).

Note: Potentilla fulgens was used for P. lineata until Mabblerley (1984) discovered the older name for this species. Unfortunately we could not examine the type.

Potentilla festiva and P. lineata are similar in external appearance, and were treated conspecific for a long time. The auricles of the stipules of P. festiva are connate while those of P. lineata are free (Figs. 1 & 2). Potentilla lineata has multicellular hairs with glandular tips on the peduncles and the outside of the hypanthia while P. festiva has no such hairs. Potentilla festiva has smaller and narrower leaflets and petals

than does *P. lineata*. The anthers of *P. festiva* are globose to ellipsoid while those of *P. lineata* are ovoid.

In the Jaljale Himal, *P. lineata* and *P. festiva* often grow sympatrically between 1900-2500 m and sometimes presumed hybrids occur (see p.44).

Potentilla fulgens var. *macrophylla* Card. was characterized as having large leaves, but the size of the leaves of the type specimen (Delavay s.n. in 1889) are within the range of the variation of *P. lineata*.

Fig. 17 shows the distribution of *P. lineata*.

4. *Potentilla fallens* Card., *Lecomte, Not. Syst.*, 3: 232 (1914).

TYPE: Yunnan, paturages frais au col de Koua-la-po, Hokin, 3000 m. Delavay s.n., 5 VIII, 1885, (P).

P. rockiana Melch., *Notizb. Bot. Gart. Mus. Berl.*, 11: 795

(1933). TYPE: NW Yunnan, Yangtze watershed, Prefectural District of Likiang, eastern slopes of Likiang Range. Rock 4350 (B-holo (not seen), A, E, NY, P-iso).

Radical leaves oblanceolate, 4-17 cm long, 2-3.5 cm wide with 8-14 pairs of lateral leaflets with alternating small leaflets or without small leaflet; petioles 0.5-1 cm long; base of uppermost leaflet pair truncate to cordate. Leaflets strigose beneath; terminal leaflets sub-sessile, obovate, 0.8-1.7 cm long, 0.5-1.2 cm wide, serrate with 12-20 teeth. Auricles of stipules free.

Peduncles 5-30 cm long, lower with unicellular hairs, upper with multicellular hairs with glandular tips and unicellular hairs. Cauline leaves with 6-8 pairs of leaflets, upper 2-3 pairs without small leaflet. Auricles of stipules serrate with 8-12 teeth.

Pedicels 1-3 cm long with multicellular hairs with glandular tips and unicellular hairs. Flowers 1-1.8 cm across; hypanthia 6-10 mm across. Episeals oblong to elliptic, 3-4 mm long, 2-3 mm wide, entire or with 3 teeth, apex acute or acuminate, strigose on both side. Sepals elliptic to ovate, 3-6 mm long, 1.5-3 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals obovate to broad obovate with round or retuse apex, 6-12 mm long, 4-10 mm wide.

Long stamens 3-4 mm long; anthers globose, 0.6-1 mm long, 0.4-0.8 mm wide. Ovaries ellipsoid to ovoid, 0.4-0.7 mm long, 0.3-0.5 mm wide; styles 1.2-1.5 mm, slender; stigmas inflated.

Distr. Yunnan and Szechuan.

Specimens examined

YUNNAN: Koua-la-po. Hokin, 3000 m, Delavay s.n., 5 VIII, 1885 (P); Lichiang Range, 27°10'N, 11000-12000 ft., Forrest 2445, VI, 1906 (E, K); loc. cit., 27°20'N, 11000-12000 ft., Forrest 5687, V, 1910 (E, K); loc. cit., 27°25'N, 11000-12000 ft., Forrest 6035, VII, 1910 (E); Yangtze watershed, Prefectural District of Likiang, eastern slopes of Likiang Snow Range, Rock

4350, V-X, 1922 (A, E, NY, P); Lichiang Snow Range, 2800 m, Yü 15296, 11 VII, 1937 (A, E); loc. cit., Ching 30321, 27 VI, 1939 (A); S Kiulung, Metikonga, Lamashi, 3600 m, Yü 6868, 6 VII, 1937 (PE); Yü 6233 in 1937 (A); Yü 6325 in 1937 (A); Yü 6642 (A).
SZECHUAN: Ma-pien Hsien, 3500 m, Wang 22922, 26 V, 1931 (A); Lei Bo Hsian, Huan Mo Gen, 2900-3200 m, Guan 8513, 19 VI, 1959 (PE); loc. cit., 2900 m, collector unknown 0769, 19 VI, 1959 (PE).

Note: *Potentilla fallens* is restricted to Yunnan and Szechuan and has peduncles with multicellular hairs with glandular tips. This character is also found in *P. lineata*, but *P. lineata* is sericeous on the lower surface while *P. fallens* is strigose. The stigmas of *P. fallens* are inflated while those of *P. lineata* are smooth.

The base of the uppermost leaflet pair of *Potentilla fallens* is truncate to cordate while in *P. festiva*, *P. lineata* and *P. polyphylla* it is cuneate; and in *P. josephiana* it is decurrent.

Potentilla rockiana Melch., based on Rock 4350, is identical with the type specimen of *P. fallens* in the shape of the leaflets and the hairiness of the peduncles.

Fig. 16 (▲) shows the distribution of *P. fallens*.

5. *Potentilla polyphylla* Wall. [Cat. 28, n. 1026 (1829), nom. nud.] ex Lehm., Pugill., 3: 13 (1831).

TYPE: Nepal, Gosain Than, Wallich 1026 (K-holo, BM, K-iso).

Key to varieties of *P. polyphylla*

1. Leaves 16-30 cm; leaflets broad linear to lanceolate, villose beneath

5c var. *interrupta*

1. Leaves 8-20(-25) cm; leaflets obovate to broad obovate, strigose beneath

2. Petals 9-11 mm long; episeals 4-7.5 mm long

5b var. *himalaica*

2. Petals 5-9 mm long; episeals 2.5-5 mm long

3. Teeth of leaflets and episeals acuminate

5d var. *barbata*

3. Teeth of leaflets and episeals acute

5a var. *polyphylla*

5a. *Potentilla polyphylla* var. *polyphylla*

SYNONYM: *P. sordida* Klotzsch, *Bot. Ergebn. Reise Waldemar.*, t. 9 (1862). TYPE: not seen.

Radical leaves oblanceolate, 4-30 cm long, 2-6 cm wide with 5-20 pairs of lateral leaflets with alternating small leaflets; petioles 2-5 cm long; base of uppermost leaflet pair cuneate. Leaflets strigose beneath; terminal leaflet petiolulate or subsessile, obovate to broad obovate, 1.5-4 cm long, 0.8-1.5 cm wide, serrate with 14-24 teeth with acute tips. Auricles of stipules free.

Peduncles 5-40 cm long with unicellular hairs. Cauline leaves with 5-13 pairs of leaflets, upper 1-2 pairs without small leaflet. Auricles of stipules serrate with 10-20 teeth.

Pedicels 2-4 cm long with unicellular hairs. Flowers 1-1.5 cm across; hypanthia 5-8 mm across. Episepals oblong to obovate, 2.5-5 mm long, 1.5-3.5 mm wide, usually serrate with 3-5 teeth, rarely entire, apex acute; strigose on both side. Sepals elliptic to ovate, 2.5-5.5 mm long, 2-4 mm wide, entire, apex acute to obtuse, lanate above, strigose beneath and margin. Petals obovate to broad obovate with round apex, 5-9 mm long, 4.5-9 mm wide.

Long stamens 3-5 mm long; anthers globose, 1-1.3 mm long, 0.6-1.2 mm wide. Ovaries ellipsoid to ovoid, 1.2-2 mm long, 0.8-1.4 mm wide; styles 1.4-2 mm long, swollen at the middle and slender at base; stigmas inflated. Chromosome number $2n=28$.

Distr. Pakistan, NW India, Nepal, Sikkim, Bhutan, Assam, N Burma, Yunnan and SE Asia (Java).

Specimens examined

NW INDIA: N. Garhwal, Kedar Nath,, Rani 8940, 19 X, 1938 (E); Garhwal, Valley of Flowers, 3800 m, Bhattacharyya 29581, 19 VIII, 1963 (TI); Kumaon, Madden's collector 117 (E); loc. cit., Kalumundi, 9000 ft., Strachey & Winterbottom 14 (BM); loc. cit., Ralam, 11500 ft., Strachey & Winterbottom 14 (A); loc. cit., above Shinkola, 8000-9000 ft., Duthie 5510, 15 VII, 1886 (BM, DR); Stewart 1031 (E).

NEPAL. W NEPAL: Doti District, Kapthad, 3330 m., Tabata et al. 1080, 9 VII, 1976 (KYO, A, TI); loc. cit., 3000 m, Tabata et al. 1095, 9 VII, 1976 (KYO, A, TI); Sajbari area, 13000 ft., Shrestha 12, 1 VII, 1966 (BM); Dori Lekh, 3500 m, Rajbhandari & Roy 3359, 17 VII, 1979 (KYO). C NEPAL: Kali Gandaki, Tukucha, 10000 ft., Stainton, Sykes & Williams 1113 & 1197, 13 & 16 VI, 1954 (BM, A, E); loc. cit., Lete, 10000 ft., Stainton, Sykes & Williams 1669, 9 VII, 1954 (BM); Above Maikot, 10000 ft., Stainton, Sykes & Williams 3266, 26 VI, 1954 (BM, A, E); Ghar Khola, 9500 ft., Stainton, Sykes & Williams 5773, 15 VI, 1954 (BM, L); Michet, 13000-14500 ft., Wigram 138, 16 IX, 1927 (E); Khare Khola, Bitta Kharka - Patale Pokhari, 3300-4100 m, Ohba et al. 8351412, 12 IX, 1983 (TI); Dhaulagiri Zone, Parbat Distr., Chandruk - Gandruk Deorali, 1950-2530 m, Ohba et al. 8310233, 10 VII, 1983 (TI); loc. cit., Gandruk Deorali - Bhanthanti, 2500 m, Ohba et al. 8350245, 11 VII, 1983 (TI); loc. cit., Banthanti - Gorepani Deorali, 2900 m, Ohba et al. 8310313, 12 VII, 1983 (TI); loc. cit., Gorepani Deorali - Shikha, 2100-3170 m, Ohba et al. 8350404, 14 VII, 1983 (TI); Machhapuchhare Base Camp - Hinko, 3500-3650 m, Suehiro 1411, 1 X, 1976 (KYO); Yatumbal - Oo Kharka, 2900 m, Kanai & Shakya 672139, 30 VI, 1970 (TI, KYO, TNS); Gosain Than, Wallich 1026 (A, BM, E, K); loc. cit., Wallich s.n. (DR). E NEPAL: Khimti Khola, 27°33'N 86°17'E, 11000 ft., Stainton 4787, 13 VII, 1964 (BM); Janakpur Zone, Ramechhap Distr., Koshing Kharka - Thare Og, 4000-4150 m, Ohba et al. 8580392, 22 VII, 1985

(YI); Rolwaling, 27°55'N 86°23'E, 12000 ft., Stainton 4689, 27 VI, 1964 (BM); Rolwaling Himal, Lamuzala, 3000 m, Yoda s.n., 8 VI, 1963 (KYO); loc. cit., 2900 m, Yoda s.n., 8 VI, 1963 (KYO); Jata Pokhri, 14000-15000 ft., Dhwoj 628 & 629 in 1930 (BM, E, TI); Lamche Danda, 27°26'N 86°27'E, 3100 m, Dobremex 247, 25 VI, 1970 (BM); Soongoorey, Dhwoj 238 in 1929 (BM, E); Seti - Jumbesi, c. 10000 ft., Schilling 924, 20 VII, 1966 (K); Tolo Gumpa Khola, 3100 m, Nakao s.n., 16 VII, 1953 (KYO, TNS); Pike (near Okhardhunga), 3000-3500 m, Itoh I-69, 9-10 IX, 1976 (KYO); Bhojpur Distr., Salpabhanjang - Charapani, 3320 m, Tabata et al. 10936, 26 VI, 1978 (KYO); Yiringdham, 27°20'N 87°07'E, 9000 ft., Williams 617, 15 VI, 1969 (BM); Arun Valley, Kasuwa Khola, N of Num, 10000 ft., Stainton 604, 10 VI, 1956 (BM, A, E); Sankhuwa Khola, 10000 ft., Stainton 7078, 10 VI, 1974 (E); Sankhuwa Sabha Distr., Bhainsi Kharka - Khongma, 27°35'N 87°15'E, 2540-3500 m, Suzuki et al. 8880494, 15 VII, 1988 (TI); Sogie - Gupa, c. 9000 ft., Beer 8218, 25 VI, 1971 (BM, TI); Mt. Makalu, Chungnehri, 2500 m, Ohsawa & Shakya 2325, 14 X, 1971 (TI); Shidua - Tute, 2200-2400 m, Ohba et al. 9133019, 13 VII, 1991 (TI); Tute - Tinjure Phedi, 2400-2600 m, Ohba et al. 9133025, 14 VII, 1991 (TI); Mangal Bare - Gupha Pokhari, 2700-2750 m, Ohba et al. 9133054, 16 VII, 1991 (TI); Gupha Pokhari - Angare Kharka, 2800 m, Ohba et al. 9133057 & 9133058, 17 VII, 1991 (TI); Angare Kharka - Chhippon, 2810 m, Ohba et al. 9133061, 18 VII, 1991 (TI); Chhippon - Gidde, 3500 m, Ohba et al. 9133063, 19 VII, 1991

(TI); Chhippon - Gidde, 3040 m, Ohba et al. 9133064, 19 VII, 1991
(TI); Singoa Kharka - Pahakhola, Ohba et al. 9130356, 11 VIII,
1991 (TI).

SIKKIM: Darjeering, 11000 ft., Burkill 25367, 22 X, 1904
(E); loc. cit., Tonglo, 10000 ft., Clarke 27523, 12 IX, 1875 (BM,
K); loc. cit., Senchal, 8000 ft., Cave s.n., 14 VII, 1917 (E, A);
loc. cit., Phalut - Sandakphu, 3300 m, Hara et al. 2626, 6 VI,
1960 (TI); Sandakphu, 12000 ft., Ribu & Rhomoo 765, 21 VII, 1913
(E); loc. cit., 12000 ft., Cave s.n., 25 VII, 1919 (A, E); loc.
cit., Singalila, 3800-3970 m, Hara et al. 15355 & 15356, 14 VII,
1969 (TI, KYO); Sandakphu - Garibans, 3000-2600 m, Hara et al.
2625 & 2638, 7 VI, 1960 (TI, KYO); Singalila, 10000 ft., Clarke
13514, 7 X, 1870 (BM); loc. cit., Mt. Singalila, 3980 m, Hara et
al. s.n., 17 VII, 1969 (TI); Singalila Ridge, c. 4000 m, Rai 325
& 327, 19 VII, 1981 (B); Chiyabanjan - Singalila, c. 11500 ft.,
Lacaita 42, 5 V, 1913 (BM); Chiyabanjan - Phalut, 3100-3500 m,
Hara et al. 766, 2 VI, 1960 (TI, A, KYO); Senchal - Tiger Hill,
2400-2500 m, Hara et al. 2624, 23 VI, 1960 (TI, A); Yakla, 11000
ft., Clarke 10059, 17 X, 1869 (BM); loc. cit., 13000 ft., Clarke
9616, 16 X, 1869 (BM); Jongri, 9000 ft., Watt 5632, 6 VI, 1881
(E); loc. cit., 12000 ft., Clarke 25953, 15 X, 1875 (BM); Thomson
s.n. in 1857 (L); 10000-12000 ft., Hooker f. s.n. (A, BM, E, K,
L, P); 11000 ft., Clarke s.n., X, 1870 (DR).

E HIMALAYA: Debripani, 5000 ft., Cave s.n., 9 VI, 1923 (E);
Hooker f. & Thomson s.n. in 1855 (P).

BHUTAN: Timpu, Phajuding, 10000 ft., Cooper 3083-B, 13 VII, 1914 (BM); Shingbe, Me La, 12500 ft., Ludlow, Sherriff & Hicks 20696, 4 VI, 1949 (BM, E).

ASSAM: Kashia, 5000 ft., Clarke 19168, 16 X, 1872 (K).

BENGAL: Wallich s.n. (DR).

CEYLON: N Eliya, 7000 ft., C. V. 2767 (BM, K).

NE BURMA: Ridge above Laktang (Kang-fang route), 9000 ft., Kingdon-Ward 3076, 26 V, 1919 (E); N Maikha-Salwin Divide, 26°30'N, 12000 ft., Forrest 29701, VI, 1931 (E, TI).

YUNNAN: Che-tse-lo, 3200 m, Tsai 58332, 30 VIII, 1934 (A); Chengkang, Snow Range, Hsiaoshuishan, 3000 m, Yü 17218, 5 VIII, 1938 (A, E); Salwin-Kiukiang Divide, Parolaka, 3400 m, Yü 20649, 11 X, 1938 (A, E); loc. cit., Panbahlung, 3600 m, Yü 20845, 22 X, 1938 (A); Mekong-Salwin Divide, 4000 m, Yü 22450, 20 VIII, 1938 (PE); loc. cit., Sila, 3400 m, Yü 22543, 27 VIII, 1938 (E); Sawalonba, 3400 m, Yü 22811, 21 X, 1938 (PE).

LOCALITY UNKNOWN: Papabnee Luikala Chaudaus, c. 8000 ft., collector unknown s.n., 15 VII, 1886 (E); Leuhen, collector unknown s.n., 9 VII, 1849 (K).

Note: Var. polyphylla shows much variation in the Himalaya and adjacent regions in height, leaf length, serration and indumentum of the leaves. The variety grows in various habitats, such as beside trails in forests, temperate meadows and wet places between 2000 m and 3500 m.

In SE Asia, var. polyphylla was recorded from Java and var. kinabaluensis (Stapf) Kalkman from Borneo (Kalkman 1968). We have not examine any specimen of var. polyphylla collected from Java. Var. kinabaluensis has lanceolate serration incised to about halfway of the leaflets while var. polyphylla has ovate serration incised less than halfway. Though we examined only one specimen of var. kinabaluensis identified by Kalkman (Mt. Kinabalu, near Sayat-Sayat Hut, 3760m, Smith 502, 29 VII, 1978 deposited in KYO), it seems to be regarded as a geographical variety.

5b. *Potentilla polyphylla* var. *himalaica* H. Ikeda et H. Ohba,
var. nov. (Fig. 18)

A typo calycis lobis longioribus 4.5-7.5 mm (nec 2.5-5 mm) longis, petalis 9-11 mm (nec 6-9 mm) longis, pedicels 4-6 cm et stylis 1-1.2 mm bene differt.

TYPE: E Nepal, Koshi Zone, Sankhuwa Sabha Distr., Jaljale Himal, Khokling - Jaljale (87°25'E 27°25'N), 3700 m alt. 21 VII, 1991. H. Ohba et al. 9136075 (TI-holo, BM, A, KATH-iso).

Radical leaves 10-30 cm long, 2-5 cm wide with 6-12 pairs of lateral leaflets with alternating small leaflets. Leaflets strigose beneath; terminal leaflet obovate to broad obovate, 1-3 cm long, 1-2 cm wide, serrate with 20-25 teeth with acute tips.

Peduncles 8-25 cm long. Cauline leaves with 5-8 pairs of leaflets, upper 1-2 pairs without small leaflet; auricles of

stipules with 7-13 teeth.

Pedicels 4-6 cm long. Flowers 1.5-3 cm across; hypanthia 8-12 mm across. Episeals narrowly oblong to oblong, 4-7 mm long, 3-6 mm wide, serrate with 3-5 teeth with acute tips. Sepals 4-6 mm long, 3-4.5 mm wide. Petals 9-11 mm long, 9-12 mm wide.

Long stamens 2-3 mm long; anthers 0.9-1.2 mm long, 1-1.2 mm wide. Ovaries 0.7-0.8 mm long, 0.4-0.6 mm wide; styles 1-1.4 mm long, slender. Chromosome number $2n=28$.

Distr. E Nepal and Bhutan.

Specimens examined

E NEPAL: Khokling - Jaljale, 3700 m, Ohba et al. 9136075, 21 VII, 1991 (TI).

BHUTAN: Shingbe, Me La, 12500 ft., Ludlow, Sherriff & Hicks 20696, 4 VI, 1949 (BM).

Note: Var. himalaica (Fig. 18) has longer styles, anthers and petals than those of var. polyphylla. Fig. 20 shows the length and width of the petals of var. himalaica and var. polyphylla from the specimens collected in the Jaljale Himal and from herbarium specimens. Var. himalaica grows in alpine meadows around 3500 m in the Jaljale Himal.

5c. *Potentilla polyphylla* var. *interrupta* (Yü et Li) H. Ikeda et H. Ohba, stat. et comb. nov.

TYPE: Yunnan, Gonsshan, alt. 3500 m, 16 X, 1938. T. T. Yü 20723
(PE-holo, iso, E-iso).

BASIONYM: *P. interrupta* Yü et Li, *Acta Phytotax. Sin.*, 18: 8
(1980).

Radical leaves 16-30 cm long, 2-5 cm wide with 6-10 pairs of lateral leaflets with alternating small leaflets. Leaflets villose beneath; terminal leaflet broad linear to lanceolate, 3-6 cm long, 1.5-2.5 cm wide, serrate with 25-50 teeth with acute tips.

Peduncles 10-35 cm long. Cauline leaves with 5-7 pairs of leaflets, upper 1-2 pair without small leaflet; auricles of stipules with 8-15 teeth.

Pedicels 2-4 cm long. Flowers 1.5-2 cm across; hypanthia 8-12 mm across. Episeals 3-5 mm long, 2-3 mm wide, entire or with 3 teeth with acute tips. Sepals 4-5.5 mm long, 3-4 mm wide. Petals 8-9.5 mm long, 6-8.5 mm wide.

Long stamens 2-3 mm long; anthers 0.6-1 mm long, 0.5-0.8 mm wide. Ovaries 0.7-0.9 mm long, 0.5-0.6 mm wide; styles 1-1.3 mm long, slender. Chromosome number $2n=28$.

Distr. Nepal, Sikkim, Bhutan and Yunnan.

Specimens examined

NEPAL. C NEPAL: Michet, 15000 ft., Dhwoj 165 in 1928 (E);
Gurkha Nesum, collector unknown s.n., 20 VII, 1937 (E);

Kyanging, Langtang Khola, 3600-3900 m, Kanai & Shakya 2306, 15 VII, 1970 (TI). E NEPAL: Khare Khola, Patale Pokhari - Phedi Kharka, 4000-2100 m, Ohba et al. 8332008, 13 IX, 1983 (TI); Jata Pokhri, 14000-15000 ft., Dhwoj 631 in 1930 (E, BM); Janakpur Zone, Ramechhap Distr., Jata Pokhari - Botase Kharka, 4220-4500 m, Ohba et al. 8580336, 20 VII, 1985 (TI); loc. cit., Botase Kharka - Koshing Kharka, 4000-4500 m, Ohba et al. 8530386, 21 VII, 1985 (TI); loc. cit., Thare og - Phedi Kharka, 4150 m, Ohba 8530520, 26 VII, 1985 (TI); Around Banduke, Ohba et al. 9130224, 2 VIII, 1991 (TI); Banduke - Jomle, 4200 m, Ohba et al. 9130237, 4 VIII, 1991 (TI); Jogimara Bhanjyang, 4100 m, Kanai & Shakya 1520, 15 VI, 1972 (TI); Tamur Valley, Mewa Khola, Topke Gola, 13000 ft., Stainton 916, 10 VII, 1956 (BM, A, E).

SIKKIM: Zeum Valley, 11500 ft., Smith & Cave 1678, 21 VII, 1909 (B).

E HIMALAYA: Tonglo, 9000 ft., Ribu & Rhomoo 6305 in 1913 (E).

BHUTAN: Above Sengor, below Thrumse La, 27°23'N 91°01'E, c. 3600 m, Grierson & Long 1919, 14 VI, 1979 (E, A, K).

YUNNAN: Salwin-Kiukiang Divide, Danglahtung, 3500 m, Yü 20723, 16 X, 1938 (E, PE).

Note: The lower surface of the leaflets of var. interrupta are villose with appressed hairs while those of var. polyphylla are strigose with spreading hairs mainly on the veins. The

leaflets of var. interrupta are narrowly elliptic and 3.5-5.0(-5.5) cm long while those of var. polyphylla are elliptic to broadly elliptic and 1.5-3.5(-5) cm long. The auricles of the stipules of var. interrupta are linear versus oblong to ovate in var. polyphylla.

Although Soják (1988b) suggested that P. interrupta was identical with P. josephiana (as P. lineata var. intermedia), var. interrupta has the uppermost leaflet pair with a cuneate base while P. josephiana has a decurrent leaf base. The chromosome number of var. interrupta is $2n=28$ versus $2n=42$ in P. josephiana.

Several specimens of this variety were identified as P. lineata var. interrupta by Grierson & Long (1987).

5d. Potentilla polyphylla var. barbata Lehm., Rev. Pot. 54 (1856).

TYPE: Bengal. Wallich 1030 (BM, E, L, P)

Radical leaves 10-30 cm long, 2-5 cm wide with 6-12 pairs of lateral leaflets with alternating small leaflets. Leaflets strigose beneath; terminal leaflet obovate, 1-3 cm long, 1-2 cm wide, margin with 20-25 teeth with acuminate tips.

Peduncles 8-25 cm long. Cauline leaves with 4-7 pairs of leaflets, upper 1-2 pairs without small leaflet; auricles of stipules with 7-13 teeth.

Pedicels 4-6 cm long. Flowers 1.5-3 cm across; hypanthia 8-

12 mm across. Episeals narrow oblong to oblong, 4-5 mm long, 3-6 mm wide, serrate with 3-5 teeth with acuminate tips. Sepals 4-6 mm long, 3-4.5 mm wide. Petals 9-12 mm long, 9-12 mm wide.

Long stamens 2-3 mm long; anthers 0.9-1.2mm long, 1-1.2 mm wide. Ovaries 0.7-0.8 mm long, 0.4-0.6 mm wide; styles 1-1.4 mm long, slender. Chromosome number $2n=28$.

Distr. Kumaon, Ceylon and Assam.

Specimens examined

NW INDIA: Kumaon, Blinkworth s.n. (BM).

ASSAM: Khasi Hills, collector unknown s.n. (BM); loc. cit., Herb. Kurz s.n. (E); loc. cit., Oldham s.n. (E); loc. cit., 4000-5000 ft., Hooker f. & Thomson s.n. (A, BM, DR, E, L, P); loc. cit., Herb. Miers 371 (BM); loc. cit., Maglong, Nandi s.n., 15 X, 1932 (K); loc. cit., Mawphlang, c. 6000 ft., Chand 7960, 11 VIII, 1954 (L); loc. cit., 6000 ft., Koelz 32173, 15 XII, 1952 (L); loc. cit., Laitlynkot, c. 6000 ft., Chand 1740, 8 VII, 1949 (L); loc. cit., Cherrapunji, Kihara & Nakao s.n., 8 XI, 1959 (KYO); Sohra, 5000 ft., Clarke 19168 D, 16 X, 1872 (K); loc. cit., Reen, 5000 ft., Clarke 14779 A, 28 XI, 1871 (BM); Tserra, 4000-5000 ft., Clarke 5396, 29 IX, 1867 (BM); Simons s.n. (L); Griffith 371 (BM).

BENGAL: loc. cit., Wallich 1030 (BM, E, L, P); loc. cit., Wallich s.n. (BM, DR); E Bengal, Herb. Griffith 2125 (A, L); loc. cit., Herb. Griffith s.n. (DR).

CEYLON: loc. cit., Hooker f. s.n. (DR).

PENINSULA IND. ORIENTALIS: loc. cit., Herb. Wight 289 (E)

LOCALITY UNKNOWN: collector unknown, s.n. (B).

Note: Var. barbata was published first as a species, P. barbata Wall. [Cat. Pl. 28, no. 1030 (1829), nom. nud.], and Lehmann (1856) described this as a variety of P. polyphylla. It differs from var. polyphylla in the leaflets and episepals with acuminate teeth and the slender styles.

Potentilla mooniana Wight, described from Ceylon and illustrated in Wight, Icon. Pl. Ind. Orient., 1: t. 233 (1839), shows the same shape of leaflets, episepals and the style as P. polyphylla var. barbata. Therefore P. mooniana may be identical with var. barbata.

Putative hybrids in Nepal Himalaya

In Nepal Himalaya four putative hybrids between species in the P. lineata group are recognized by comparisons of morphological characters and chromosome numbers: P. x polyjosephiana (P. polyphylla x P. josephiana); P. lineata x P. festiva; P. lineata x P. polyphylla; and P. festiva x P. polyphylla. These are sterile and produce no normal pollen nor mature seed. Some individuals have degenerated stamens, others have anthers without normal pollen. The assumed parents can be presumed from the shared diagnostic characters of both parents

and/or the chromosome numbers.

1. *Potentilla* x *polyjosephiana* H. Ikeda et H. Ohba, hybr. nov.
(Fig. 19)

Hybrida putativa inter *P. josephiana* et *P. polyphylla*, et propagatione asexualis, caule florifero profuse ramoso, circa dimidio inferiore repente et radicante ad nodos, ceterum adscendente. Flore sine polline semineque. Numero chromosomatum $2n=35$, quo triploideo, hoc inter eos parentium putativorum.

TYPE: E Nepal. Koshi Zone, Sankhuwa Sabha Distr., Milke Danda, Gupha Pokhari - Angare Kharka, 2810 m. Ohba et al. 9137058 (TI-holo, BM, A, KATH-iso).

Radical leaves 5-15 cm long, 2-3.5 cm wide with 5-10 pairs of lateral leaflets with alternating small leaflets. Leaflets strigose beneath; terminal leaflet 1-3 cm long, 1-2 cm wide, serrate with 20-35 teeth. Auricles of stipules free.

Peduncles 5-20, 8-25 cm long with unicellular hairs; occasionally propagate from the nodes of peduncles. Cauline leaves with 5-8 pairs of leaflets, upper 1-2 pairs without small leaflet; auricles of stipules with 7-13 teeth.

Pedicels 1-3 cm long. Flowers 1-1.5 cm across; hypanthia 7-12 mm across. Episepals narrow oblong to oblong, 3-5 mm long, 2.5-4.5 mm wide, serrate with 3-5 teeth. Sepals elliptic to ovate, 3-5 mm long, 2-4 mm wide. Petals obovate to broad obovate

with round apex, 5.5-9 mm long, 5-9 mm wide.

Stamens sometimes degenerated; long stamens 1-2 mm long; anthers globose or ellipsoid, 0.3-0.9 mm long, 0.3-0.8 mm wide without normal pollen. Ovaries ellipsoid to ovoid, 0.5-0.7 mm long, 0.2-0.5 mm wide; styles 0.5-1.3 mm long. Chromosome number $2n=35$.

Specimens examined

E NEPAL: Hati Sar - Minchin Dhap, Hara et al. s.n., 28 X, 1963 (TI); Minchin Dhap - Mul Pokhari, near Taplejung, c. 2700 m, Hara et al. 6306860, 29 X, 1963 (TI, KYO); Mul Pokhari - Gorzu Kosir, c. 2200 m, Hara et al. s.n., 30 X, 1963 (TI); Dumban - Taplejung, c. 1400 m, Kanai et al. s.n., 1 XI, 1963 (TI); Taplejung, 1700 m, Hara et al. s.n., Nov. 2, 1963 (TI); Shidua - Tute, 2200-2400 m, Ohba et al. 9137019, 13 VII, 1991 (TI); Gupha Pokhari - Angare Kharka, 2800 m, Ohba et al. 9137058, 17 VII, 1991 (TI); Angare Kharka - Chhippon, 2810 m, Ohba et al. 9137061, 18 VII, 1991 (TI); Near Tawa, 7000 ft., Upadhye 1338, XI, 1963 (US).

Note: Potentilla x polyjosephiana (Fig. 19) is similar to P. polyphylla in external appearance, but does not produce normal pollen nor seed. The chromosome number is $2n=35$ (Fig. 13), which is an intermediate number between P. polyphylla ($2n=28$) and P. josephiana ($2n=42$). From the chromosome numbers, these plants are thought to be putative hybrids between P. polyphylla and P.

joepiana, although the uppermost leaflet pair is not deccurrent at the base as in P. joepiana. Instead of producing seed, the plants reproduce by new shoots from the nodes of the peduncles and spread in disturbed habitats, such as places arising from landslides.

2. Putative hybrid of P. lineata and P. festiva

Radical leaves 6.5-11 cm long, 2-3 cm wide with 5-10 pairs of lateral leaflets with alternating small leaflets. Leaflets sericeous beneath; terminal leaflet 1.5-3 cm long, 0.7-1 cm wide, serrate with 30-45 teeth. Auricles of stipules sometimes connate and sometimes free.

Peduncles 6-20 cm long, lower with unicellular hairs, upper with multicellular hairs with glandular tips and unicellular hairs. Cauline leaves with 5-8 pairs of leaflets, upper 1-2 pairs without small leaflet; auricles of stipules with 7-13 teeth.

Pedicels 1-2 cm long. Flowers 1-1.5 cm across; hypanthia 6-1.2 mm across. Episeals narrow elliptic, 3-4.5 mm long, 1.5-2.5 mm wide, entire or with 2-3 teeth. Sepals elliptic to ovate, 4-5 mm long, 2.5-3.5 mm wide with acuminate apex. Petals obovate to broad obovate with round apex, 5-7 mm long, 4.5-5.5 mm wide.

Stamens sometimes degenerated; long stamens 0.6-0.7 mm long; anthers globose or ellipsoid without normal pollen, 0.5-0.7 mm long, 0.4-0.6 mm wide without normal pollen. Ovaries ellipsoid to

ovoid, 0.6-0.7 mm long, 0.4-0.5 mm wide; styles 1.1-1.3 mm long.
Chromosome number $2n=21$.

Specimens examined

E NEPAL: Mangal Bare - Gupha Pokhari, 2700-2750 m, Ohba et al. 9138054, 16 VII, 1991 (TI).

Note: This plant was growing with the putative parents, P. lineata and P. festiva and has peduncles with multicellular hairs with glandular tips. The length of the leaflets, the number of serrations and the shape of petals are intermediate between P. festiva and P. lineata. The auricles of the stipules are sometimes connate and sometimes free. The chromosome number, $2n=21$, is intermediate between P. lineata ($2n=14$) and P. festiva ($2n=28$).

3. Putative hybrid of P. lineata and P. polyphylla

Radical leaves 8-12 cm long, 2-3 cm wide with 5-9 pairs of lateral leaflets with alternating small leaflets. terminal leaflet 2-4 cm long, 1-2 cm wide, serrate with 30-50 teeth; leaflets strigose beneath. Auricles of stipules free.

Peduncles 5-20 cm long, lower with unicellular hairs, upper multicellular hairs with glandular tips and unicellular hairs. Cauline leaves with 4-9 pairs of leaflets, upper 1-2 pairs without small leaflet; auricles of stipules with 7-13 teeth.

Pedicels 1-2 cm long. Flowers 1-1.5 cm across; hypanthia 7-

12 mm across. Episepals oblong, 4-5 mm long, 1.5-3 mm wide, serrate with 3-5 teeth. Sepals elliptic to ovate with acute apex, 3.5-4.5 mm long, 2.5-3.5 mm wide. Petals obovate to broad obovate with round apex, 6-8 mm long, 5.5-7 mm wide.

Stamens sometimes degenerated; long stamens 1.8-2.5 mm long; anthers globose or ellipsoid without normal pollen, 0.6-0.7 mm long, 0.4-0.7 mm wide. Ovaries ellipsoid to ovoid, 0.5-0.7 mm long, 0.3-0.5 mm wide; styles 1-1.2 mm long.

Specimens examined

E NEPAL: Tute - Tinjure Phedi, 2400-2600 m, Ohba et al. 9139025, 14 VII, 1991 (TI); Mangal Bare - Gupha Pokhari, 2700-2750 m, Ohba et al. 9139054, 16 VII, 1991 (TI).

Note: This grows together with the putative parents, P. lineata and P. polyphylla. The indumentum of the lower leaf surface, the shape of the episepals and styles are intermediate between P. lineata and P. polyphylla, while the shape of the sepals is identical with those of P. polyphylla. The peduncles have multicellular hairs with glandular tips. The anthers are smaller than those of P. polyphylla and P. lineata.

4. Putative hybrid of P. festiva and P. polyphylla

Radical leaves 5-18 cm long, 2-3 cm wide with 5-13 pairs of lateral leaflets with alternating small leaflets. Leaflets

villose beneath; terminal leaflet 1-3.5 cm long, 0.7-2 cm wide, serrate with 20-45 teeth. Auricles of stipules free.

Peduncles 5-25 cm long with unicellular hairs. Cauline leaves with 5-12 pairs, upper 1-2 pairs without small leaflet; auricles of stipules with 5-15 teeth.

Pedicels 1-2.5 cm long. Flowers 1-1.3 cm across; hypanthia 6-10 mm across. Episepals elliptic to ovate, 3-5.5 mm long, 1.5-4.2 mm wide, entire or with 3-5 teeth. Sepals broad ovate to triangular with acute or acuminate apex, 3-5 mm long, 2.5-3.5 mm wide. Petals obovate to broad obovate with round apex, 5-9 mm long, 4.5-9 mm wide.

Stamens sometimes degenerated; long stamens 0.5-3 mm long; anthers globose or ellipsoid without normal pollen, 0.2-0.9 mm long, 0.2-0.7 mm wide. Ovaries ellipsoid to ovoid, 0.4-0.7 mm long, 0.4-0.5 mm wide; styles 0.7-1.2 mm long. Chromosome number $2n=28$.

Specimens examined

E NEPAL: Bilbatay Bhanjang - Hati Sar, Hara et al. s.d., 27 X, 1963 (TI); Tute - Tinjure Phedi, 2400-2600 m, Ohba et al. 9130025, 14 VII, 1991 (TI); Tinjure Phedi - Mangal Bare, 2600-2750 m, Ohba et al. 9130050, 15 VII, 1991 (TI); Mangal Bare - Gupha Pokhari, 2700-2750 m, Ohba et al. 9130054, 16 VII, 1991 (TI); Gupha Pokhari - Angare Kharka, 2800 m, Ohba et al. 9130057 & 9130058, 17 VII, 1991 (TI).

Note: These plants are found in habitats where P. festiva and P. polyphylla grow together and are intermediate in the indumentum of the lower leaf surface and the shape of the styles between those two species. The stamens are sometimes degenerate. The chromosome number, $2n=28$ (Fig. 14), is identical with that of P. festiva ($2n=28$) and P. polyphylla ($2n=28$). Although this putative hybrid is euploid, it is thought to be an FI hybrid because it produces no normal pollen nor seed.

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Table 1. Chromosome numbers of four species and three putative hybrids of the *P. lineata* group. The numbers in parentheses indicate the number of individuals observed. All materials obtained in the Jaljale Himal in 1991.

<i>P. festiva</i>	2n=28 (12)
<i>P. lineata</i>	2n=14 (10)
<i>P. josephiana</i>	2n=42 (7)
<i>P. polyphylla</i>	
var. <i>polyphylla</i>	2n=28 (20)
var. <i>himalaica</i>	2n=28 (1)
var. <i>interrupta</i>	2n=28 (1)
<i>P. x polyjosephiana</i>	2n=35 (7)
(<i>P. polyphylla</i> x <i>P. josephiana</i>)	
<i>P. lineata</i> x <i>P. festiva</i>	2n=21 (1)
<i>P. festiva</i> x <i>P. polyphylla</i>	2n=28 (9)

Figures 1 & 2. Stipules of radical leaves (scale bar=2 mm). Fig. 1. Stipules of radical leaves of Potentilla festiva. Between arrows indicates connate part of the auricles. In the schematic figure below shows the connate auricles (shaded). Fig. 2. Stipules of radical leaves of Potentilla lineata. Though two auricles overlap, they do not connate to the base (arrow). The schematic figure shows the free auricles.

Figures 3 & 4. Upper part of leaves (scale bar=2 mm). Fig. 3. Upper part of leaf of Potentilla josephiana. Fig. 4. Upper part of leaf of Potentilla polyphylla.

Figures 5-8. Peduncles and stigmas (scale bars=0.5 mm in Figs. 5 & 6, in Figs. 7 & 8=50 μ m). Fig. 5. Peduncle of Potentilla lineata. Fig. 6. Peduncle of Potentilla festiva. Fig. 7. Stigma of Potentilla polyphylla. Fig. 8. Stigma of Potentilla lineata.

Figures 9-14. Chromosomes of four species and two putative hybrids (scale bars=5 μ m). Fig. 9. Potentilla lineata, 2n=14. Fig. 10. Potentilla festiva, 2n=28. Fig. 11. Potentilla polyphylla var. polyphylla, 2n=28. Fig. 12. Potentilla josephiana, 2n=42. Fig. 13. Potentilla x polyjosephiana, 2n=35. Fig. 14. Putative hybrid of Potentilla festiva and P. polyphylla, 2n=28.

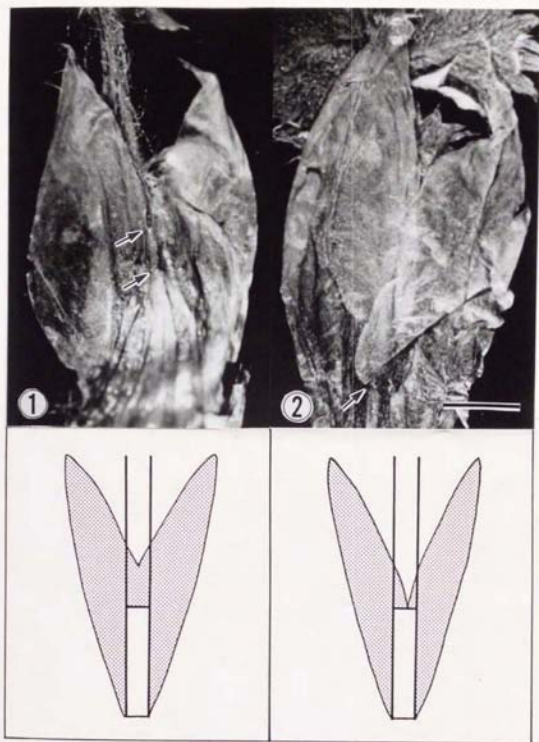
Figure 15. Distribution map of Potentilla festiva.

Figure 16. Distribution map of Potentilla josephiana (●) and Potentilla fallens (▲).

Figure 17. Distribution map of Potentilla lineata.

Figures 18 & 19. Holotypes. Fig. 18. Holotype of Potentilla polyphylla var. himalaica. Fig. 19. Holotype of Potentilla x polyjosephiana. Arrow indicates a reproductive new shoot from a node of a peduncle.

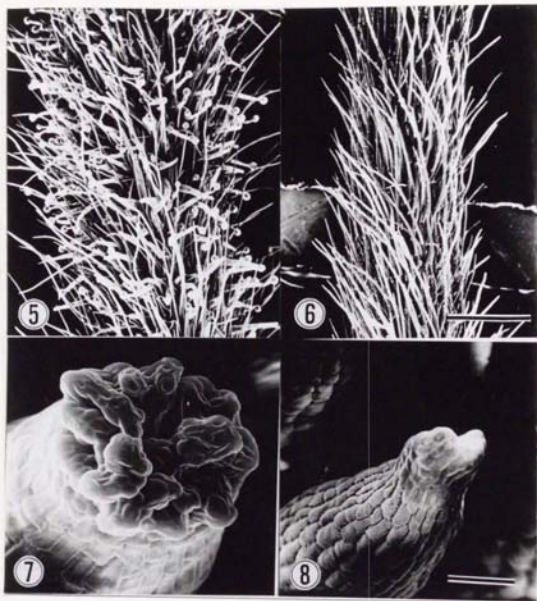
Figure 20. Partial separation of Potentilla polyphylla var. polyphylla (●, from collections in Nepal in 1991; △, from herbarium specimens) and P. polyphylla var. himalaica (○, from collections in Nepal in 1991; ▲, from herbarium specimen) using petal length and petal width.



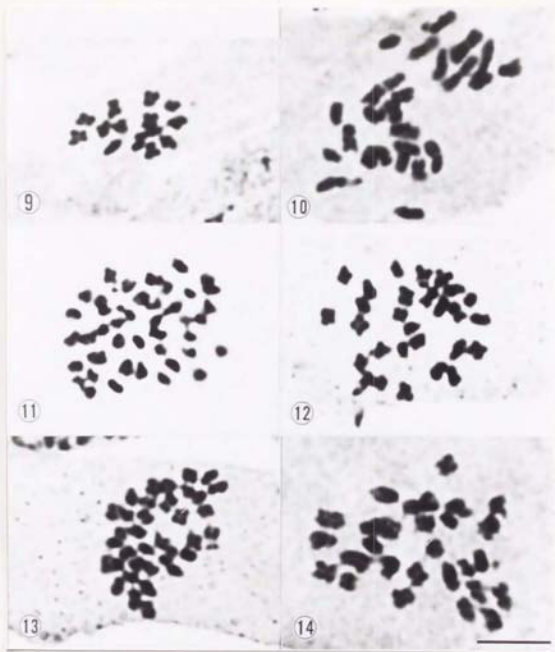
Figures 1 & 2. Stipules of radical leaves (scale bar=2 mm). Fig. 1. Stipules of radical leaves of *Potentilla festiva*. Between arrows indicates connate part of the auricles. In the schematic figure below shows the connate auricles (shaded). Fig. 2. Stipules of radical leaves of *Potentilla lineata*. Though two auricles overlap, they do not connate to the base (arrow). The schematic figure shows the free auricles.



Figures 3 & 4. Upper part of leaves (scale bar=2 mm). Fig. 3. Upper part of leaf of *Potentilla josephiana*. Fig. 4. Upper part of leaf of *Potentilla polyphylla*.



Figures 5-8. Peduncles and stigmas (scale bars=0.5 mm in Figs. 5 & 6, in Figs. 7 & 8=50 μ m). Fig. 5. Peduncle of Potentilla lineata. Fig. 6. Peduncle of Potentilla festiva. Fig. 7. Stigma of Potentilla polyphylla. Fig. 8. Stigma of Potentilla lineata.



Figures 9-14. Chromosomes of four species and two putative hybrids (scale bars=5 μ m). Fig. 9. *Potentilla lineata*, $2n=14$.
 Fig. 10. *Potentilla festiva*, $2n=28$. Fig. 11. *Potentilla polyphylla* var. *polyphylla*, $2n=28$. Fig. 12. *Potentilla josephiana*, $2n=42$. Fig. 13. *Potentilla* x *polyjosephiana*, $2n=35$.
 Fig. 14. Putative hybrid of *Potentilla festiva* and *P. polyphylla*, $2n=28$.

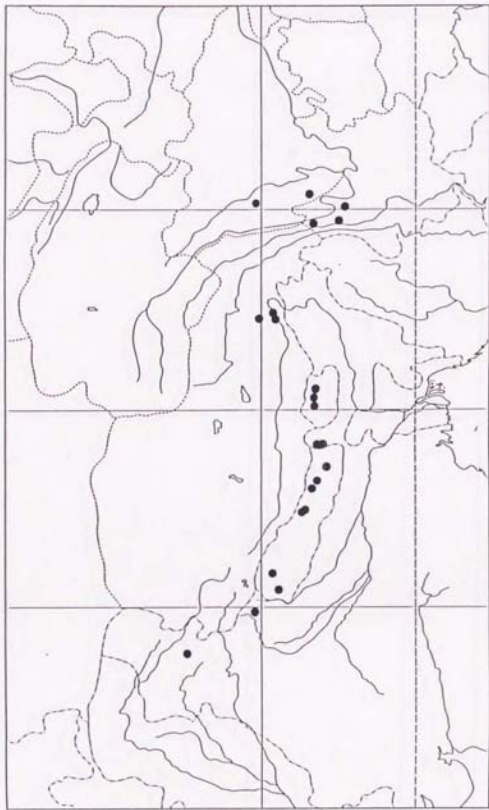


Figure 15. Distribution map of *Potentilla festiva*.

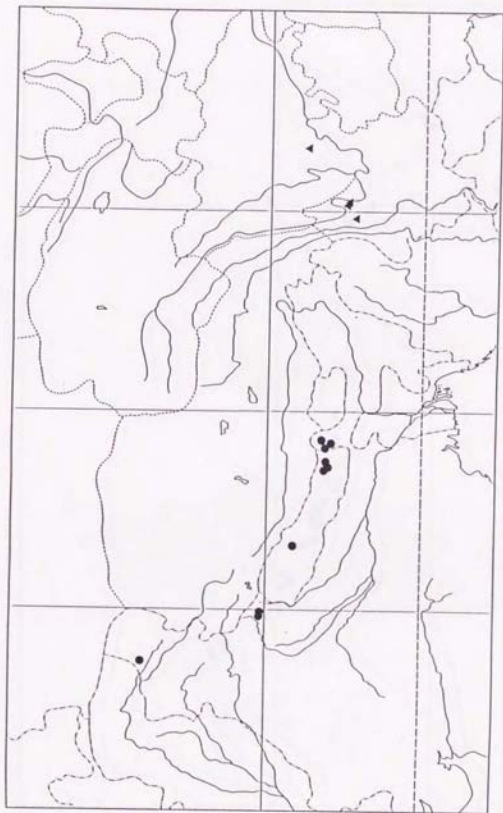


Figure 16. Distribution map of *Potentilla josephiana* (●) and *Potentilla falleng* (▲).

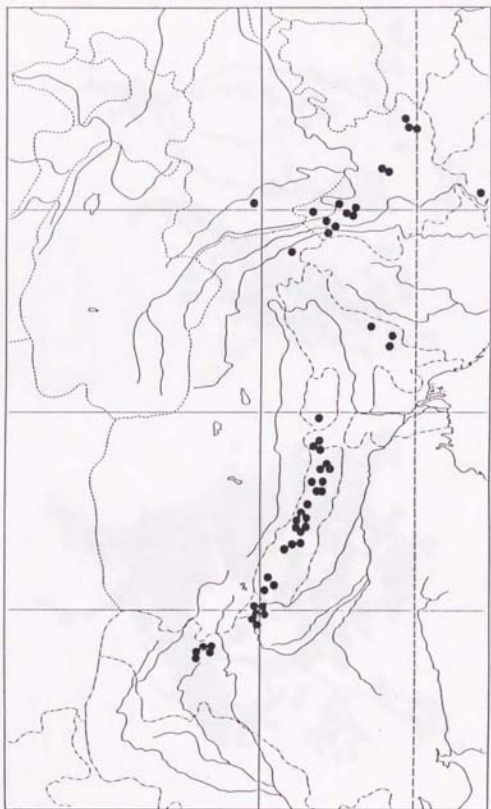


Figure 17. Distribution map of *Eotentilla lineata*.

18



19



Figures 18 & 19. Holotypes. Fig. 18. Holotype of *Potentilla polyphylla* var. *himalaica*. Fig. 19. Holotype of *Potentilla* x *polyjosephiana*. Arrow indicates a reproductive new shoot from a node of a peduncle.

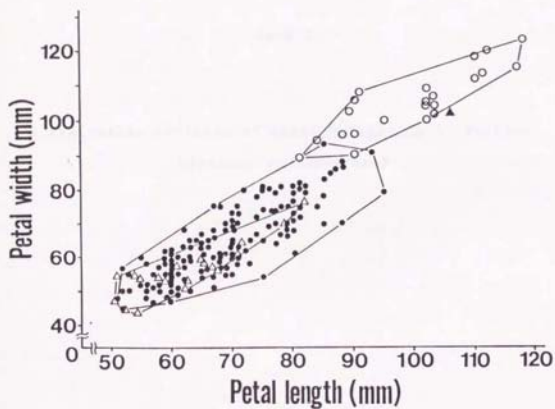


Figure 20. Partial separation of *Potentilla polyphylla* var. *polyphylla* (●, from collections in Nepal in 1991; Δ, from herbarium specimens) and *P. polyphylla* var. *himalaica* (○, from collections in Nepal in 1991; ▲, from herbarium specimen) using petal length and petal width.

Part 3

A systematic revision of genus *Potentilla* L. section
Leptostylae (Rosaceae)

I. INTRODUCTION

Section *Leptostylae* of genus *Potentilla* is mainly distributed in Himalaya and adjacent regions from Afghanistan to SW China (Yunnan and Sichuan) and the archipelagic Malaysia through NW India, Nepal, Sikkim, Bhutan, Tibet and Burma, except *P. anserina* and *P. anserinoides*. *Potentilla anserina* is distributed in Europe, Asia including Himalaya and adjacent regions, and also N America, and *P. anserinoides*, a close relative of *P. anserina*, occurs New Zealand (Rousi 1965). In Himalaya, the species of *Leptostylae* are found widely in the alpine grasslands and sometimes become dominant. Although Himalayan *Potentilla* has been studied, the circumscription of the species has not yet been successful.

The present paper aims to provide a revision of the species of *Leptostylae* in the region from Himalaya to SW China including Tibet and Burma. In this revision, I adopted a concept that a species is distinguished from others by difference of one or more qualitative morphological characters. If discontinuous quantitative character (or characters) is found in a species, infraspecific taxa are recognized in the species.

II. HISTORY

Taxonomic study of Himalayan Potentilla was begun in the early 19th century. In "Flora Nepalensis" based on the specimens of Buchanan-Hamilton and Wallich in Nepal, Don described nine species of Potentilla, in which three species, P. leuconota, P. peduncularis and P. microphylla, are in Leptostylae (Don 1825). Wallich prepared many new names in his lithographically printed catalogue (Wallich 1828-1849). He listed P. velutina and three variants in P. microphylla, β. glabriuscula, γ. depressa and δ. latifolia in Leptostylae (Wallich 1829). Lehmann (1856) revised Potentilla and he treated Wallich's P. velutina as a synonym of P. peduncularis and described Wallich's no. 1010 δ as an independent species, P. commutata.

Hooker (1878) recognized 39 species of Potentilla in his Flora of British India, in which P. anserina, P. peduncularis, P. leuconota, P. microphylla are in Leptostylae sensu Wolf (1908). He settled three sections, sect. Sibbaldia with 7 species, sect. Trichothalamus with 4 species and sect. Potentilla (as sect. Potentilla proper) with 28 species. Section Sibbaldia is now usually treated a distinct genus from Potentilla, and remaining herbaceous species were all included in sect. Potentilla. Although sect. Potentilla is heterogeneous, his treatment has been regarded as the basis of the systematics of Himalayan Potentilla.

Wolf (1908) published the first detailed monograph of Potentilla. He constructed the infrageneric system comprising two sections and six subsections essentially by the difference of hairiness of pistils as well as shape and position of styles. He recognized seven species in Leptostylae, in which four species are distributed in Himalaya. P. anserina, P. peduncularis, P. leuconota and P. microphylla, one, P. tatsienluensis, in SW China (Sichuan) and two, P. papuana and P. parvula, in SE Asia.

After Hooker (1878), great number of the specimens of Potentilla from various Himalayan regions have been accumulated in several herbaria, particularly BM, E, GH, K, KYO, TI and US. Recently Ohashi (1979) enumerated the Nepalese species. Grierson & Long (1987) treated the Bhutanese species of Potentilla, and recognized four species in Leptostylae.

Plants of high mountains in SW China (mainly Yunnan and Sichuan) were initially collected by French missionaries as Delavay and Soulié in the middle 19th century. It is the first that Franchet (1890) described P. peduncularis var. stenophylla based on Delavay's collection. Later Potentilla in SW China was vigorously been gathered by Forrest, Rock, Smith and Kingdon-Ward. Diels (1912a, 1912b), Smith (1914), Handel-Mazzetti (1939) and Fletcher (1950) found several new species in these collections. "Symborae Sinicae" is the first publication in which the species of Potentilla in high mountains of SW China were treated (Handel-Mazzetti 1933). Handel-Mazzetti recognized 30 species of Potentilla with one new species, P.

turfosa.

Yü and Li (1980, 1985) accomplished a revision of Chinese Potentilla according to a modified infrageneric system. Their system is fundamentally not different from Wolf (1908), but changed the rank and added several new infrageneric taxa. Leptostylae is treated as section in subgenus Gymnocarpae and recognized 15 species. In China although treatises of Potentilla were recently published in regional floras, e.g. Yü , Lu and Ku 1985 for Tibet, Ku 1993 for Hengduan mountains, their authors followed Yü and Li (1985).

III. MATERIALS AND METHODS

Morphological features and variations were observed mainly from about 2000 herbarium specimens. In the text, the following abbreviations of the herbaria are used according to Index Herbariorum, Part 1 (Holmgren, Holmgren & Barnett 1990).

Branching pattern and life forms were observed in the field and by herbarium specimens. Floral and other parts were observed under a binocular microscope and drawn by the aid of camera lucida after boiling in water.

Chromosome numbers were counted in root tips. Root tips were collected in the field and pretreated in 2 mM 8-hydroxyquinoline solution for 2-3 hours and fixed in Newcomer's fluid (see Sharma & Sharma 1980) in the field (see Wakabayashi 1988). Root tips were macerated in 1N HCl at 60°C for 10.5 minutes and stained with 2% lacto-propionic orcein and squashed for cytological observation.

IV. RESULTS AND DISCUSSIONS

A. Morphological characters

1. Life forms based on the branching pattern (Figs. 1 & 2)

Four life forms, rosette, cushion, rhizomatous and stoloniferous, are found in *Leptostylae*. These life forms are produced from six different branching patterns of vegetative

shoots (Fig. 1). Leuconota-type (Fig. 1e) and Aristata-type (Fig. 1f) produce rosette form; Microphylla-type (Fig. 1c) bears cushion form; Peduncularis-type (Fig. 1d) rhizomatous form; Smithiana-type (Fig. 1a) and Anserina-type (Fig. 1b) stoloniferous form.

In the six branching patterns, Smithiana-type is sympodial and others are monopodial. Two species are sympodial and seventeen species are monopodial.

a. Smithiana-type

Potentilla smithiana and P. taronensis have axillary shoots terminating a flower and bearing a new vegetative shoot from the axils of the uppermost leaf. After producing several flowering shoots the axillary shoot finally becomes a new individual (Fig. 1a).

b. Leuconota-type

The stems do not branch or only branch occasionally (Fig. 1e). It found in P. leuconota, P. turfosa, P. turfosoidea, P. cardotiana, P. tristis, P. commutata, P. montisvictoriae, P. wenchuensis, P. festiva, P. josephiana, P. lineata, P. fallens and P. polyphylla.

c. Microphylla-type

In P. microphylla and P. stenophylla, many lateral stems have many leaves at the base and elongate from the axils of radical and cauline leaves (Fig. 1c). Branches and old leaves form a cushion.

d. Anserina-type

Potentilla anserina and P. gombalana differ from others in

having stolons elongate from the axils of radical leaves (Fig. 1b). The stolons do not terminate any flower. In P. anserina flowers and new vegetative shoots come forth from the axils of cauline leaves of stolons.

e. Peduncularis-type

Potentilla peduncularis, P. contigua, P. glabriuscula and P. makaluensis have rhizomatous stems which elongate from the nodes of subterranean rhizomes (Fig. 1d). Leaf blades of cauline leaves on rhizomes in subterranean part are somewhat degenerated but normal in terrestrial part.

f. Aristata-type

A rosulate species, P. aristata, is unique in branching pattern (Figs. 1f & 2). New shoots were produced and removed from subterranean rhizomes (Fig. 2).

Life form is thought to be related the vegetative and reproductive adaptation to the habitat of each species. Rosette form is the most common life form of perennial herbs not only in alpine and also various types of grassland. Leuconota- and Aristata-types produce this form. Cushion form is one of the characteristic life forms in alpine plants, and is thought to be an adaptation to severe environments in alpine habitats. Microphylla-type produces this form. Rhizomatous and stoloniferous forms are thought to be the way to spread individuals by vegetative reproductions. Smithiana-, Anserina- and Peduncularis-types produce this form. In Peduncularis-type, P. peduncularis and P. contigua grow dominantly in alpine grassland in Nepal Himalaya through the rhizomatous

reproduction, while *P. makaluensis* forms a dense mat community in alpine marshy place through copious rhizomatous reproduction. The representative species of Anserina-type, *P. anserina* spreads by many stolons in relatively arid places in alpine region. Table 1 shows the life forms, the branching patterns and the branching types of each species in sect. *Leptostylae*.

2. Stipules of radical leaves (Fig. 3)

As mentioned in Part 1, three types of stipules of radical leaves are recognized in section *Leptostylae* (Fig. 3).

The stipules of the following species are B-type: *P. microphylla*, *P. aristata*, *P. stenophylla*, *P. turfosa*, *P. turfosoidea*, *P. contigua*, *P. cardotiana*, *P. montisvictoriae*, *P. smithiana*, *P. taronensis*, *P. josephiana*, *P. lineata*, *P. fallens* and *P. polyphylla*. They have two triangular auricles with acute tips.

Potentilla leuconota, *P. tristis* and *P. festiva* are C-type, having two auricles variously connate. Figure 4 shows variation of degree of connation of two auricles of *P. leuconota*. *Potentilla makaluensis*, *P. glabriuscula*, *P. peduncularis*, *P. commutata*, *P. wenchuensis*, *P. anserina* and *P. gombalana* are D-type, having one auricle with entire margin. These three types of stipule are constant, and no intermediate state is found.

3. Stipules of cauline leaves (Fig. 5)

In *P. turfosoidea* and *P. anserina*, the auricles of cauline leaves surround stems and connate (Fig. 5b).

4. Inflorescence (Fig. 6)

Inflorescence of Potentilla is basically a dichasium (Fig. 6b). Variation of inflorescence in Potentilla can be interpreted as modification of dichasium. Number of flower is variable from one to many. In P. microphylla, P. aristata, P. turfosa, P. turfosoidea, P. makaluensis, P. glabriuscula, P. tristis, P. commutata, and P. gombalana the inflorescence is often reduced into a single flower (Fig. 6a). Potentilla leuconota, P. montisvictoriae and P. wenchuensis have umbel-like inflorescences, which are thought to be derived from reduction of peduncles (Fig. 6c).

5. Number of stamens (Fig. 7)

Three types of the number of stamens can be recognized.

A-type: stamens 20-25 or 30, arranged in three whorls (Fig. 7a). All species except P. commutata, P. glabriuscula and P. turfosa have this type.

B-type: stamens usually 10, arranged in a single whorl (Fig. 7b). Additional stamens sometimes emerged from the outer or inner whorl. Potentilla commutata var. commutata has this type.

C-type: stamens usually 5, sometimes 7-8, alternipetalously arranged in a single whorl (Fig. 7c). Potentilla glabriuscula has this type.

Number of stamens sometimes different between varieties in P. turfosa. Var. turfosa is 20 while var. gracillima is 15-17.

Varieties of Potentilla commutata belong to different types. Variety commutata having 10-15 stamens is B-type while var. major, 20 stamens, is A-type.

B. Chromosome numbers

In Leptostylae chromosome numbers have been reported from few species except for P. anserina and its aggregates distributed widely in temperate to arctic region of the Northern Hemisphere. In this species Tischler (1929), Popoff (1935), Turesson (1938), Erlandsson (1942), Löve & Löve (1956), Pólya (1949), Jørgensen, Sørensen & Westergaard (1958), Sokokovskaja & Strelkova (1960) and Rousi (1965) reported $2n=28$ (tetraploid), and Roscoe (1927), Erlandsson (1942), Gadella & Kliphuis (1963) and Rousi (1965) reported $2n=42$ (hexaploid). However, the chromosome number of the Himalayan P. anserina has not been reported.

Chromosome numbers of sixteen species in section Leptostylae collected in Nepal Himalaya were counted. Chromosome numbers of four species of series Lineatae are reported in Part 2 and those of twelve species are in Table 2. The somatic chromosome numbers of seven species are 14, seven are 28 and two are 42. Length of chromosomes, 1 μm to 4 μm , makes difficulty to analyze the karyotype.

Estimating the basic chromosome number of Potentilla as $x=7$, $2n=14$ is diploid, $2n=28$ is tetraploid and $2n=42$ is hexaploid. It is clarified that a polyploid series exists in Leptostylae. Diploid and triploid species are found in series

Microphyllae, and diploid, tetraploid and hexaploid species in series Pedunculatae and Lineatae.

No relationship between ploidy level and altitudinal distribution is found. This result is similar to those found in *Saxifraga* (Wakabayashi & Ohba 1989).

V. SYSTEMATIC TREATMENTS

Potentilla L., Sp. Pl. 1st ed. 495 (1753). DC., Prodr. 2: 571 (1825). G. Don, Gen. Hist. 2: 549 (1838). Endlicher, Gen. Pl. 1242, n. 6363 (1840). Lehmann, Rev. *Potentilla*.: 1 (1956). Hooker in Benth. & Hook. f., Gen. Pl. 1: 620 (1865). Focke in Engl. & Prantl, Nat. Pfl.-fam. III, 3: 34 (1891). Wolf, Monogr. *Potentilla*: 1 (1908). Rydberg in North Amer. Fl. 22: 293 (1908). Hutchinson, Gen. Fl. Pl. 1: 197 (1964).

Lectotype species: *P. reptans* L. (Rydberg 1908).

Section *Leptostylae* (Wolf) Yü et C. Li in Fl. Reip. Pop. Sin. 37: 263 (1985).

Potentilla section *Gymnocarpae* Wolf subsection *Leptostylae* Wolf in Monogr. Pot. 52 (1908).

Type species: *P. anserina* L.

Key to the subsection, series and species of section *Leptostylae*

1. Plants without stolons [Subsect. *Microphyllae*]
2. Cauline leaves more than 4 [Ser. *Lineatae*]
2. Cauline leaves 1-3 [Ser. *Microphyllae*]
3. Uppermost leaflet pair sessile
4. Small leaflets between leaflets present

- 5. Auricles of cauline leaves surrounding stems but not connate 4. P. turfosa
- 5. Auricles of cauline leaves surrounding stems and connate 5. P. turfosoides
- 4. Small leaflets between leaflets absent
 - 5. Stamens 5-8(-10) 7. P. glabriuscula
 - 5. Stamens around 20
 - 6. Rhizome with a few slender elongate roots. P. aristata
 - 6. Rhizome without slender elongate roots
 - 7. Radical leaves with a single auricle with round tip 6. P. makaluensis
 - 7. Radical leaves with two auricles with acute apex
 - 8. Leaflets 5-15 mm long 3. P. stenophylla
 - 8. Leaflets 2-4 mm long 1. P. microphylla
- 3. Uppermost leaflet pair decurrent
 - 4. Inflorescences cyme [Ser. Pedunculatae]
 - 5. Rhizomes creeping
 - 6. Radical leaves with a single auricle with round tip 8. P. peduncularis
 - 6. Radical leaves with two auricles with acute apex 9. P. contigua
 - 5. Rhizomes erect
 - 6. Radical leaves with a single auricle with round tip 12. P. commutata
 - 6. Radical leaves with two auricles
 - 7. Auricles connate up to middle 11. P. tristis
 - 7. Auricles free 10. P. cardotiana

4. Inflorescences umbel-like [Ser. Leuconotae]

5. Radical leaves with a single auricle with round tip
15. *P. wenchuensis*

5. Radical leaves with two auricles

6. Auricles connate up to middle 13. *P. leuconota*

6. Auricles free 14. *P. montisvictoriae*

1. Plants stoloniferous [Subsect. Leptostylae]

2. Radical leaves many at flowering (more than 10)

[Ser. Leptostylae]

3. Pedicels with scaly leaves 17. *P. kumbalana*

3. Pedicels without scaly leaves 16. *P. anserina*

2. Radical leaves absent or a few at flowering (less than 4)

[Ser. Smithianae]

3. Leaves nearly glabrous above; terminal leaflets rhomboid
elliptic 18. *P. smithiana*

3. Leaves sericeous above; terminal leaflets normal elliptic
19. *P. taronensis*

Species of section Leptostylae in Himalaya, Tibet, SW China
and Burma

Perennial prostrate or rhizomatous herb. Radical leaves
imparipinnate, petiolate, forming a rosette; lateral leaflets
gradually reduced in size towards base. Alternating small
leaflets between leaflets exist or not exist. Stipules adnate
to the petioles in lower half; auricles of stipules free or
connate.

Peduncles from axils of radical leaves or leaves of

stolons, usually with one cauline leaf bears no flower.

Cauline leaves imparipinnate. Stipules adnate to the petioles in lower half; auricles of stipules free, triangular to ovate, serrate or entire.

Flowers simple or in a dichasium, hermaphrodite, actinomorphic. Episepals 5, entire or serrate with 2-3 teeth. Sepals 5, entire. Petals 5, spreading, bright yellow, narrowly oblong to broad obovate, apex round or retuse.

Stamens usually 20, rarely 25-30 or 5-10(-15); in the case of 20 stamens, 3 whorls, alternipetalous ones 5, from the inner whorl longer than others; oppositipetalous 5, from the middle whorl the shortest; those located between petals and sepals 10, from the outer whorl; in the case of 10 stamens, they are located between petals and sepals in the same length; in the case of 5 stamens, they are located alternipetalous in the same length. Anthers globose, ellipsoid or ovoid, sub-basal, with 4 locules, yellow before dehiscence. Pistils crowded on receptacles. Ovaries ellipsoid to ovoid, smooth. Styles lateral, not swollen at middle except slightly swollen at middle in *P. commutata*. Stigmas inflated and papillate. Placenta located at ventro-lateral side near style base.

Description of species

A. Subsect. Microphyllae (Yü et C. Li) H. Ikeda et H. Ohba,
stat. nov.

i. Ser. Lineatae H. Ikeda et H. Ohba, ser. nov.

Foliis cauliferis numero multis quam 4 ornatis.

Type species: Potentilla lineata Trev.

The treatment of this series was published in Part 2, under
the name of Potentilla lineata group.

ii. Ser. Microphyllae Yü et C. Li in Acta Phytotax. Sin. 18:
5 (1980); in Yu, Fl. Reip. Popul. Sin. 37: 271 (1985).

1. Potentilla microphylla D. Don, Prodr. Fl. Nepal. 231
(1825)--Franch. in DC, Prodr. 2: 583 (1825)--Lehm., Pugill. 3:
17 (1831); Rev. Pot. 30 (1856)--Royle, Ill. Bot. Himal. 208,
t. 41, f. 2 (1835)--Hook. f., Fl. Br. Ind. 2: 352 (1878), pro
major parte--Strachey, Cat. Pl. Kumaon 56 (1906)--Wolf,
Monogr. Pot. 681 (1908), excl. SE Asian ones--Marquand in J.
Linn. Sc. Bot. 48: 175 (1929)--Hand.-Mazz. in Acta Hort.
Gothob. 13: 321 (1939)--Bernardi in Candollea 18: 274 (1963)--
Malla et al. in Bull. Dept. Med. Pl. Nepal 7: 78 (1976)--
Ohashi in Hara & Williams, Enum. Flow. Pl. Nepal 2: 140
(1979)--Polunin & Stainton, Flow. Himal. 126 (1984)--C. Y. Wu
et al., Index Fl. Yunnan. 1: 496 (1984)--Yü et C. Li in Yü,
Fl. Reip. Popul. Sin. 37: 271, t. 41, f. 11 (1985)--Yü et al.

in C. Y. Wu, Fl. Xizang. 2: 649, t. 200, f. 10 (1985)--
Grierson & Long, Fl. Bhutan 1: 572 (1987)--Soják in Candollea
43: t. 1, f. 1-3; t. 2, f. 1 (1988)--Miehe, Langtang Himal,
445, t. D2.89 (1990)--Ku in Wang et al., Vascul. Pl. Hengduan
Mts. 1: 850 (1993).

Type: Nepal; Gosainthan (Wallich 1010, BM-holo, not
seen).

Potentilla microphylla is characterized by the dwarf and
cushion-forming habit.

Three varieties are recognized by habit and shape of
leaflets.

Key to the varieties of P. microphylla.

1. Leaves 1-5 cm, not crowded around stems; leaflets 7-9
pairs.
 2. Leaflets deeply divided, tips acute 1a. var. microphylla
 2. Leaflets divided into nearly half of the laminas, tips
obtuse 1c. var. luteopilosa
1. Leaves 0.5-1 cm, crowded around stems and make tower-like
structure; leaflets 2-3(-5) pairs 1b. var. tapetodes

1a. var. microphylla

SYNONYM: P. microphylla D. Don var. glabriuscula Wall.
[Cat. 28, n. 1010 β (1829), nom. nud.] ex Lehm., Pugill. 3: 19
(1831); Rev. Pot. 30 (1856)--Strachey, Cat. Pl. Kumaon 56
(1906)--Wolf, Monogr. Pot. 682 (1908)--C. Y. Wu et al., Index
Fl. Yunnan. 1: 497 (1984)--Yü et C. Li in Yü, Fl. Reip. Popul.

Sin. 37: 274 (1985), excl. vars. multijuga and caespitosa--Yü et al. in C. Y. Wu, Fl. Xizang. 2: 650 (1985), excl. vars. multijuga and caespitosa.

Type: Nepal: Gosainthan (Wallich 1010 β , K-lecto, designated by Soják in 1989 and syn, BM, E, L, NY-syn).

P. microphylla D. Don var. depressa Wall. [Cat. 28, n. 1010Y (1829), nom. nud.] ex Lehm., Pugill. 3: 19 (1831); Rev. Pot. 30 (1856)--Wolf, Monogr. Pot. 682 (1908).

Type: Nepal: Gosainthan (Wallich 1010Y, K-lecto, designated by Soják in 1989 and syn, GH, BM, E-syn).

Radical leaves oblanceolate, 3-6 cm long, 4-8 mm wide, 7-9 pairs of lateral leaflets with alternating small leaflets; petioles 0.5-1.5 cm long; base of uppermost leaflet pair cuneate. Leaflets strigose beneath; terminal leaflet subsessile, oblong to narrowly obovate, 2-3.5 mm long, 1.5-2.5 mm wide, serrate with 5-9 teeth. Auricles of stipules free.

Peduncles 1-4 cm long with unicellular hairs. Cauline leaves simple, entire or tri-lobed. Auricles of stipules entire or rarely tri-lobed.

Inflorescence 1-2(-3) flowers; pedicel 0.5-4 cm long with unicellular hairs. Flowers 1-1.5 cm across; hypanthia 5-8 mm across. Episepals lanceolate to oblong, 2-2.5 mm long, 0.5-1 mm wide, entire or deeply divided into two lobes, apex acute or obtuse, sparsely strigose above, sericeous beneath. Sepals elliptic to ovate, 3.5-4 mm long, 1.5-2 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin.

Petals oblong to elliptic with round apex, 6-8 mm long, 5-6 mm wide.

Long stamens 2-2.5 mm long; anthers globose to ellipsoid, 0.5-0.7 mm long, 0.5-0.7 mm wide. Ovaries ellipsoid, 0.6-0.8 mm long, 0.4-0.5 mm wide; styles 1-1.3 mm long, slender; stigmas slightly inflated. Chromosome number $2n=28$.

Distr. NW India, Nepal, Sikkim, Bhutan, Tibet.

NOTE. Var. microphylla is most widely distributed in the varieties of P. microphylla from NW India to SW China. The cushion habit is thought to be an adaptation to the alpine environment and the habit can be found in other species in Arenaria, Saussurea, Androsace, etc. Length and number of leaflets vary and Wallich's collection nos. 1010b and 1010c are within the variation of var. microphylla.

1b. var. tapetodes (Soják) H. Ikeda et H. Ohba, stat. et comb. nov.

BASIONYM: P. tapetodes Soják in Cas. Nar. Mus. (Prague) 152: 160 (1983); Candollea 43: 161, t. 1, f. 4-6; 162, t. 2, f. 3 (1988).

Type: Bhutan; Shinje La, upper Mo Chu, 15500 ft. (Ludlow, Sherriff & Hicks 16425, 5 June 1949, BM-holo).

SYNONYM: P. microphylla D. Don var. caespitosa Yü et C. Li in Yü, Fl. Reip. Popul. Sin. 37: 274, t. 41, f. 12 (1985)--Yü et al. in C. Y. Wu, Fl. Xizang. 2: 650, t. 200, f. 9 (1985), nom. nud.

Type: Tibet; Dingye, Riwu, 4700 m (Qinghai-Xizang Exped.

5698, 11 June 1975, PE-lecto, designated here).

Radical leaves oblanceolate, 0.5-1 cm long, 4-7 mm wide, 2-3(-5) pairs of lateral leaflets without small leaflets; petioles 2-3 mm long; base of uppermost leaflet pair cuneate. Leaflets hirsute beneath; terminal leaflet sessile, oblong, 2-4 mm long, 1.5-2 mm wide, serrate with 3-5 teeth. Auricles of stipules free.

Peduncles 3-5 mm long with unicellular hairs. Cauline leaves simple, entire. Auricles of stipules entire.

Pedicel 2-3 mm long with unicellular hairs. Flowers 1-1.5 cm across; hypanthia 5-7 mm across. Episepals oblong to obovate, 1.5-2 mm long, 0.7-1 mm wide, entire, apex acute or obtuse, sparsely strigose above, sericeous beneath. Sepals elliptic to ovate, 2-2.5 mm long, 1.5-2 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals oblong to elliptic with round apex, 3-4 mm long, 2.6-3.3 mm wide.

Long stamens 1.2-1.4 mm long; anthers globose to ellipsoid, 0.4-0.5 mm long, 0.4-0.5 mm wide. Ovaries ellipsoid, 0.5-0.6 mm long, 0.4-0.5 mm wide; styles 0.5-0.7 mm long, slender; stigmas slightly inflated.

Distr. Sikkim, Bhutan, Tibet.

NOTE. Var. tapetodes was first described as a species (Soják 1983). Although Soják (1983) distinguished P. tapetodes and P. microphylla by the number of leaflets and the length of leaves, these characters are overlapped. Habit of var.

tapetodes is tower-like mainly due to stems surrounded by many old leaves. Yū and Li (1985) described new variety, var.

caespitosa, without latin description nor indication of type specimen. I could examine one specimen indicated as a type of var. caespitosa collected from Tibet in PE and the type matched var. tapetodes.

lc. var. luteopilosa (Yū et C. Li) H. Ikeda et H. Ohba,
stat. et comb. nov.

Potentilla luteopilosa Yū et C. Li in Acta Phytotax. Sin.
18: 9, t. 5, f. 2 (1980)--C. Y. Wu et al., Index. Fl. Yunnan.
1: 496 (1984)--Yū et C. Li in Yū, Fl. Reip. Popul. Sin. 37:
274, t. 41, f. 8-10 (1985)--Ku in wang et al., Vascul. Pl.
Hengduan Mts. 1: 850 (1993).

Type: China: Yunnan, Gongshan, 4100 m (Yū 23238, 4 Oct.
1938, PE-lecto, designated here, GH, E-isosyn)--Deqin, alt.
3800-3900 m (Feng 6738, 18 Aug. 1940, PE-syn).

Radical leaves oblanceolate, 1-1.8 cm long, 6-10 mm wide,
7-10 pairs of lateral leaflets without small leaflets; peti-
oles 2-4 mm long; base of uppermost leaflet pair cuneate.
Leaflets hirsute beneath; terminal leaflet sessile, oblong, 2-
4 mm long, 1.5-2.5 mm wide, serrate with 7-9 teeth. Auricles
of stipules free.

Peduncles 3-10 mm long with unicellular hairs. Cauline
leaves simple, entire. Auricles of stipules entire.

Pedicele 7-12 mm long with unicellular hairs. Flowers 1-

1.5 cm across; hypanthia 6-12 mm across. Episepals oblong to obovate, 2-3.5 mm long, 0.7-1 mm wide, entire, apex acute or obtuse, sparsely strigose above, hirsute beneath. Sepals elliptic to ovate, 3.5-4.5 mm long, 2-3 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin.

Distr. Tibet, SW China (Yunnan, Sichuan).

NOTE. Though var. luteopilosa was first described as a species (Yü and Li 1980), there is no fundamental difference between P. microphylla and P. luteopilosa. The leaflets of var. luteopilosa are incised about half and the tips are obtuse, while var. microphylla deeply incised nearly to the main nerves and the tips are acute.

2. Potentilla aristata Soják in Candollea 43: 159, t. 1, f. 7-9; t. 2, f. 2 (1988)--Miehe, Langtang Himal, 445, t. D2.58 (1990).

Type: Bhutan; Kantanang, Tsampa, 13000 ft. (Ludlow, Sherriff & Hicks 19067, 7 June 1949, E-holo).

SYNONYM: P. microphylla D. Don var. achilleifolia Hook. f., Fl. Br. Ind. 2: 353 (1878)--Wolf, Monogr. Pot. 682 (1908)--Kitamura in Kihara, F. Fl. Nepal Himal. 152 (1955)--Bernardi in Candollea 18: 275 (1963)--Liv. Himal. Flow. t. 227 (1964)--Banerji in Rec. Bot. Surv. Ind. 19 (2): 41 (1966)--Murata in Hara, Fl. E. Himal. 124 (1966); 2: 53 (1971)--Ohashi in Hara & Williams, Enum. Flow. Pl. Nepal 2: 140 (1979)--C. Y. Wu et al., Index Fl. Yunnan. 1: 497 (1984)--Yü et C. Li in Yü, Fl.

Reip. Popul. Sin. 37: 272 (1985)--Yü et al. in C. Y. Wu, Fl. Xizang. 2: 650 (1985)--Grierson & Long, Fl. Bhutan 1: 572 (1987), syn. nov.

P. microphylla D. Don var. *multiuga* Yü et C. Li in Acta Phytotax. Sin. 18: 8, t. 2, f. 2 (1980)--Yü et C. Li in Yü, Fl. Reip. Popul. Sin. 37: 274, t. 41, f. 13 (1985)--Yü et al. in C. Y. Wu, Fl. Xizang. 2: 650, t. 200, f. 8 (1985).

Type: Tibet: Jilung, 3800 m (Wu et al. 75-618, 5 July 1975, PE-holo).

P. microphylla D. Don var. *glabriuscula* auct. non Wall. ex Lehm.: Yü et C. Li in Yü, Fl. Reip. Popul. Sin. 37: 274 (1985), pro parte--Yü et al. in Wu, Fl. Xizang. 2: 650 (1985), pro parte.

Radical leaves oblanceolate, 1.5-4 cm long, 0.5-1 cm wide, 13-16 pairs of lateral leaflets without alternating small leaflets; petioles 0.5-0.8 cm long; base of uppermost leaflet pair cuneate. Leaflets strigose beneath; terminal leaflet sessile, oblong to narrowly obovate, 2-3 mm long, 1.5-2.5 mm wide, serrate with 8-12 teeth. Auricles of stipules free.

Peduncles 1-2 cm long with unicellular hairs. Cauline leaves simple to 4-5(-9) pairs of leaflets. Auricles of stipules entire.

Pedicel 0.5-1 cm long with unicellular hairs. Flowers 1-1.5 cm across; hypanthia 5-8 mm across. Episepals lanceolate to oblong, 2-3 mm long, 1.5-2.5 mm wide, entire or deeply divided into two lobes, apex acute or obtuse, sparsely

strigose above, sericeous beneath. Sepals elliptic to ovate, 2.5-4 mm long, 1.5-2.5 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals oblong to elliptic with round apex, 6-6.7 mm long, 4.5-6 mm wide.

Long stamens 2-3 mm long; anthers globose to ellipsoid, 0.5-0.5-0.7 mm long, 0.5-0.7 mm wide. Ovaries ellipsoid, 0.7-1.2 mm long, 0.5-0.8 mm wide; styles 1.3-1.8 mm long, slender; stigmas slightly inflated. Chromosome number $2n=14$.

Distr. Nepal, Sikkim, Bhutan, Tibet.

NOTE. *Potentilla aristata* has been treated as an infraspecific taxon of *P. microphylla*, i.e., *P. microphylla* var.

achilleifolia. Although *P. aristata* had been treated as a variety of *P. microphylla*, the branching type is quite different between *P. aristata* and *P. microphylla*. Yü and Li (1980) described *P. microphylla* var. *multiijuga* from Tibet, and it is identical with *P. aristata*. Yü and Li (1985) mistakenly identified *P. aristata* as *P. microphylla* var. *glabriuscula* Wall. ex Lehm., which was not described by Wallich (1829).

3. *Potentilla stenophylla* (Franch.) Diels in Not. Bot.

Gard. Edinb. 5: 271 (1912)--Lév. in Cat. Pl. Yun-Nan 233 (1917)--Hand.-Mazz., Symb. Sin. 7: 518 (1933)--Melch. & Stroh in Notizb. Bot. Gart. Mus. Berl. 11: 799 (1933)---Fletcher in Not. Bot. Gard. Edinb. 20: 215 (1950), pro parte--Lauener in Not. Bot. Gard. Edinb. 30: 261 (1970)--C. Y. Wu et al., Index Fl. Yunnan. 1: 498 (1984), pro parte--Yü et C. Li in Yü, Fl.

Reip. Popul. Sin. 37: 270, t. 40, f. 6 (1985), pro parte--
Soják in Candollea 43: t. 4, f. 5 (1988)--Ku in Wang et al.,
Vascul. Pl. Hengduan Mts. 1: 849 (1993).

Type: China: Yunnan, Tsang-shan, Tali (Delavay s.n., P-
holo, not seen).

BASIONYM: P. peduncularis D. Don var. stenophylla Franch.
in Pl. Delav. 3: 214 (1890)--Wolf, Monogr. Pot. 678 (1908).

Potentilla stenophylla was first described as a variety of
P. peduncularis (Franchet 1890). P. stenophylla differs from
P. peduncularis by having two free auricles of stipules of
radical leaves while P. peduncularis having coalesced auri-
cles. Four varieties are recognized in P. stenophylla.

Key to the varieties of P. stenophylla.

- | | |
|--|-----------------------------|
| 1. Leaflets dentate with 3-5 teeth | 3a. var. <u>stenophylla</u> |
| 1. Leaflets more than 5 teeth | |
| 2. Leaflets 0.8-1.5 cm long with 6-15 teeth | |
| 3. Leaflets glabrous except tufted hairs on serrate tips | 3d. var. <u>cristata</u> |
| 3. Leaflets hairy on both sides | 3c. var. <u>taliensis</u> |
| 2. Leaflets 0.6-1.0 cm long, 4-7 teeth | 3b. var. <u>emergens</u> |

3a. var. stenophylla

SYNONYM: P. millefolium Lév. in Bull. Acad. Geog. Bot. 24:
281 (1914); Cat. Pl. Yun-Nan 232 (1917).

Type: China; Yunnan, Io-chan, 3400 m (Maire s.n., E-holo

and iso, P-iso).

Radical leaves oblanceolate, 7-13 cm long, 1.2-2 cm wide, 15-25 pairs of lateral leaflets without small leaflets; petioles 1-1.5 cm long; base of uppermost leaflet pair cuneate. Leaflets sericeous beneath; terminal leaflet sessile, oblong to narrowly obovate, 6-10 mm long, 4-6 mm wide, dentate or sometimes 5-lobed at upper part of leaflets. Auricles of stipules free.

Peduncles 7-10 cm long with unicellular hairs. Cauline leaves with 1-2 pairs of leaflets. Auricles of stipules serrate with 3-5 teeth.

Pedicel 1.5-2.5 cm long with unicellular hairs. Flowers 1.2-1.5 cm across; hypanthia 6-10 mm across. Episepals oblong to obovate, 3-5 mm long, 1.5-3 mm wide, entire or with 3 teeth, apex acute or obtuse, sparsely strigose above, sericeous beneath. Sepals elliptic to ovate, 4-6 mm long, 2.5-4.5 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals oblong to elliptic with round apex, 5-7 mm long, 4-5.5 mm wide.

Long stamens 1.5-2 mm long; anthers globose to ellipsoid, 0.6-1 mm long, 0.4-0.9 mm wide. Ovaries ellipsoid, 0.6-0.8 mm long, 0.4-0.6 mm wide; styles 0.9-1.3 mm long, slender; stigmas slightly inflated.

Distr. Tibet, SW China (Yunnan, Sichuan).

NOTE. Var. stenophylla is characterized by having leaflets with 3(-5) teeth. Potentilla peduncularis var. stenophylloides

has been confused with var. stenophylla. I could not find any difference between var. stenophylla and P. millefolium.

3b. var. emergens Card. in Lecomte, Not. Syst. 3: 241 (1914)--Melch. & Stroh in Notizb. Bot. Gart. Mus. Berl. 11: 800 (1933).

Type: China; Szechuan, Kiala, Kajilatho (Soulié 2548 in 1894, P-lecto, designated here)--loc. cit., Tatsienlu (Musset 110 in 1897, P-syn)--loc. cit., Kiala, Tongolo (Soulié 91, July 1891, P-syn)--loc. cit., Kiala, Tatsienlu (Soulié 893, 10 July 1893, P-syn)--W China, 10000-13000 ft. (Wilson 3461, July 1903, P-syn).

SYNONYM: P. microphylla auct. non D. Don; Hook. f., Fl. Br. Ind. 2: 352 (1878), pro minor parte.

P. tatsienluensis Wolf, Monogr. Pot. 680 (1908)--Hand.-Mazz. in Acta Hort. Gothob. 13: 323 (1939)--Fletcher in Not. Bot. Gard. Edinb. 20: 216 (1950)--C. Y. Wu et al., Index Fl. Yunnan. 1: 499 (1984)--Yü et C. Li in Yü, Fl. Reip. Popul. Sin. 37: 271, t. 40, f. 5 (1985)--Yü et al. in C. Y. Wu, Fl. Xizang. 2: 649 (1985)--Soják in Candollea 43: t. 3, f. 5 (1988)--Ku in Wang et al., Vascul. Pl. Hengduan Mts. 1: 849 (1993).

Type: China; Sichuan, Tatsienlu (Potanin s.n., July 1893, DR-holo and iso).

P. stenophylla (Franch.) Diels var. exaltata Card. in Lecomte, Not. Syst. 3: 241 (1914).

Type: China; Szechuan, Kiala, Tongolo (Soulié 659 in 1893,

P-lecto, designated here)--loc. cit. (Soulié 88, July 1891, P-syn)--loc. cit., Tatsienlu (Soulié 539 in 1893, P-syn).

? *P. stenophylla* (Franch.) Diels var. *compacta* J. Krause in Fedde, Repert. Sp. Nov. Beih. 12: 410 (1922).

Type: China and Tibet (Limpricht 1671 & 1812, B-syn, not seen).

Radical leaves oblanceolate, 2.5-13 cm long, 0.8-1.5 cm wide, 8-15 pairs of lateral leaflets without small leaflets; petioles 1-2 cm long; base of uppermost leaflet pair decurrent. Leaflets appressed hairy beneath, especially on veins; terminal leaflet sub-sessile, oblong to narrowly obovate, 6-10 mm long, 4-6 mm wide, serrate with 4-7 teeth. Auricles of stipules free.

Peduncles 4-25 cm long with unicellular hairs. Cauline leaves with 2-5 pairs of leaflets. Auricles of stipules serrate with 4-7 teeth.

Pedicel 1.5-4 cm long with unicellular hairs. Flowers 1-1.8 cm across; hypanthia 6-10 mm across. Episepals oblong to obovate, 1.5-2 mm long, 0.7-1 mm wide, entire, apex acute or obtuse, sparsely strigose above, sericeous beneath. Sepals elliptic to ovate, 2-2.5 mm long, 1.5-2 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals oblong to elliptic with round apex, 3-4 mm long, 2.6-3.3 mm wide.

Long stamens 1.2-1.4 mm long; anthers globose to ellipsoid, 0.4-0.5 mm long, 0.4-0.5 mm wide. Ovaries ellipsoid.

0.5-0.6 mm long, 0.4-0.5 mm wide; styles 0.5-0.7 mm long,
slender; stigmas slightly inflated.

Distr. NW China (Sichuan).

NOTE. Var. emergens is characterized by having leaflets with
5-7 teeth. Tough P. tatsienluensis was described by Wolf
(1908) the type specimens are identical with var. emergens.
Potentilla stenophylla var. exaltata has long leaves with
sparse leaflets and it is also identical with var. emergens.

3c. var. taliensis (W. W. Smith) H. Ikeda et H. Ohba, stat.
et comb. nov.

BASIONYM: P. taliensis W. W. Smith in Not. Bot. Gard.
Edinb. 7: 199 (1914)--Yü et C. Li in Yü. Fl. Reip. Popul. Sin.
37: 270 (1985)--Soják in Candollea 43: t. 3, f. 11 (1988).

Type: China; Yunnan, Tali Range, 25°40'N, 10000-11000
ft., (G. Forrest 7017, Aug, 1910, E-holo, K-iso).

Radical leaves oblanceolate, 4-23 cm long, 1.2-3.5 cm wide,
5-15 pairs of lateral leaflets without small leaflets; peti-
oles 1-4 cm long; base of uppermost leaflet pair decurrent.
Leaflets lanate beneath, especially on veins; terminal leaflet
sub-sessile, oblong to narrowly obovate, (0.6-)0.8-1.5 cm
long, 4-8 mm wide, serrate with 6-15 teeth. Auricles of
stipules free.

Peduncles 7-18 cm long with unicellular hairs. Cauline
leaves with 1-2 pairs of leaflets. Auricles of stipules ser-
rate with 5-8 teeth.

Pedice! 1-3 cm long with unicellular hairs. Flowers 1.2-2 cm across; hypanthia 7-10 mm across. Episepals oblong to obovate, 1.5-2 mm long, 0.7-1 mm wide, entire, apex acute or obtuse, sparsely strigose above, sericeous beneath. Sepals elliptic to ovate, 2-2.5 mm long, 1.5-2 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals oblong to elliptic with round apex, 3-4 mm long, 2.6-3.3 mm wide.

Long stamens 1.2-1.4 mm long; anthers globose to ellipsoid, 0.4-0.5 mm long, 0.4-0.5 mm wide. Ovaries ellipsoid, 0.5-0.6 mm long, 0.4-0.5 mm wide; styles 0.5-0.7 mm long, slender; stigmas slightly inflated.

Distr. SW China (Yunnan).

NOTE. Although var. taliensis was first described as a species (Smith 1914), there is no fundamental difference between P. stenophylla and P. taliensis. The number of serration is continuous from vars. stenophylla, emergens and taliensis. Var. taliensis is distributed in Yunnan, SW China.

3d. var. crisata (Fletcher) H. Ikeda et H. Ohba, stat. et comb. nov.

Type: Upper Burma; Moku-ji Pass, 12200 ft. (Farrer 1803, 4 Aug. 1920, E-holo).

BASIONYM: P. crisata Fletcher in Not. Bot. Gard. Edinb. 20: 218 (1950).

Radical leaves oblanceolate, 3.5-5.5 cm long, 1-1.5 cm

wide, 5-8 pairs of lateral leaflets without small leaflets; petioles 0.5-1 cm long; base of uppermost leaflet pair cuneate. Leaflets appressed hairy above, glabrous beneath except tips with tuft hairs; terminal leaflet sub-sessile, oblong to elliptic, 1-1.2 cm long, 5-7 mm wide, serrate with 11-13 teeth. Auricles of stipules free.

Peduncles 3-4 cm long with unicellular hairs. Cauline leaves simple, serrate with 3-5 teeth. Auricles of stipules entire or serrate with 3-5 teeth.

Pedicel 1.5-2 cm long with unicellular hairs. Flowers 1.2-1.5 cm across; hypanthia 7-8 mm across. Episepals lanceolate to oblong, 2-4 mm long, c. 1 mm wide, entire or with 2-3 teeth, apex acute or obtuse, sparsely strigose above, sericeous beneath. Sepals elliptic to ovate, 2-2.5 mm long, 1.5-2 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals oblong to elliptic with round apex, 3-4 mm long, 2.6-3.3 mm wide.

Long stamens 1.2-1.4 mm long; anthers globose to ellipsoid, 0.4-0.5 mm long, 0.4-0.5 mm wide. Ovaries ellipsoid, 0.5-0.6 mm long, 0.4-0.5 mm wide; styles 0.5-0.7 mm long, slender; stigmas slightly inflated.

Distr. N Burma.

NOTE. Although var. crisata was first described as a species (Fletcher 1950), there is no fundamental difference between P. stenophylla and P. crisata. Var. crisata has broad obovate leaflets and leaflets are glabrous except tufted hairs on serrate tips. I could examine only the type specimen.

4. *Potentilla turfosa* Hand.-Mazz.. Symb. Sin. 7: 518
(1933)--C. Y. Wu et al. Index Fl. Yunnan. 1: 499 (1984)--Yü et
C. Li in Yü, Fl. Reip. Popul. Sin. 37: 275 (1985)--Yü et al.
in C. Y. Wu, Fl. Xizang. 2: 651 (1985)--Ku in Wang et al.,
Vascul. Pl. Hengduan Mts. 1: 850 (1993).

Type: China; NW Yunnan, Mekong-Salwin Divide, 3900 m, 16
June 1916, Hand.-Mazz. 8899 (W?, not seen).

Two varieties are recognized in *P. turfosa*.

Key to the varieties of *Potentilla turfosa*.

- | | |
|------------------|----------------------------|
| 1. Stamens 20 | 4a. var. <u>turfosa</u> |
| 1. Stamens 11-14 | 4b. var. <u>gracillima</u> |

4a. var. turfosa

Radical leaves oblanceolate, 3.5-11 cm long, 1.2-2 cm wide,
5-8 pairs of lateral leaflets usually with small leaflets
between uppermost and the next leaflet pairs; petioles 1-2 cm
long; base of uppermost leaflet pair cuneate. Leaflets sparse-
ly strigose beneath; terminal leaflet sub-sessile, oblong to
narrowly obovate, 6-10 mm long, 4-7 mm wide, serrate with 12-
18 teeth. Auricles of stipules free.

Peduncles 3-5 cm long with unicellular hairs. Cauline
leaves with 2-4 pairs of leaflets.

Pedice 1-5 cm long with unicellular hairs. Flowers 1-1.5
cm across; hypanthia 4-8 mm across. Episepals oblong to

obovate, 2-3 mm long, 0.8-1.2 mm wide, entire or deeply divided into two lobes, apex acute or obtuse, sparsely strigose above, sericeous beneath. Sepals elliptic to ovate, 3-3.5 mm long, 2-3 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals oblong to elliptic with round apex, 5-6.5 mm long, 4.5-6 mm wide.

Long stamens 1.5-2.2 mm long; anthers globose to ellipsoid, 0.5-0.8 mm long, 0.6-0.7 mm wide. Ovaries ellipsoid, 0.7-0.9 mm long, 0.5-0.6 mm wide; styles 0.7-0.9 mm long, slender; stigmas slightly inflated.

Distr. Tibet, SW China (Yunnan).

4b. var. *gracillima* (Yü et C. Li) H. Ikeda et H. Ohba, stat. et comb. nov.

BASIONYM: *Potentilla gracillima* Yü et C. Li in Acta Phytotax. Sin. 18: 9 (1980)--Yü & C. Li in Yü, Fl. Reip. Popul. Sin. 37: 274 (1985)--Yü et al. in C. Y. Wu, Fl. Xizang. 2: 650, t. 200, f. 1-7 (1985)--Ku in Wang et al., Vascul. Pl. Hengduan Mts. 1: 850 (1993).

Type: Tibet: Bomi, 4200 m (Ying & Hung 1180, PE-holo).

Radical leaves oblanceolate, 3-7 cm long, 0.7-1.2 cm wide, 3-5 pairs of lateral leaflets without or with small leaflets between uppermost and the next leaflet pairs; petioles 1-2 cm long; base of uppermost leaflet pair cuneate. Leaflets sparsely strigose beneath; terminal leaflet sub-sessile, oblong to narrowly obovate, 5-7 mm long, 3-4 mm wide, serrate with 7-12

teeth. Auricles of stipules free.

Peduncles 4-5 cm long with unicellular hairs. Cauline leaves simple or one pair of leaflets.

Pedice! 1.5-2.0 cm long with unicellular hairs. Flowers 0.8-1.2 cm across; hypanthia 5-7 mm across. Episepals oblong to obovate, 2-3 mm long, 0.8-1.2 mm wide, entire or deeply divided into two lobes, apex acute or obtuse, sparsely strigose above, sericeous beneath. Sepals elliptic to ovate, 3-3.5 mm long, 1.5-2.5 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals oblong to elliptic with round apex, 5-6 mm long, 4-5 mm wide.

Long stamens 1.0-1.2 mm long; anthers globose to ellipsoid, 0.5-0.6 mm long. Ovaries ellipsoid, 0.5-0.6 mm long; styles 0.6-0.7 mm long, slender; stigmas slightly inflated.

Distr. Tibet.

NOTE. Although var. gracillima was described as a species (Yü and Li 1980), fundamental difference between P. turfosa and P. gracillima cannot be found. Var. turfosa has about 20 stamens, while var. gracillima has 11-14.

5. *Potentilla turfosoides* H. Ikeda et H. Ohba, sp. nov.

Differt Potentillae turfosae Hand.-Mazz. auriculis stipularum foliorum cauliferorum extus connatis nec liberis.

Type: E Nepal; Koshi Zone, Sankhuwa Sabha Distr., around Khongma, 3500 m (Suzuki et al. 8880570, TI-holo, BM, E, GH, KATH-iso).

Radical leaves oblanceolate, 3.5-11 cm long, 1.2-2 cm wide, 5-8 pairs of lateral leaflets usually with small leaflets between uppermost and the next leaflet pairs; petioles 1-2 cm long; base of uppermost leaflet pair cuneate. Leaflets sparsely strigose beneath; terminal leaflet sub-sessile, oblong to narrowly obovate, 6-10 mm long, 4-7 mm wide, serrate with 12-18 teeth. Auricles of stipules free.

Peduncles 3-5 cm long with unicellular hairs. Cauline leaves with 2-4 pairs of leaflets. Auricles of stipules of lower leaves connate at the backside of peduncles in lower half, entire; auricles of stipules of upper leaves entire or serrate with 2-4 teeth.

Pedicele 1-5 cm long with unicellular hairs. Flowers 1-1.5 cm across; hypanthia 4-8 mm across. Episepals oblong to obovate, 2-3 mm long, 0.8-1.2 mm wide, entire or deeply divided into two lobes, apex acute or obtuse, sparsely strigose above, sericeous beneath. Sepals elliptic to ovate, 3-3.5 mm long, 2-3 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals oblong to elliptic with round apex, 5-6.5 mm long, 4.5-6 mm wide.

Long stamens 1.5-2.2 mm long; anthers globose to ellipsoid, 0.5-0.8 mm long, 0.6-0.7 mm wide. Ovaries ellipsoid, 0.7-0.9 mm long, 0.5-0.6 mm wide; styles 0.7-0.9 mm long, slender; stigmas slightly inflated. Chromosome number $2n=28$.

Distr. E Nepal.

NOTE. Although *P. turfesoides* is similar to *P. turfosa* in gross appearance, it differs in the nature of stipules of

cauline leaves. Potentilla turfoides is distributed in Arun Valley, E Nepal.

6. *Potentilla makaluensis* H. Ikeda et H. Ohba in J. Jap. Bot. 67: 149 (1992).

Type: E Nepal; Koshi Zone, Sankhuwa Sabha Distr., Shipton Pass, 4120 m (Suzuki et al. 8880826, 30 July 1988, TI-holo, GH, BM, E, KATH-iso).

Perennial acaulescent herb, creeping with long rhizomes and forming a dense mat at wet place. Rhizomes slender, 1.5-3.5 cm long, pale brown with sparse degenerated leaves of which stipules surround the rhizomes. Radical leaves numerous, forming a rosette 2-4 cm long; imparipinnate with 4-5 pairs of lateral leaflets, petiolate; petioles 4-10 mm long; laminae oblanceolate, 1.5-4 cm long, 0.6-1 cm wide, strigose with appressed or ascending, straight, stiff hairs on the petioles and both surfaces of laminae (especially on undersurface, margins and veins). Terminal leaflet subsessile, oblong to obovate, 3-7 mm long, 3-4.5 mm wide, serrate with 5-9 teeth, lateral leaflets sessile, gradually smaller towards the basal one. Stipules membranaceous, brown, adnate to the middle of petiole, lobes fused with each other forming a narrow ovate or lanceolate laminar structures.

Peduncles axillary from radical leaves, 1.5-4 cm long.

with one or two cauline leaves. Cauline leaves simple, oblanceolate, apically 1-3 lobulate, together with the peduncles strigose with appressed or ascending, straight, stiff hairs; stipules lower half fused, upper half greenish and laminar-form.

Flowers solitary, actinomorphic, opening upright, 1-1.5 cm across. Hypanthia 0.5-0.8 cm across. Episepals 5, oblong to elliptic, 2-3 mm long, 1-1.5 mm wide, apex acute, strigose on outer surface and margin, upper half pilose with minute hairs. Calyx lobes 5, elliptic to ovate, 3-4 mm long, 2-3 mm wide, apex acute to obtuse, strigose with unicellular straight, appressed, stiff hairs on outer surface side and margin, glabrous on inner surface, short lanate on upper part of the surface. Petals 5, spreading, bright yellow, obovate to broad obovate, apex rotundate, 5.5-7 mm long, 5-7 mm wide.

Stamens 20, 3-circular; alternipetalous ones 5, from the inner circle long, 2-3.2 mm long; oppositipetalous 5, from the middle circle short, 1.2-1.7 mm long, those located between petals and calyx lobes 10, from the outer circle, 1.5-2.5 mm long. Anthers orbicular, sub-basal, 4 locules, 0.7-1 mm long, 0.6-0.9 mm wide, dehiscent by longitudinal slits, bright yellow before dehiscence. Pistils 22-35, crowded on receptacles. Ovaries 1-ovulate, elliptic to ovate, 0.7-0.9 mm long, 0.6-1 mm wide, smooth. Styles lateral, 1-1.2 mm long, not swollen at the base. Stigmas slightly or apparently inflated. Placenta located at ventro-lateral side near style base. Chromosome number $2n = 14$.

Distr. E Nepal.

NOTE. Potentilla makaluensis grows wet places and has a mat-like structure consisting of long, slender rhizomes with a few scaly leaves. This habit is thought to be useful to spread its individuals at wet habitat. Potentilla makaluensis is distributed at Arun Valley, E Nepal (Ikeda & Ohba 1992).

7. Potentilla glabriuscula (Yü et C. Li) Soják in Candollea 43: 453 (1988).

Type: China: Yunnan, Nu Shan (Mekong-Salwin Divide), 3800 m (Yü 22265, 10 Aug. 1938, PE-holo, E-iso).

BASIONYM: Sibbaldia glabriuscula Yü et C. Li in Acta Phytotax. Sin. 19: 516 (1981); Yü et C. Li in Yü, Fl. Reip. Popul. Sin. 37: 343 (1985)--Yü et al. in C. Y. Wu, Fl. Xizang. 2: 669, t. 202, f. 4-9 (1985).

P. microphylla D. Don var. latiloba non Wall. ex Lehm.; Grierson et Long, Fl. Bhutan 1: 573 (1987).

Though P. glabriuscula was first described as a species in another genus, Sibbaldia (Yü and Li 1981), Soják transferred this to genus Potentilla. Genus Sibbaldia is characterized by small number of stamens around 5. The number of stamens of P. glabriuscula is varies from 5 to 10, and the other characters match to the species of section Leptostylae. I treated this as a species of Potentilla, section Leptostylae. Two varieties are recognized in P. glabriuscula.

7b. var. *oligandra* (Soják) H. Ikeda et H. Ohba, stat. et
comb. nov.

BASIONYM: *P. oligandra* Soják in Cas. Nar. Mus. (Prague)
152: 160 (1983).

Type: SE Tibet: Kongbo, Doshong La, 13500 ft. (Ludlow,
Sherriff & Elliot 14362, 16 Aug. 1947, BM-holo, E-iso).

Radical leaves oblanceolate, 2-5 cm long, 0.5-1 cm wide, 4-
7 pairs of lateral leaflets without small leaflets; petioles
4-12 mm long; base of uppermost leaflet pair cuneate. Leaflets
strigose or almost glabrous beneath; terminal leaflet sub-
sessile, oblong to narrowly obovate, 3-4 mm long, 2-3 mm wide,
serrate with 5-7 teeth. Auricles of stipules connate and tips
round.

Peduncles 10-35 mm long with unicellular hairs. Cauline
leaves simple to trifoliate, entire or three-lobed. Auricles
of stipules entire.

Pedicel 4-10 mm long with unicellular hairs. Flowers 0.6-
1.2 cm across; hypanthia 4-7 mm across. Episeals lanceolate
to oblong, 2-3 mm long, 0.4-0.9 mm wide, entire, apex acute or
obtuse, sparsely strigose above, sericeous beneath. Sepals
elliptic to ovate, 2-3 mm long, 1.0-1.8 mm wide, entire, apex
acute or obtuse, lanate above, strigose beneath and margin.
Petals oblong to elliptic with round apex, 3-5 mm long, 2-4 mm
wide.

Long stamens 1.3-1.5 mm long; anthers globose to ellip-
soid, 0.5-0.7 mm long, 0.4-0.6 mm wide. Ovaries ellipsoid.

0.7-0.8 mm long, 0.4-0.5 mm wide; styles 0.6-0.7 mm long,
slender; stigmas slightly inflated.

Distr. SE Tibet.

NOTE. Though var. oligandra was described as a species
(Soják 1988a), fundamental difference between P. glabriuscula
and P. oligandra cannot be found. Var. oligandra shows larger
habit than var. glabriuscula and has 8-10 stamens while var.
glabriuscula has 5-7.

iii. Ser. Pedunculatae Yü et C. Li in Acta Phytotax. Sin.
18: 5 (1980); in Yü, Fl. Reip. Popul. Sin. 37: 265 (1985).

8. Potentilla peduncularis D. Don, Prodr. Fl. Nepal. 230
(1825)--Franch. in DC. Prodr. 2: 583 (1825)--Hook. f., Fl. Br.
Ind. 2: 351 (1878), excl. var. clarkei--Franch. in Pl. Delav.
3: 213 (1890)--Wolf, Monogr. Pot. 677 (1908)--Lév. in Cat. Pl.
Yun-Nan 232 (1917)--Hand.-Mazz. in Acta Hort. Gothob. 13: 322
(1939)--Fletcher in Not. Bot. Gard. Edinb. 20: 213 (1950), pro
parte--Bernardi in Candollea 18: 275 (1963)--Spring Fl. Sikkim
Himal. t. 13 (1963)--Murata in Hara, Fl. E. Himal. 124 (1966)-
-Nasir et Ali in Fl. W. Pakist. 358 (1972)--Malla et al. in
Bull. Dept. Med. Pl. Nepal 7: 79 (1976)--Ohashi in Hara et
Williams, Enum. Flow. Pl. Nepal 2: 106 (1979)--Polunin et
Stainton, Flow. Himal. 126, t. 37 (1984)--C. Y. Wu et al.,
Index Fl. Yunnan. 1: 497 (1984)--Yü et C. Li in Yü, Fl. Reip.
Popul. Sin. 37: 265, t. 40, f. 3 & 4 (1985), pro minor parte--
Yü et al. in C. Y. Wu, Fl. Xizang. 2: 647 (1985), pro parte--

Grierson et Long, Fl. Bhutan 1: 571 (1987)--Soják in Candollea 43 (1): t. 3, f. 6, 7 & 10; t. 5, f. 4 (1988)--Miehe, Langtang Himal, 445 (1990)--Ku in Wang et al., Vascul. Pl. Hengduan Mts. 1: 848 (1993), pro minor parte.

Type: Nepal: Gosainthan (Wallich s.n., BM-holo).

Potentilla peduncularis is larger species in section Leptostylae and distributed widely from NW India to SW China. Potentilla peduncularis shows wide morphological variation and four varieties are recognized.

Key to the varieties of P. peduncularis

1. Leaflets serrated more than 10
 2. Leaflets narrowly ovate; densely hairy beneath, sparsely hairy above 8a. var. peduncularis
 2. Leaflets broad ovate; densely hairy both side 8c. var. shweliensis
 1. Leaflets 3-5(-9) teeth
 2. Leaflets narrowly ovate, 1.5-3 cm long, dentate at tips or blunt serrate with 5-9 teeth 8b. var. vittata
 2. Leaflets narrowly obovate, 0.5-2 cm long, dentate or 4-5 teeth 8d. var. stenophylloides
- 8a. var. peduncularis

SYNONYM: ? P. peduncularis D. Don var. obscura Hook. f., Fl. Br. Ind. 2: 352 (1878)--Strachey, Cat. Pl. Kumaon 56 (1906)--Lév., Cat. Pl. Yun-Nan 232 (1917)--Wolf, Monogr. Pot. 678 (1908).

Type: NW India; Kumaon, Kalari, 13000 ft. (Strachey & Winterbottom, K, not seen)

P. peduncularis D. Don var. *elongata* Yü et C. Li in Acta Phytotax. Sin. 18: 8, t. 1, f. 4 (1980)--C. Y. Wu et al., Index Fl. Yunnan. 1: 497 (1984)--Yü et C. Li in Yü, Fl. Reip. Popul. Sin. 37: 266 (1985)--Yü et al. in C. Y. Wu, Fl. Xizang. 2: 648 (1985).

Type: China; Yunnan, Gongshan (K. M. Feng 8287, 9 Oct. 1940, PE-holo).

P. remota Soják in Preslia (Praha) 63: 335 (1991).

Type: same as *P. peduncularis* D. Don var. *elongata*.

P. peduncularis D. Don var. *abbreviata* Yü et C. Li in Yü, Fl. Reip. Popul. Sin. 37: 266 (1985)--Yü et al. in C. Y. Wu, Fl. Xizang. 2: 648 (1985), nom. nud.

Type: Tibet; Cona, 4800 m (Qinghai-Xizang Exped. 75/973, 12 Sept. 1975, PE-lecto, designated here), loc. cit., 4300-4600 m (Wu et al. 75-974, 18 July 1975, PE-syn).

Radical leaves oblanceolate, 14-25 cm long, 2-6 cm wide, 10-15 pairs of lateral leaflets, usually without small leaflets and sometimes with alternating small leaflets; petioles 2-5 cm long; base of uppermost leaflet pair decurrent. Leaflets sericeous beneath; terminal leaflet sessile, oblong to narrowly obovate, 1.5-3 cm long, 0.5-1.0 cm wide, serrate with 10-15 teeth. Auricles of stipules connate and tips round.

Peduncles 6-15 cm long with unicellular hairs. Cauline leaves with 1-2 pairs of leaflets. Auricles of stipules ser-

rate with 3-5 teeth.

Pedice! 1.5-3 cm long with unicellular hairs. Flowers 2-3.5 cm across; hypanthia 8-12 mm across. Episepals oblong to obovate, 6-7 mm long, 2.5-3.5 mm wide, entire or with 3 teeth, apex acute or obtuse, sparsely strigose above, sericeous beneath. Sepals elliptic to ovate, 6-7 mm long, 4-5 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals oblong to elliptic with round apex, 12.5-14.5 mm long, 12-13.5 mm wide.

Long stamens 4-5 mm long; anthers globose to ellipsoid, 1.2-1.7 mm long, 1-1.5 mm wide. Ovaries ellipsoid, 1.2-1.5 mm long, 0.8-1 mm wide; styles 1.8-2.2 mm long; stigmas slightly inflated. Chromosome number $2n=42$.

Distr. NW India, Nepal, Sikkim, Bhutan, Tibet, SW China (Yunnan, Sichuan).

NOTE. Var. peduncularis is sometimes very common and dominates at high altitude in Nepal Himalaya. Although Soják elevated P. peduncularis D. Don var. elongata Yü et C. Li to a species rank, it shows lower altitudinal type of P. peduncularis var. peduncularis in the field research in 1991.

8b. var. vittata (Soják) H. Ikeda et H. Ohba, stat. et comb. nov.

Type: SE Tibet; Kongbo, Ba La, Pasum Chu, 14000 ft. (Ludlow, Sherriff & Elliot 13966, 22 June 1947, BM-holo, E-iso).

BASIONYM: P. vittata Soják var. vittata in Candollea 43:

164. t. 4. f. 2-4 (1988).

SYNONYM: P. vittata Soják var. pluriflora Soják in
Candollea 43: 166 (1988).

Type: SE Tibet: Pome, Showa La, 9500 ft. (Ludlow,
Sherriff & Elliot 13159, 13 June 1947, BM-holo).

P. oxydonta Soják in Candollea 43: 162, t. 4, f. 1: t.
5, f. 5 (1988).

Type: SE Tibet: Deyang La, 13500 ft. (Ludlow, Sherriff &
Elliot 14296, 10 Aug. 1947, BM-holo, E-iso).

Radical leaves oblanceolate, 5-20 cm long, 2-2.5 cm wide,
18-25 pairs of lateral leaflets without small leaflets; peti-
oles 1.5-4 cm long; base of uppermost leaflet pair decurrent.
Leaflets sericeous or strigose beneath, especially on veins;
terminal leaflet sessile, oblong to narrowly obovate, 6-8 mm
long, 3-5 mm wide, tri-dentate at apex or bluntly with 5-7
teeth. Auricles of stipules connate and tips round.

Peduncles 8-15 cm long with unicellular hairs. Cauline
leaves with 1-2 pairs of leaflets. Auricles of stipules
triangular to lanceolate, entire.

Pedicele 1-3 cm long with unicellular hairs. Flowers 1.5-
2.7 cm across; hypanthia 8-13 mm across. Episeals oblong to
obovate, 1.5-2 mm long, 0.7-1 mm wide, entire, apex acute or
obtuse, sparsely strigose above, sericeous beneath. Sepals
elliptic to ovate, 2-2.5 mm long, 1.5-2 mm wide, entire, apex
acute or obtuse, lanate above, strigose beneath and margin.
Petals oblong to elliptic with round apex, 3-4 mm long, 2.6-

3.3 mm wide.

Long stamens 1.2-1.4 mm long; anthers globose to ellipsoid. 0.4-0.5 mm long, 0.4-0.5 mm wide. Ovaries ellipsoid, 0.5-0.6 mm long, 0.4-0.5 mm wide; styles 0.5-0.7 mm long, slender; stigmas slightly inflated.

Distr. Sikkim, Tibet.

NOTE. Var. vittata is characterized by dentate apex or blunt serrated of leaflets. Although Soják (1988a) described P. vittata with var. pluriflora by having many flowers, specimens of P. vittata are a few and I could not conclude that var. pluriflora can be recognized as an infraspecific taxon or not. Soják (1988a) also described P. oxydonta, but the number of serration is continuous with P. vittata and P. oxydonta.

8c. var. shweliensis (Fletcher) H. Ikeda et H. Ohba, stat. et comb. nov.

Type: China: Yunnan, Shweli-Salwin Divide, 25° 30' N, 11000 ft. (G. Forrest 15929, July 1917, E-holo).

BASIONYM: P. shweliensis Fletcher in Not. Bot. Gard. Edinb. 20: 215 (1950)--C. Y. Wu et al., Index Fl. Yunnan. 1: 498 (1984).

Radical leaves oblanceolate, 8-15 cm long, 3-6.5 cm wide, 5-10 pairs of lateral leaflets without small leaflets; petioles 2-4 cm long; base of uppermost leaflet pair decurrent. Leaflets sericeous beneath; terminal leaflet sessile, oblong to narrowly elliptic, 2-3 cm long, 1-1.5 cm wide, serrate with

20-30 teeth. Auricles of stipules connate and tips round.

Peduncles 10-16 cm long with unicellular hairs. Cauline leaves with 1-2 pairs of leaflets. Auricles of stipules serrate with 3-5 teeth.

Pedicel 1.5-3.5 cm long with unicellular hairs. Flowers c. 2 cm across; hypanthia 8-15 mm across. Episepals oblong to obovate, 4-5 mm long, 3-4 mm wide, entire, apex acute or obtuse, sparsely strigose above, sericeous beneath. Sepals elliptic to ovate, 5-8 mm long, 4-6 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals oblong to elliptic with round apex, 8-12 mm long, 8-11 mm wide.

Long stamens 2.5-3 mm long; anthers globose to ellipsoid, 0.9-1.0-1.2 mm long, 0.8-1.2 mm wide. Ovaries ellipsoid, 0.5-0.6 mm long, 0.4-0.5 mm wide; styles 1.4-1.7 mm long, slender; stigmas slightly inflated.

Distr. SW China (Yunnan).

NOTE. Var. shweliensis was described as a species, P. shweliensis (Fletcher 1950). The differences of P. peduncularis are the shape and indumentum of leaflets and I conclude this as an infraspecific taxon of P. peduncularis.

8d. var. stenophylloides H. Ikeda et H. Ohba, var. nov.

A typo foliolis apice dentatis vel dentibus 4-5 (nec 13-20) ornatis bene differt. Potentillae stenophyllae (Franch.) Diels auriculis connatis apice rotundatis (nec liberis nec apice acutis) satim distinguibilis.

Type: Tibet: Mountains Tjonatong, upper Salwin River (Rock 22321, June-July 1932, GH-holo, E. NY, US-iso).

SYNONYM: *P. stenophylla* auct. non (Franch.) Diels; Fletcher in Bot. Gard. Edinb. 20: 215 (1950), pro parte.

Radical leaves oblanceolate, 2.5-14 cm long, 0.8-2 cm wide, 5-16 pairs of lateral leaflets without small leaflets; petioles 0.5-3.5 cm long; base of uppermost leaflet pair decurrent. Leaflets sparsely hairy beneath, especially on veins; terminal leaflet sessile, oblong to narrowly elliptic, 0.5-1.0 cm long, 0.3-0.8 cm wide, dentate or with 5-7 teeth. Auricles of stipules connate and tips round.

Peduncles 2-15 cm long with unicellular hairs. Cauline leaves simple or 3-lobed incised. Auricles of stipules simple or with 3-5 teeth.

Pedicele 1-3 cm long with unicellular hairs. Flowers 1-2 cm across; hypanthia 7-12 mm across. Episepals oblong to obovate, 3-5 mm long, 1.5-2.5 mm wide, entire, apex acute or obtuse, sparsely strigose above and beneath. Sepals elliptic to ovate, 3-5 mm long, 2-3.5 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals oblong to elliptic with round apex, 6-9 mm long, 6-8 mm wide.

Distr. Tibet, SW China (Yunnan).

Note: Though var. *stenophylloides* has been identified as *P. stenophylla* (Franch.) Diels, it differs from *P. stenophylla* by having connate auricles of stipules of radical leaves, which is free in *P. stenophylla*.

9. *Potentilla contigua* Soják in *Candollea* 43: 160, t. 3, f. 1-4; t. 5, f. 1 & 2 (1988)--Miehe, Langtang Himal, 445, t. D2.49 (1990).

Type: Bhutan: Pangotang, Tsampa, 12000-14500 ft. (Ludlow, Sherriff & Hicks 19739, 13 Sept. 1949, BM-holo).

SYNONYM: *P. peduncularis* auct. non D. Don; Hook. f., Fl. Br. Ind. 2: 351 (1878), pro parte.

P. peduncularis D. Don var. *clarkei* Hook. f., Fl. Br. India 2: 352 (1878)--Wolf, Monogr. Pot. 678 (1908)--Murata in Hara, Fl. E. Himal. 2: 53 (1971)--Grierson & Long, Fl. Bhutan 1: 572 (1987).

Type: Sikkim: Yakla, 14000 ft. (C. B. Clarke 9787, 17 Oct. 1869, K-holo).

P. peduncularis D. Don var. *glabriuscula* Yü et C. Li in Acta Phytotax. Sin. 18: 7, t. 1, f. 3 (1980); Yü et C. Li in Yü, Fl. Reip. Popul. Sin. 37: 266 (1985)--Yü et al. in C. Y. Wu, Fl. Xizang. 2: 648 (1985).

Type: Tibet: Yadong, 3600 m (C. W. Chang 2448, 22 May 1964, PE-holo).

Radical leaves oblanceolate, 10-20 cm long, 1.5-4.5 cm wide, 13-16 pairs of lateral leaflets usually without alternating small leaflets and rarely with alternating small leaflets; base of uppermost leaflet pair decurrent. Leaflets strigose beneath; terminal leaflet sessile, oblong to narrowly obovate, 1-2 cm long, 0.5-0.7 cm wide, serrate with 11-15 teeth. Auricles of stipules free.

Peduncles 10-12 cm long with unicellular hairs. Cauline leaves with 3-5 pairs of leaflets. Auricles of stipules serrate with 3-6 teeth.

Pedicele 1.5-4 cm long with unicellular hairs. Flowers 1.5-2.5 cm across; hypanthia 1-1.5 mm across. Episepals oblong to obovate, 4-5 mm long, 2-3 mm wide, entire or with 3 teeth, apex acute or obtuse, strigose above and beneath. Sepals elliptic to ovate, 4.5-6 mm long, 3.5-4.5 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals oblong to elliptic with round apex, 9.5-10.5 mm long, 9.5-11 mm wide.

Long stamens 1.3-2.5 mm long; anthers globose to ellipsoid, 1-1.3 mm long, 0.9-1.1 mm wide. Ovaries ellipsoid, 1-1.3 mm long, 0.8-1 mm wide; styles 1.6-2 mm long, slender; stigmas slightly inflated. Chromosome number $2n=28$.

Distr. Nepal, Sikkim, Bhutan, Tibet, SW China (Sichuan).
NOTE. Although P. contigua is similar to P. peduncularis in the habit, auricles of stipules of radical leaves of P. contigua are free with two lobes, while those of P. peduncularis are connate and make membranaceous structure with round tips. Potentilla contigua and P. peduncularis often grow sympatrically in Nepal Himalaya, but preference of habitat of each species seems different. Potentilla contigua prefer south-faced slopes of relatively dry, craggy places, while P. peduncularis prefer north-faced slopes or hollow place of wet places (Kikuchi 1992). Potentilla peduncularis vars. clarkei Hook. f. and glabriuscula Yü et C. Li are identical with P.

contigua.

Note: Potentilla contigua had been treated as P. peduncularis by the similarity of gross morphology (leaf shape, flower size), but differs the auricles of stipules.

10. Potentilla cardotiana Hand.-Mazz. in Acta Hort. Gothob. 13: 322 (1939)--Soják in Candollea 43: t. 3, f. 8 (1988).

Type: China; Yunnan, Lo-pin Chan, c. 3200 m (Delavay s.n., 1 Sept. 1888, P-holo).

Two varieties are recognized in P. cardotiana.

Key to the varieties of P. cardotiana.

1. Plants 20-40 cm tall; leaflets golden hairy beneath

10a. var. cardotiana

1. Plants 15-30 cm tall; leaflets silvery hairy beneath

10b. var. nepalensis

10a. var. cardotiana

SYNONYM: P. leuconota D. Don var. corymbosa Card. in Not. Syst. 3: 241 (1916)--Lév. in Cat. Pl. Yun-Nan 232 (1917).

P. peduncularis auct. non D. Don: Fletcher in Not. Bot. Gard. Edinb. 20: 213 (1950), pro parte--Yü & C. Li in Yü, Fl. Reip. Popul. Sin. 37: 265 (1985), pro major parte--Ku in Wang et al., Vascul. Pl. Hengduan Mts. 1: 848 (1993), pro major parte.

Radical leaves oblanceolate, 10-13 cm long, 2.5-3.5 cm wide, 15-18 pairs of lateral leaflets usually with alternating small leaflets; petioles 1-1.5 cm long; base of uppermost leaflet pair decurrent. Golden hairs densely on leaflets beneath; terminal leaflet sessile, broad lanceolate to oblong, 1.2-2 cm long, 0.5-0.8 cm wide, serrate with 15-20 teeth. Auricles of stipules free.

Peduncles 10-15 cm long with unicellular hairs. Cauline leaves with 4-6 pairs of leaflets. Auricles of stipules serrate with 3-5 teeth.

Pediceal 1.5-2 cm long with unicellular hairs. Flowers 8-12 mm across; hypanthia 7-9 mm across. Episepals oblong to obovate, 1.5-2 mm long, 0.7-1 mm wide, entire, apex acute or obtuse, sparsely strigose above, sericeous beneath. Sepals elliptic to ovate, 2-2.5 mm long, 1.5-2 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals oblong to elliptic with round apex, 3-4 mm long, 2.6-3.3 mm wide.

Long stamens 1.2-1.4 mm long; anthers globose to ellipsoid, 0.4-0.5 mm long, 0.4-0.5 mm wide. Ovaries ellipsoid, 0.5-0.6 mm long, 0.4-0.5 mm wide; styles 0.5-0.7 mm long, slender; stigmas slightly inflated.

Distr. SW China (Yunnan), N Burma.

NOTE. Although *P. cardotiana* was first described as a variety of *P. leuconota*; i.e. *P. leuconota* var. *corymbosa* (Cardot 1914), it differ auricles of stipules of radical leaves. Auricles of stipules of radical leaves of *P. cardotiana* are

free and has two lobes while those of *P. leuconota* connate and make membranaceous structure.

10b. var. *nepalensis* H. Ikeda et H. Ohba, var. nov.

A typo pilis foliolis infra argenteis (nec aureis) obtegentibus differt.

Type: E Nepal; Koshi Zone, Sankhuwa Sabha Distr., Cha Ding Kharka - Khongma, 3800 m (Suzuki et al. 8880805, 30 July 1988, TI-holo, BM, E. GH, KATH-iso).

Radical leaves oblanceolate, 7-16 cm long, 2-3 cm wide, 10-22 pairs of lateral leaflets usually with alternating small leaflets, rarely without small leaflets; petioles 2-4 cm long; base of uppermost leaflet pair decurrent. Leaflets silvery sericeous beneath; terminal leaflet sessile, lanceolate to narrowly oblong, 1-2 cm long, 4-7 mm wide, serrate with 18-38 teeth. Auricles of stipules free.

Peduncles 10-15 cm long with unicellular hairs. Cauline leaves with 1-3 pairs of leaflets. Auricles of stipules serrate with 5-7 teeth.

Pedice 1.5-2 cm long with unicellular hairs. Flowers 1-1.5 cm across; hypanthia 6-9 mm across. Episeals oblong to obovate, 3-5 mm long, 1.5-3 mm wide, entire or with 3 teeth, apex acute or obtuse, sparsely strigose above, sericeous beneath. Sepals elliptic to ovate, 4-6 mm long, 2.5-4.5 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals oblong to elliptic with round apex.

5-7 mm long, 4-5.5 mm wide.

Long stamens 1.5-2 mm long; anthers globose to ellipsoid, 0.6-1 mm long, 0.4-0.9 mm wide. Ovaries ellipsoid, 0.6-0.8 mm long, 0.4-0.6 mm wide; styles 0.9-1.3 mm long, slender; stigmas slightly inflated. Chromosome number $2n=14$.

Distr. E Nepal.

NOTE. Var. nepalensis differs from var. cardotiana in the size of plants and indumentum of leaflets. Height of var. nepalensis is smaller than var. cardotiana, var. nepalensis 15-30 cm while var. cardotiana 20-40 cm; hairs of leaf beneath of var. nepalensis are silvery while var. cardotiana are gold.

NOTE. Potentilla cardotiana var. nepalensis is restricted to Arun Valley, E Nepal.

11. Potentilla tristis Soják in Preslia (Praha) 63: 333 (1991).

SYNONYM: P. fallens auct non Card.; Miehe, Langtang Himal. 445 (1990).

Type: Nepal; Tukucha, Kali Gandaki (Stainton, Sykes & Williams 7767, 11 Sept. 1954, BM-holo, E-iso).

Radical leaves oblanceolate, 2-5 cm long, 1-1.2 cm wide, 8-12 pairs of lateral leaflets, usually with alternating small leaflets, sometimes without small leaflets; petioles c. 0.5 cm long; base of uppermost leaflet pair cuneate. Leaflets patent dense hairs on beneath, especially on veins; terminal leaflet

sessile, oblong to obovate, 4-5 mm long, 4-5 mm wide, serrate with 6-11 teeth. Auricles of stipules connate from base to middle.

Peduncles 1-2 cm long with unicellular hairs. Cauline leaves with 1-2 pairs of leaflets. Auricles of stipules serrate with 2-4 teeth.

Pedicele c. 5 mm long with unicellular hairs. Flowers 8-12 mm across; hypanthia 5-7 mm across. Episepals oblong to obovate, 3-5 mm long, 1.5-3 mm wide, entire or with 3 teeth, apex acute or obtuse, sparsely strigose above, sericeous beneath. Sepals elliptic to ovate, 4-6 mm long, 2.5-4.5 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals oblong to elliptic with round apex, 5-7 mm long, 4-5.5 mm wide.

Long stamens 1.5-2 mm long; anthers globose to ellipsoid, 0.6-1 mm long, 0.4-0.9 mm wide. Ovaries ellipsoid, 0.6-0.8 mm long, 0.4-0.6 mm wide; styles 0.9-1.3 mm long, slender; stigmas slightly inflated. Chromosome number $2n=28$.

Distr. NW India, C Nepal.

NOTE. Potentilla tristis is similar to P. fallens. P. commutata and P. peduncularis in the habit. Potentilla tristis, P. commutata and P. peduncularis don't have glandular hairs on petioles which P. fallens has. Auricles of stipules of radical leaves of P. tristis are connate from the base to the middle, while those of P. fallens are free with two lobes and those of P. commutata and P. peduncularis are wholly connate and make membranaceous structure.

12. *Potentilla commutata* Lehm., Pugill. 3: 16 (1831); Rev. Pot. 65 (1856)--Soják in Candollea 43: t. 1, f. 10; t. 2, f. 4 (1988)--Miehe, Langtang Himal, 445 (1990).

Type: Wallich 1010[♂] (K-holo)

SYNONYM: *P. microphylla* D. Don var. *commutata* (Lehm.) Hook. f., Fl. Br. Ind. 2: 353 (1878)--Strachey, Cat. Pl. Kumaon 56 (1906)--Hand.-Mazz., Symb. Sin. 7: 519 (1933)--Ohashi in Hara & Williams, Enum. Flow. Pl. Nepal 2: 141 (1979)--C. Y. Wu et al., Index Fl. Yunnan. 1: 497 (1984).

P. microphylla D. Don var. *latifolia* Wall. [Cat. 28, n. 1010[♂] (1829), nom. nud.] ex Lehm., Pugill. 3: 16 (1831)--T. Wolf, Monogr. Pot. 683 (1908)--Grierson & Long, Fl. Bhutan 1: 573 (1987).

Type: NW India; Kumaon (Wallich 1010[♂], K-lecto, designated by Soják in 1989).

P. microphylla D. Don var. *latiloba* Lehm., Rev. Pot. 30 (1856)--Hook. f., Fl. Br. Ind. 2: 353 (1878)--Strachey, Cat. Pl. Kumaon 56 (1906)--Wolf, Monogr. Pot. 682 (1908).

Type: same as *P. microphylla* D. Don var. *latifolia* Wall. ex Lehm.

Two varieties are recognized in *P. commutata*.

Key to the varieties of *P. commutata*

- | | |
|----------------------|----------------------------|
| 1. Stamens 10-14 | 12a. var. <i>commutata</i> |
| 1. Stamens around 20 | 12b. var. <i>major</i> |

12a. var. *commutata*

Radical leaves oblanceolate, 2-4 cm long, 6-8 mm wide, 5-9 pairs of lateral leaflets without alternating small leaflets; petioles 3-5 mm long; base of uppermost leaflet pair apparently decurrent or sometimes slightly decurrent. Leaflets sericeous or strigose beneath; terminal leaflet sessile or sub-sessile, oblong to narrowly obovate, 3.5-5 mm long, 2-3 mm wide, serrate with 7-12 teeth. Auricles of stipules connate and membranaceous.

Peduncles 0.5-1.5 cm long with unicellular hairs. Cauline leaves simple, entire or tri-lobed. Auricles of stipules entire.

Pedicele 3-7 mm long with unicellular hairs. Flowers 5-8 mm across; hypanthia 4-6 mm across. Episepals lanceolate to oblong, 1.5-2.5 mm long, 1.5-2.5 mm wide, entire or with 3 teeth, apex acute or obtuse, sparsely strigose above, sericeous beneath. Sepals elliptic to ovate, 1.5-2.2 mm long, 1.5-2 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals oblong to elliptic with round apex, 3.5-4.5 mm long, 3-4.2 mm wide.

Stamens 8-12, long stamens 1.3-1.7 mm long; anthers globose to ellipsoid, 0.5-0.7 mm long, 0.5-0.7 mm wide. Ovaries ellipsoid, 0.6-0.8 mm long, 0.4-0.5 mm wide; styles 0.4-0.5 mm long, slender; stigmas slightly inflated. Chromosome number $2n=14$.

Distr. NW India, Nepal, Sikkim.

12b. var. major H. Ikeda et H. Ohba, var. nov.

A typo staminibus numero 20 (nec 10 vel 14) differt.

Type: E Nepal; Koshi Zone, Sankhuwa Sabha Distr., Jaljale Himal, around Banduke, 4150 m (Ohba et al. 9130183, TI-holo, KATH, BM-iso).

Radical leaves oblanceolate, 3-8 cm long, 1-1.5 cm wide, 10-15 pairs of lateral leaflets without small leaflets; petioles 0.5-1 cm long; base of uppermost leaflet pair decurrent. Leaflets strigose above, sericeous beneath; terminal leaflet sessile, oblong to narrowly obovate, 5-8 mm long, 3-4 mm wide, serrate with 7-11 teeth. Auricles of stipules connate and apex round.

Peduncles 2-5 cm long with unicellular hairs. Cauline leaves simple or with one pair of leaflets. Auricles of stipules entire or with 2-3 teeth.

Pedicele 1-2.5 cm long with unicellular hairs. Flowers 8-12 mm across; hypanthia 6-8 mm across. Episepals oblong to obovate, 1.5-2 mm long, 0.7-1 mm wide, entire, apex acute or obtuse, sparsely strigose above, sericeous beneath. Sepals elliptic to ovate, 2-2.5 mm long, 1.5-2 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals oblong to elliptic with round apex, 3-4 mm long, 2.6-3.3 mm wide.

Long stamens 1.2-1.4 mm long; anthers globose to ellipsoid, 0.4-0.5 mm long, 0.4-0.5 mm wide. Ovaries ellipsoid, 0.5-0.6 mm long, 0.4-0.5 mm wide; styles 0.5-0.7 mm long.

slender; stigmas slightly inflated. Chromosome number $2n=14$.

Type: E Nepal; Koshi Zone, Sankhuwa Sabha Distr., (Suzuki et al. 1988, TI-holo. BM, K. KATH-iso).

Distr. NW India, Nepal, Sikkim, SW China (Sichuan).

NOTE. Variety major differs from var. commutata in the number of stamens. Variety major has around 20 stamens while var. commutata has 10-14. In Nepal Himalaya, var. commutata and var. major grow sympatrically. Chromosome numbers of the two varieties are same as diploid ($2n=14$).

iv. Series Leuconotae (Dixit et Panigrahi) H. Ikeda et H. Ohba, comb. nov.

BASIONYM: Section Leuconotae Dixit et Panigrahi in Proc. 4 Ann. Conf. Orissa Bot. Soc. 25 (1979).

Type species: Potentilla leuconota D. Don

13. Potentilla leuconota D. Don. Prodr. Fl. Nepal. 230 (1825)--Franch. in DC. Prodr. 2: 583 (1825)--Lehm. Rev. Pot. 65 (1856)--Hook. f., Fl. Br. Ind. 2: 352 (1878)--Franchet. Pl. Delav. 2: 41 (1888); 3: 213 (1890)--Strachey, Cat. Pl. Kumaon 56 (1906)--Wolf, Monogr. Pot. 679 (1908), excl. var. borneensis--Lév. in Cat. Pl. Yun-Nan 232 (1917)--J. Krause in Fedde, Repert. Sp. Nov. Beih. 12: 410 (1922)--Hand.-Mazz., Symb. Sin. 7: 518 (1933)--Fletcher in Not. Bot. Gard. Edinb. 20: 213 (1950)--Murata in Hara, Fl. E. Himal. 123 (1966)--Acad. Sin. Bot., Iconogr. Cormophyt. Sin. 2: 300, t. 2330

(1972)--Malla et al. in Bull. Dept. Med. Pl. Nepal 7: 78
(1976)--Ohashi in Hara et Williams, Enum. Flow. Pl. Nepal 2:
140 (1979)--C. Y. Wu et al., Index Fl. Yunnan. 1: 496 (1984)--
Yü et C. Li in Yü, Fl. Reip. Popul. Sin. 37: 266 (1985)--Yü
et al. in C. Y. Wu, Fl. Xizang. 2: 648 (1985)--Grierson et
Long, Fl. Bhutan 1: 572 (1987)--Soják in Candollea 43: t. 3,
f. 9; t. 5, f. 3 (1988)--Miehe, Langtang Himal. 445 (1990)--Ku
in Wang et al., Vascul. Pl. Hengduan Mts. 1: 849 (1993).

Type: Nepal: Gosainthan, Wallich 1021 (BM-holo, K-iso).

13a. var. *leuconota*

SYNONYM: *P. velutina* Wall., Cat. 28, n. 1016 (1829), nom.
nud.

Type: Nepal: Gosainthan (Wallich 1016, BM-holo).

P. leuconota D. Don var. *morrisonicola* Hayata in Journ.
Coll. Sci. Univ. Tokyo 25 (19): 83 (1908)--Su in Li et al. Fl.
Taiwan 3: 78 (1977).

Type: Formosa: Mt. Morrison, 13094 ft., Nov. 1905, S.
Nagasawa 732 (TI).

P. morrisonicola (Hayata) Hayata, Icon. Pl. Form. 3: 96
(1913).

Type: same as *P. leuconota* var. *morrisonicola*.

Radical leaves oblanceolate, 2.5-20 cm long, 1.5-4 cm wide,
6-17 pairs of lateral leaflets usually with alternating small
leaflets; petioles 1-3 cm long; base of uppermost leaflet pair
decurent. Leaflets sericeous beneath; terminal leaflet ses-

sile. oblong to narrowly obovate, 0.5-2 cm long, 3-10 mm wide, serrate with 10-20 teeth. Auricles of stipules connate from base to middle.

Peduncles 2-2.5 cm long with unicellular hairs. Cauline leaves with 3-8 pairs of leaflets. Auricles of stipules serrate with 5-10 teeth.

Pediceal 1-3 cm long with unicellular hairs. Internode of inflorescence short and like umbels. Flowers 5-8 mm across; hypanthia 3-5 mm across. Episepals lanceolate to narrowly oblong, 1.5-2 mm long, 0.7-1 mm wide, entire, apex acute or obtuse, sparsely strigose above, sericeous beneath. Sepals elliptic to ovate, 2-2.5 mm long, 1.5-2 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals oblong to elliptic with round apex, 3-4 mm long, 2.6-3.3 mm wide.

Long stamens 1.2-1.4 mm long; anthers globose to ellipsoid, 0.4-0.5 mm long, 0.4-0.5 mm wide. Ovaries ellipsoid, 0.5-0.6 mm long, 0.4-0.5 mm wide; styles 0.5-0.7 mm long, slender; stigmas slightly inflated. Chromosome number $2n=14$.

Distr. NW India, Nepal, Sikkim, Bhutan, Tibet, Assam, SW China (Yunnan, Sichuan, Hupei), N Burma, Taiwan.

NOTE. Potentilla leuconota is distributed from NW India to Taiwan. The Taiwan plants has been distinguished by having no small leaflets between leaflet pairs and having small bracts on the petioles (Hayata 1908), but such type is distributed throughout the distributed range of the species, so I concluded that P. leuconota var. morrisonicola (P. morrisonicola) are

the synonyms of *P. leuconota* var. *leuconota*.

13b. var. *omeiensis* H. Ikeda et H. Ohba, var. nov.

A typo foliis infra pilis aureis (nec argenteis) satis distincta.

Type: China: Sichuan, Omei Hsien, Mt. Omei, 8500-9000 ft. (Fang 2872, 13 Aug. 1928, E-holo, GH, US-iso).

Radical leaves oblanceolate, 12-18 cm long, 2-3 cm wide, 15-18 pairs of lateral leaflets usually with alternating small leaflets, sometimes without small leaflets; petioles 3-4 cm long; base of uppermost leaflet pair decurrent. Leaflets golden sericeous beneath; terminal leaflet sessile, oblong to narrowly obovate, 1.2-2 mm long, 5-8 mm wide, serrate with 20-25 teeth. Auricles of stipules connate from base to middle.

Peduncles 14-23 cm long with unicellular hairs. Cauline leaves with 5-10 pairs of leaflets. Auricles of stipules serrate with 5-7 teeth.

Pedicels 1-2 cm long with unicellular hairs. Flowers 6-8 mm across; hypanthia 4-6 mm across. Episepals oblong to obovate, 1.5-2 mm long, 0.7-1 mm wide, entire, apex acute or obtuse, sparsely strigose above, sericeous beneath. Sepals elliptic to ovate, 2-2.5 mm long, 1.5-2 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals oblong to elliptic with round apex, 3-4 mm long, 2.6-3.3 mm wide.

Long stamens 1.2-1.4 mm long; anthers globose to ellip-

soid, 0.4-0.5 mm long, 0.4-0.5 mm wide. Ovaries ellipsoid, 0.5-0.6 mm long, 0.4-0.5 mm wide; styles 0.5-0.7 mm long, slender; stigmas slightly inflated.

Distr. SW China (Sichuan).

13c. var. *brachyphyllaria* Card. in Lecomte, Not. Syst. 3: 241 (1914)--Hand.-Mazz. in Acta Hort. Gothob. 13: 324 (1939)--C. Y. Wu et al., Index Fl. Yunnan, 1: 496 (1984)--Ku in Wang et al., Vascul. Pl. Hengduan Mts. 1: 849 (1993).

Type: China: Szechuan, Kiala, Tongolo (Soulié 690, 13 July 1893, P-lecto, designated here, syn). China: Szechuan, Kiala, Ta-tsien-lou (Soulié s.n. in 1893, P-syn). Tibet orient.; Kajilatho (Soulié 2447, 20 July 1894, P, BM-syn).

Radical leaves oblanceolate, 4-9 cm long, 1-2.5 cm wide, 8-15 pairs of lateral leaflets without small leaflets; petioles 1-3 cm long; base of uppermost leaflet pair decurrent. Leaflets strigose beneath, especially on veins; terminal leaflet sessile, oblong to narrowly obovate, 6-10 mm long, 4-6 mm wide, serrate with 10-15 teeth. Auricles of stipules connate from base to middle.

Peduncles 5-8 cm long with unicellular hairs. Cauline leaves with 3-5 pairs of leaflets. Auricles of stipules serrate with 5-8 teeth.

Pedicels very short, 1-2 mm long with unicellular hairs. Flowers 5-7 mm across; hypanthia 3-5 mm across. Episepals oblong to obovate, 1.5-2 mm long, 0.7-1 mm wide, entire, apex

acute or obtuse, sparsely strigose above, sericeous beneath. Sepals elliptic to ovate, 2-2.5 mm long, 1.5-2 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals oblong to elliptic with round apex, 3-4 mm long, 2.6-3.3 mm wide.

Long stamens 1.2-1.4 mm long; anthers globose to ellipsoid, 0.4-0.5 mm long, 0.4-0.5 mm wide. Ovaries ellipsoid, 0.5-0.6 mm long, 0.4-0.5 mm wide; styles 0.5-0.7 mm long, slender; stigmas slightly inflated.

Distr. Assam, Tibet, SW China (Yunnan, Sichuan).

14. *Potentilla montisvictoriae* H. Ikeda et H. Ohba in J. Jpn. Bot. (in printing).

Type: C Burma; Mt. Victoria (Cooper 6002 in 1924, E-holo and iso).

Radical leaves oblanceolate, 4-12 cm long, 1-5 cm wide, 6-12 pairs of lateral leaflets usually with alternating small leaflets; petioles 1-3 cm long; base of uppermost leaflet pair decurrent. Leaflets sericeous beneath; terminal leaflet sessile, oblong to narrowly obovate, 5-8 mm long, 3-4 mm wide, serrate with 10-15 teeth. Auricles of stipules free.

Peduncles 5-10 cm long with unicellular hairs. Cauline leaves with 3-7 pairs of leaflets. Auricles of stipules entire or with 2-3 teeth.

Pedicels 5-15 cm long with unicellular hairs. Flowers 8-

12 mm across; hypanthia 4-8 mm across. Episepals lanceolate to narrowly elliptic, 1.5-2 mm long, 0.7-1 mm wide, entire, apex acute or obtuse, sparsely strigose above, sericeous beneath. Sepals elliptic to ovate, 2-2.5 mm long, 1.5-2 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals obovate with round apex, 3-4 mm long, 2.6-3.3 mm wide.

Long stamens 1.2-1.4 mm long; anthers globose to ellipsoid, 0.4-0.5 mm long, 0.4-0.5 mm wide. Ovaries ellipsoid, 0.5-0.6 mm long, 0.4-0.5 mm wide; styles 0.5-0.7 mm long, slender; stigmas slightly inflated.

Distr. C Burma.

NOTE. Although *P. montisvictoriae* has been identified as *P. leuconota*, it differs auricles of stipules of radical leaves free and two lobes while those of *P. leuconota* connate from the base to the middle. Inflorescence of *P. montisvictoriae* are loose umbel-like while those of *P. leuconota* look like umbel. *P. montisvictoriae* is only known from Mt. Victoria, C Burma. *Potentilla* species Kingdon-Ward cited (Kingdon-Ward 1958) is perhaps *P. montisvictoriae*.

15. *Potentilla wenchuensis* H. Ikeda et H. Ohba, sp. nov.

Potentillae leuconotae D. Don primo aspectu maxime similis, sed auriculis stipularum foliorum cauliferorum integris nec bilobatis.

Type: China; Sichuan, Win-chuan, Tsao-puh, 12000-13000 ft.

(S. Y. Hu 2666, Aug. 1944, GH-holo).

Radical leaves oblanceolate, 10-18 cm long, 3-4 cm wide, 8-10 pairs of lateral leaflets without small leaflets; petioles 2-4 cm long; base of uppermost leaflet pair decurrent. Leaflets yellowish silvery beneath; terminal leaflet sessile, lanceolate to narrowly oblong, c. 2 mm long, 5-7 mm wide, serrate with c. 20 teeth. Auricles of stipules connate, apex round.

Peduncles 9-12 cm long with unicellular hairs. Cauline leaves with 1-2 pairs of leaflets. Auricles of stipules serrate with 4-6 teeth.

Pedicels 1-1.5 cm long with unicellular hairs. Hypanthia 5-7 mm across. Episepals oblong to obovate, 1.5-2 mm long, 0.7-1 mm wide, entire, apex acute or obtuse, sparsely strigose above, sericeous beneath. Sepals elliptic to ovate, 2-2.5 mm long, 1.5-2 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals oblong to elliptic with round apex, 3-4 mm long, 2.6-3.3 mm wide.

Distr. SW China (Sichuan, Guizhou).

NOTE. Potentilla wenchuensis differs from P. leuconota by the auricles of stipules of radical leaves connate from the base to the top and tips round while those of P. leuconota connate from the base to the middle and divided into two lobes.

B. Subsect. *Leptostylae*

v. Ser. *Leptostylae*

- Syn. Ser. *Anserinae* (Wolf) Yü et C. Li in *Acta Phytotax.*
Sin. 18: 5 (1980); in Yü, *Fl. Reip. Popul. Sin.* 37: 275
(1985).
16. *Potentilla anserina* L., *Sp. Pl.* 1st ed. 495 (1753)--
Lehm., Monogr. Pot. 71 (1820)--Ser. in DC., *Prodr.* 2: 582
(1825)--Bunge, *Enum. Pl. Chin. Bor.* 26 (1833)--*Lehm., Rev.*
Pot. 188 (1856)--Hook. f., *Fl. Br. Ind.* 2: 350 (1878)--
Franch., Pl. David. 1: 113 (1884); *Pl. Delav.* 3: 211 (1890)--
Strachey, Cat. Pl. Kumaon 56 (1906)--Wolf, *Monogr. Pot.* 669
(1908)--Melch. & Stroh in *Notizb. Bot. Gart. Mus. Berl.* 11:
799 (1933)--Hand.-Mazz. in *Acta Hort. Gothob.* 13: 326 (1939)--
Fletcher in Not. Bot. Gard. Edinb. 20: 207 (1950)--*Baehni,*
Bonner & Vautier in Candollea 13: 228 (1951)--*Kitamura in*
Kihara, F. Fl. Nepal Himal. 149 (1955)--*Kitamura, Pl. W.*
Pakist. 84 (1964)--*Murata in Hara, Fl. E. Himal.* 2: 52 (1971)--
-Pesmen in Davis, Fl. Turkey 4: 47 (1972)--*Nasir & Ali in Fl.*
W. Pakistan 353 (1972)--*Acad. Sin. Bot., Iconogr. Cormophyt.*
Sin. 2: 300, t. 2329 (1972)--*Acad. Sin. Bot., Fl. Tsinling.* 1
(2): 549, t. 458 (1974)--*Malla et al. in Bull. Dept. Med. Pl.*
Nepal 7: 78 (1976)--*Ohashi in Hara et Williams, Enum. Flow.*
Pl. Nepal 2: 138 (1979)--*Panigrahi et Dixit in J. Econ. Tax.*
Bot. 1: 129 (1980)--*Polunin et Stainton, Flow. Himal.* 125
(1984)--*C. Y. Wu et al., Index Fl. Yunnan.* 1: 490 (1984)--*Yü &*
C. Li in Yü, Fl. Reip. Popul. Sin. 37: 275 (1985)--*Yü et al.*
in C. Y. Wu, Fl. Xizang. 2: 652 (1985)--*Grierson et Long, Fl.*

Bhutan 1: 571 (1987)--Miehe, Langtang Himal. 445 (1990)--Ku in wang et al., Vascul. Pl. Hengduan Mts. 1: 850 (1993).

Type: Linnaeus in the Clifford Herbarium (BM),
lectotypified by Rousi (1965).

P. anserina L. forma *suberosa* Th. Wolf in Monogr. Pot. 671 (1908).

P. anserina L. var. *sericea* Hayne, Arzneineigew 4: 31 (1816)--Yü & C. Li in Yü, Fl. Reip. Popul. Sin. 37: 276 (1985)--Ku in Wang et al., Vascul. Pl. Hengduan Mts. 1: 850 (1993).

Stoloniferous herb. Radical leaves oblanceolate, 3-12 cm long, 1.5-3.0 cm wide, 5-10 pairs of lateral leaflets with alternating small leaflets; petioles 1-2 cm long; base of uppermost leaflet pair cuneate or slightly decurrent. Leaflets sericeous beneath; terminal leaflet petiolate or sub-sessile, oblong to narrowly obovate, 0.5-1.2 cm long, 0.4-1.0 cm wide, serrate with 13-19 teeth. Auricles of stipules connate and tips round.

Flowers solitary, borne from axils of radical leaves and cauline leaves of stolons. No leaf and bract on pedicels.

Pedicels 2-5 cm long, glabrous. Flowers 1.5-2.5 cm across; hypanthia 0.3-0.5 mm across. Episepals oblong to obovate, 3-8 mm long, 1-4 mm wide, entire or with 2-4 teeth, apex acute or obtuse, sparsely hairy above, sericeous beneath. Sepals elliptic to ovate, 3-8 mm long, 2-5 mm wide, entire, apex acute or obtuse, lanate upper part above, sericeous

beneath. Petals oblong to elliptic with round apex, 5-12 mm long, 3-7 mm wide.

Long stamens 3-5 mm long; anthers globose to ellipsoid, 0.8-1.2 mm long, 0.4-0.8 mm wide. Ovaries ellipsoid, 0.8-1.2 mm long, 0.4-0.8 mm wide; styles 2-4 mm long, slender; stigmas slightly inflated. Chromosome number of Nepalese plants $2n=28$.

Distr. NW India, Nepal, Sikkim, Bhutan, Tibet, SW China (Yunnan, Sichuan); temperate region of seacoast and mountain-side of Asia, Europe and N America, also New Zealand.

NOTE. Potentilla anserina and close related species, P. anserinoides are distributed widely in northern hemisphere (Europe, Asia and America) and also southern hemisphere (New Zealand). Rousi (1965) revised P. anserina aggregate and she recognized three subspecies in P. anserina, i.e., subspecies anserina, egedii (Wormsk.) Hiit. and pacifica (Howell) Rousi and one species, P. anserinoides Raoul. She treated Himalayan P. anserina as subsp. anserina. In P. anserina, new shoots and flowers are borne on the same nodes of the stolons.

17. Potentilla gombalana Hand.-Mazz. in Acta Hort. Gothob. 13: 324 (1939)--Yü & Li in Yü. Fl. Reip. Popul. Sin. 37: 277 (1985)--Ku in Wang et al., Vascul. Pl. Hengduan Mts. 1: 851 (1993).

Type: China: Szechuan, Kangting (Tachienlu) distr., Yulingkong, Gomba La, c. 3700 m (Smith 10714, 22 July 1934, W-holo, not seen. BM, PE-iso).

Stoloniferous herb. Radical leaves oblanceolate, 13-25 cm long, 4.5-6 cm wide, 9-12 pairs of lateral leaflets with alternating small leaflets; petioles 2-4 cm long; base of uppermost leaflet pair decurrent. Leaflets sericeous beneath; terminal leaflet sessile, narrowly oblong, 1.5-2.5 cm long, 8-10 mm wide, serrate with 20-25 teeth. Auricles of stipules connate and round apex.

Flowers 1-2, borne from radical leaves or on stolons. Peduncles 6-15 cm long with unicellular hairs. Cauline leaves simple or with one pair of leaflets. Auricles of stipules entire or serrate with 2-3 teeth.

Pedicels 4-5 cm long with unicellular hairs. Flowers 1.5-2 cm across; hypanthia 12-14 mm across. Episepals oblong to obovate, 3-5 mm long, 1.5-3 mm wide, entire or with 3 teeth, apex acute or obtuse, sparsely strigose above, sericeous beneath. Sepals elliptic to ovate, 4-6 mm long, 2.5-4.5 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals oblong to elliptic with round apex, 5-7 mm long, 4-5.5 mm wide.

Long stamens 1.5-2 mm long; anthers globose to ellipsoid, 0.6-1 mm long, 0.4-0.9 mm wide. Ovaries ellipsoid, 0.6-0.8 mm long, 0.4-0.6 mm wide; styles 0.9-1.3 mm long, slender; stigmas slightly inflated.

Distr. SW China (Sichuan).

NOTE. Potentilla gombalana is characterized by having stolons from radical leaves. In the original description, flowers of P. gombalana borne from radical leaves or on stolons, but from

two isotypes (in BM and PE) showed flowers borne from radical leaves, not on stolons.

vi. *Ser. Smithianae* H. Ikeda et H. Ohba, ser. nov.

Surcula flore terminata, ex axilla folii supremi oriens.

18. *Potentilla smithiana* Hand.-Mazz. in Acta Hort. Gothob. 13: 325 (1939)--Yü & C. Li in Yü, Fl. Reip. Popul. Sin. 37: 277, t. 42, f. 4 & 5 (1985).

Type: China: Sichuan occid., Ta-hsiang-ling, c. 1400 m (Smith 10380, 24 June 1934, W-holo, not seen, GH, BM, E, NY, PE-iso).

Stoloniferous herb. No or few radical leaves at flowering time. Cauline leaves on stolons oblong, 5-10 cm long, 2.5-5.5 cm wide, 3-5 pairs of lateral leaflets with alternating small leaflets; petioles 1-3.5 cm long; base of uppermost leaflet pair cuneate or slightly decurrent. Leaflets strigose beneath; terminal leaflet sub-sessile, oblong to obovate, 1.5-3.5 cm long, 1-1.5 cm wide, serrate with 16-30 teeth. Auricles of stipules free.

Flowers borne solitary and terminal, borne on stolons. Pedicels 2-5 cm long with unicellular hairs. Hypanthia 1-1.2 cm across. Episeals oblong to obovate, 3-5 mm long, 1.5-3 mm wide, entire or with 3-4 teeth, apex acute or obtuse, sparsely strigose above, sericeous beneath. Sepals elliptic to ovate.

4-6 mm long, 2.5-4.5 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin. Petals oblong to elliptic with round apex, 5-7 mm long, 4-5.5 mm wide.

Long stamens 1.5-2 mm long; anthers globose to ellipsoid, 0.6-1 mm long, 0.4-0.9 mm wide. Ovaries ellipsoid, 0.6-0.8 mm long, 0.4-0.6 mm wide; styles 0.9-1.3 mm long, slender; stigmas slightly inflated.

Distr. SW China (Sichuan).

NOTE. Branching pattern of *Ser. Smithianae* is unique in section *Leptostylae*. It shows branching of flowering stems sympodial.

19. *Potentilla taronensis* C. Y. Wu ex Yü et C. Li in *Acta Phytotax. Sin.* 18: 9, t. 2, f. 4 (1980)--C. Y. Wu et al., *Index Fl. Yunnan*, 1: 499 (1984)--Yü & C. Li in *Yü, Fl. Reip. Popul. Sin.* 37: 279, t. 42, f. 1-3 (1985)--Ku in Wang et al., *Vascul. Pl. Hengduan Mts.* 1: 851 (1993).

Type: China: Yunnan, Taron-Taru Divide, Tarulaka, Ganshan, 3000-3200 m (Yü 20915, 1 Nov. 1938, PE-holo).

SYNONYM: *P. macrocarpa* Yü et C. Li in *shed*.

Stoloniferous herb. No or few radical leaves at flowering time. Cauline leaves on stolons oblong, 5-10 cm long, 2.5-5.5 cm wide, 3-5 pairs of lateral leaflets with alternating small leaflets; petioles 1-3.5 cm long; base of uppermost leaflet pair cuneate or slightly decurrent. Leaflets strigose beneath:

terminal leaflet sub-sessile, oblong to obovate, 1.5-3.5 cm long, 1-1.5 cm wide, serrate with 16-30 teeth. Auricles of stipules free.

Flowers borne solitary and terminal, borne on stolons. Pedicels 2-5 cm long with unicellular hairs. Hypanthia 1-1.2 cm across. Episepals oblong to obovate, 3-5 mm long, 1.5-3 mm wide, entire or with 3-4 teeth, apex acute or obtuse, sparsely strigose above, sericeous beneath. Sepals elliptic to ovate, 4-6 mm long, 2.5-4.5 mm wide, entire, apex acute or obtuse, lanate above, strigose beneath and margin.

Distr. China (Yunnan).

NOTE. I could examine only the type specimen of P. taronensis. The type specimens bear fruits and has no flower.

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EXPLANATION OF FIGURES AND PLATES

- Fig. 1. Branching types, branching patterns and life forms of species of sect. *Leptostylae*. Branching types: a, sympodial branching; b-f, monopodial branching. Branching patterns: a, *Smithiana*-type; b, *Anserina*-type; c, *Microphylla*-type; d, *Peduncularis*-type; e, *Leuconota*-type; f, *Aristata*-type. Life forms: a & b, stoloniferous form; c, cushion form; d, rhizomatous form; e & f, rosette form.
- Fig. 2. Branching of *Potentilla aristata*. L: leaf. NR: new root. OR: old root.
- Fig. 3. Schematic figures of three types of auricles of radical leaves. a: Two triangular auricles with acute tips (B-type). b: Two auricles variously connate (C-type). c: One auricle with entire margin (D-type).
- Fig. 4. Variation of connation of auricles of radical leaves of *Potentilla leuconota* collected in Nepal.
- Fig. 5. Schematic figures of stipules of cauline leaves. a: Auricles surround stems and not connate. b: Auricles surround stems and connate.
- Fig. 6. Three types of inflorescence. a: Inflorescence with a single flower. b: Inflorescence with some flowers. c: Umbel-like inflorescence.
- Fig. 7. Floral diagrams of three types of stamens. a: Stamens 20, arranged in three whorls. b: Stamens 10, arranged in one whorl. c: Stamens 5, arranged in one whorl.
- Fig. 8. *Potentilla microphylla* D. Don var. *microphylla* (Suzuki et al. 8880718, T1). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.
- Fig. 9. *Potentilla microphylla* D. Don var. *tapetodes* (Soják) H. Ikeda et H. Ohba (Ludlow, Sherriff & Hicks 16425, holotype of *P. tapetodes* Soják, BM). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and

sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

Fig. 10. Distribution map of Potentilla microphylla var. microphylla (*), var. tapetodes (Δ) and var. luteopilosa (■).

Fig. 11. Potentilla aristata Soják (Suzuki et al. 8880689, TI). a: Sepals, inner surface (left) and outer surface (right). b: Episeals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

Fig. 12. Distribution map of Potentilla aristata.

Fig. 13. Potentilla stenophylla (Franch.) Diels var. stenophylla (Delavay 105, P). a: Sepals, inner surface (left) and outer surface (right). b: Episeals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

Fig. 14. Potentilla stenophylla (Franch.) Diels var. emergens Card. (Soulié 2548, syntype of P. stenophylla var. emergens, P). a: Sepals, inner surface (left) and outer surface (right). b: Episeals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (right two), oppositipetalous ones (left two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

Fig. 15. Potentilla stenophylla (Franch.) Diels var. taliensis (W. W. Smith) H. Ikeda et H. Ohba (Forrest 7017, holotype of P. taliensis W. W. Smith, E). a: Sepals, inner surface (left) and outer surface (right). b: Episeals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (right two), oppositipetalous ones (left two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

Fig. 16. Distribution map of Potentilla stenophylla var. stenophylla (*), var. emergens (Δ), var. taliensis (■) and var. cristata (○).

Fig. 17. Potentilla turfosa Hand.-Mazz. var. turfosa (Yü

22231, PE). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

Fig. 18. Distribution map of *Potentilla turfosa* var. *turfosa* (*) and var. *gracillima* (Δ).

Fig. 19. *Potentilla turfosoidea* H. Ikeda et H. Ohba (Suzuki et al. 8882822, collected from the type locality of *P. turfosoidea*, TI). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

Fig. 20. Distribution map of *Potentilla turfosoidea*.

Fig. 21. Distribution map of *Potentilla makaluensis*.

Fig. 22. *Potentilla glabriuscula* (Yü et C. L. Li) Soják var. *glabriuscula* (upper, Yü 19788, P) and var. *oligandra* (Soják) H. Ikeda et H. Ohba (lower, Ludlow, Sherriff & Elliot 14362, holotype of *P. oligandra* Soják, BM). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Stamens, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

Fig. 23. Distribution map of *Potentilla glabriuscula* var. *glabriuscula* (*) and var. *oligandra* (Δ).

Fig. 24. *Potentilla peduncularis* D. Don var. *peduncularis* (Suzuki et al. 8880802, TI). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

Fig. 25. *Potentilla peduncularis* D. Don var. *vittata* (Soják) H. Ikeda et H. Ohba (Ludlow, Sherriff & Elliot 13966, holotype of *P. vittata* Soják, BM). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate

1 mm.

Fig. 26. *Potentilla peduncularis* D. Don var. *shweliensis* (Fletcher) H. Ikeda et H. Ohba (Forrest 15929, holotype of *P. shweliensis* Fletcher, E) a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (lower right two) and between petals and sepals ones (upper right two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

Fig. 27. Distribution map of *Potentilla peduncularis* var. *peduncularis* (•), var. *vittata* (Δ), var. *shweliensis* (■) and var. *stenophylloides* (○).

Fig. 28. *Potentilla contigua* Soják (Minaki et al. 9080157, TI). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

Fig. 29. Distribution map of *Potentilla contigua*.

Fig. 30. *Potentilla cardotiana* Hand.-Mazz. var. *cardotiana* (Delavay s.n., P). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (right two), oppositipetalous ones (left two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

Fig. 31. *Potentilla cardotiana* Hand.-Mazz. var. *nepalensis* H. Ikeda et H. Ohba (Minaki et al. 9080357, collected from the type locality of *P. cardotiana* var. *nepalensis*, TI). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

Fig. 32. Distribution map of *Potentilla cardotiana* var. *cardotiana* (•) and var. *nepalensis* (Δ).

Fig. 33. *Potentilla tristis* Soják (Stainton, Sykes & Williams 865, E). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones

(right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

Fig. 34. Distribution map of Potentilla tristis.

Fig. 35. Potentilla commutata Lehm. var. commutata (Suzuki et al. 8880608, TI). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

Fig. 36. Potentilla commutata Lehm. var. major H. Ikeda et H. Ohba (Minaki et al. 9080222, collected from the type locality of P. commutata var. major, TI). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

Fig. 37. Distribution map of Potentilla commutata var. commutata (•) and var. major (Δ).

Fig. 38. Potentilla leuconota D. Don var. leuconota (upper, Suzuki et al. 8880569, TI), var. omeiensis H. Ikeda et H. Ohba (lower, Fang 2872, holotype of P. leuconota var. omeiensis, E). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

Fig. 39. Potentilla leuconota D. Don var. brachyphyllaria Card. (Soulié 690, syntype of P. leuconota var. brachyphyllaria, P). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Stamens, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

Fig. 40. Distribution map of Potentilla leuconota var. leuconota (•), var. omeiensis (Δ) and var. brachyphyllaria (■).

Fig. 41. Distribution map of Potentilla montisvictoriae.

Fig. 42. Potentilla wenchuensis H. Ikeda et H. Ohba (collector

unknown 0947, PE). a: Sepals, inner surface (left) and outer surface (right). b: Episeals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

Fig. 43. Distribution map of Potentilla wenchuensis.

Fig. 44. Potentilla anserina L. (Takatsuki et al. 9370002, T1). a: Sepals, inner surface (left) and outer surface (right). b: Episeals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (right two), oppositipetalous ones (left two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

Fig. 45. Distribution map of Potentilla anserina.

Fig. 46. Potentilla gombalana Hand.-Mazz. (Smith 10714, isotype of P. gombalana, BM). a: Sepals, inner surface (left) and outer surface (right). b: Episeals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

Fig. 47. Distribution map of Potentilla gombalana.

Fig. 48. Distribution map of Potentilla smithiana.

Fig. 49. Distribution map of Potentilla taronensis.

Plate 1. Chromosomes of four species of sect. Leptostylae: a. Potentilla commutata var. commutata, 2n=14; b. Potentilla cardotiana var. nepalensis, 2n=14; c. Potentilla turfosooides, 2n=28; d. Potentilla peduncularis var. peduncularis, 2n=42. Scale bar indicates 5 μ m.

Plate 2 & 3. Potentilla microphylla D. Don. 2-a. Upper right two, lower middle left & 3-a: var. microphylla (Wallich 1010 β , lectotype of P. microphylla var. glabriuscula Wall. ex Lehm.); lower middle right & 3-b: var. microphylla (Wallich 1010 γ , isotype of P. microphylla var. depressa Wall. ex Lehm.); others in 2-a & 2-b: var. microphylla (Wallich 1010a). All specimens are in K (Herb. Hook. f.).

Plate 4 & 5. 4-a. Upper two & 5-a: Potentilla microphylla D. Don var. microphylla (Wallich 1010 γ , lectotype of P. microphylla var. depressa Wall. ex Lehm.); middle right two & 4-b: P. microphylla var. microphylla (Wallich 1010 β , isotype of P. microphylla var. glabriuscula Wall. ex

Lehm.); middle left one & 5-b: *P. commutata* Lehm. (Wallich 10106, lectotype of *P. microphylla* var. *latifolia* Wall. ex Lehm.); lower right: *P. microphylla* var. *microphylla* (Duthie 1082); lower left: *P. microphylla* var. *microphylla* (Edgeworth 281). All specimens are in K (Herb. Benth.).

- Plate 6-8. 6-a. Upper left: Potentilla commutata Lehm. var. commutata (Hook. f. s.n.); upper right: P. coriandrifolia D. Don (Wallich 1018, type of P. coriandrifolia); upper middle left: P. aristata Soják (Hook. f. s.n.); upper middle right: P. microphylla D. Don var. tapetodes (Soják) H. Ikeda et H. Ohba (Hook. f. s.n.); lower middle left & 7-a: P. microphylla var. microphylla (Wallich 1010 β , isotype of P. microphylla var. glabriuscula Wall. ex Lehm.); lower middle right & 7-b: P. microphylla var. microphylla (Wallich 1010 γ , isotype of P. microphylla var. depressa Wall. ex Lehm.); lower: P. microphylla var. microphylla (Strachey & Winterbottom 19). All specimens are in BM.
- 6-b. Upper & 8-b: P. microphylla var. microphylla (Wallich 1010 γ , isotype of P. microphylla var. depressa Wall. ex Lehm.); lower & 8-a: P. microphylla var. microphylla (Wallich 1010 β , isotype of P. microphylla var. glabriuscula Wall. ex Lehm.). The two specimens are in E.
- Plate 9. Potentilla microphylla D. Don var. microphylla (Wallich 1010 γ , isotype of P. microphylla var. depressa Wall. ex Lehm., GH).
- Plate 10. Potentilla microphylla D. Don var. microphylla (Wallich 1010 γ , isotype of P. microphylla var. depressa Wall. ex Lehm., E).
- Plate 11. Potentilla microphylla D. Don var. microphylla (Wallich 1010 β , isotype of P. microphylla var. glabriuscula Wall. ex Lehm., L).
- Plate 12. Potentilla microphylla D. Don var. microphylla (Wallich 1010 β , isotype of P. microphylla var. glabriuscula Wall. ex Lehm., E).
- Plate 13. Potentilla microphylla D. Don var. microphylla (Wallich 1010 β , isotype of P. microphylla var. glabriuscula Wall. ex Lehm., NY).
- Plate 14. Potentilla microphylla D. Don var. tapetodes (Soják) H. Ikeda et H. Ohba (Ludlow, Sherriff & Hicks 16425, holotype of P. tapetodes Soják, BM).
- Plate 15. Potentilla microphylla D. Don var. microphylla (Cooper 593, BM).
- Plate 16. Potentilla microphylla D. Don var. luteopilosa (Yü et C. L. Li) H. Ikeda et H. Ohba (Yü 23238, lectotype of P. luteopilosa Yü et C. L. Li, PE).
- Plate 17. Potentilla microphylla D. Don var. luteopilosa (Yü et C. L. Li) H. Ikeda et H. Ohba (Yü 23238, isotype of P. luteopilosa Yü et C. L. Li, PE).
- Plate 18. Potentilla microphylla D. Don var. luteopilosa (Yü et C. L. Li) H. Ikeda et H. Ohba (Yü 23238, isotype of P. luteopilosa Yü et C. L. Li, E).

- Plate 19. Potentilla microphylla D. Don var. luteopilosa (Yü et C. L. Li) H. Ikeda et H. Ohba (Yü 23238, isotype of P. luteopilosa Yü et C. L. Li, GH).
- Plate 20. Potentilla microphylla D. Don var. luteopilosa (Yü et C. L. Li) H. Ikeda et H. Ohba (Feng 6738, syntype of P. luteopilosa Yü et C. L. Li, PE).
- Plate 21. Potentilla aristata Soják (Ludlow, Sherriff & Hicks 19067, holotype of P. aristata, E).
- Plate 22. Potentilla aristata Soják (Wu 75-618, holotype of P. microphylla D. Don var. multiuga Yü et C. L. Li, PE).
- Plate 23. Potentilla aristata Soják (Wu 75-618, isotype of P. microphylla D. Don var. multiuga Yü et C. L. Li, PE).
- Plate 24. Potentilla stenophylla (Franch.) Diels (Delavay 105, P).
- Plate 25. Potentilla stenophylla (Franch.) Diels (Maire s.n., syntype of P. millefolium Lévl., P).
- Plate 26. Potentilla stenophylla (Franch.) Diels (Maire s.n., syntype of P. millefolium Lévl., E).
- Plate 27. Potentilla stenophylla (Franch.) Diels (Maire s.n., syntype of P. millefolium Lévl., E).
- Plate 28. Potentilla stenophylla (Franch.) Diels var. emergens Card. (Wilson 3461, syntype of P. stenophylla var. emergens, P).
- Plate 29. Potentilla stenophylla (Franch.) Diels var. emergens Card. (Soulié 91, syntype of P. stenophylla var. emergens, P).
- Plate 30. Potentilla stenophylla (Franch.) Diels var. emergens Card. (Soulié 893, syntype of P. stenophylla var. emergens, P).
- Plate 31. Potentilla stenophylla (Franch.) Diels var. emergens Card. (Mussot 110, syntype of P. stenophylla var. emergens, P).
- Plate 32. Potentilla stenophylla (Franch.) Diels var. emergens Card. (Soulié 2548, lectotype of P. stenophylla var. emergens, P).
- Plate 33. Potentilla stenophylla (Franch.) Diels var. emergens Card. (Soulié 893, syntype of P. stenophylla var. emergens, P).
- Plate 34. Potentilla stenophylla (Franch.) Diels var. emergens Card. (Mussot 110, syntype of P. stenophylla var. emergens,

P).

- Plate 35. Potentilla stenophylla (Franch.) Diels var. emergens Card. a: Soulié 88, syntype of P. stenophylla var. exaltata Card., P. b: Soulié 539, syntype of P. stenophylla var. exaltata Card., P).
- Plate 36. Potentilla stenophylla (Franch.) Diels var. emergens Card. (Soulié 659, syntype of P. stenophylla var. exaltata Card., P).
- Plate 37. Potentilla stenophylla (Franch.) Diels var. emergens Card. (Potanin 303, lectotype of P. tatsienluensis Th. Wolf, DR).
- Plate 38. Potentilla stenophylla (Franch.) Diels var. emergens Card. (Potanin 303, syntype of P. tatsienluensis Th. Wolf, DR).
- Plate 39. Potentilla stenophylla (Franch.) Diels var. taliensis (W. W. Smith) H. Ikeda et H. Ohba (Forrest 7017, holotype of P. taliensis W. W. Smith, E).
- Plate 40. Potentilla stenophylla (Franch.) Diels var. taliensis (W. W. Smith) H. Ikeda et H. Ohba (Forrest 7017, isotype of P. taliensis W. W. Smith, K).
- Plate 41. Potentilla stenophylla (Franch.) Diels var. cristata (Fletcher) H. Ikeda et H. Ohba (Farrer 1803, holotype of P. cristata Fletcher, E).
- Plate 42. Potentilla glabriuscula (Yü et C. L. Li) Soják var. glabriuscula (Yü 22265, isotype of Sibbaldia glabriuscula Yü et C. L. Li, E).
- Plate 43. Potentilla glabriuscula (Yü et C. L. Li) Soják var. glabriuscula (Ludlow, Sherriff & Hicks 21361, BM).
- Plate 44. Potentilla glabriuscula (Yü et C. L. Li) Soják var. glabriuscula (Ludlow, Sherriff & Hicks 21361, E).
- Plate 45. Potentilla glabriuscula (Yü et C. L. Li) Soják var. oligandra (Soják) H. Ikeda et H. Ohba (Ludlow, Sherriff & Elliot 14362, holotype of P. oligandra Soják, BM).
- Plate 46. Potentilla glabriuscula (Yü et C. L. Li) Soják var. oligandra (Soják) H. Ikeda et H. Ohba (Ludlow, Sherriff & Elliot 14362, isotype of P. oligandra Soják, E).
- Plate 47. Potentilla turfosa Hand.-Mazz. var. turfosa (Kingdon-Ward 9915, BM).
- Plate 48. a. Upper right, lower left & b: Potentilla turfosa Hand.-Mazz. var. turfosa (Ludlow, Sherriff & Tailor 3950, BM). Others: P. leuconota var. leuconota.

- Plate 49. Potentilla turfosa Hand.-Mazz. var. gracillima (Yü et C. L. Li) H. Ikeda et H. Ohba (Ying & Hung 1180, holotype of P. gracillima Yü et C. L. Li, PE).
- Plate 50. Potentilla turfosoides H. Ikeda et H. Ohba (Suzuki et al. 8880570, holotype of P. turfosoides, TI).
- Plate 51. Potentilla peduncularis D. Don var. peduncularis (Wallich s.n., holotype of P. peduncularis, BM).
- Plate 52. Potentilla peduncularis D. Don var. peduncularis (Feng 8287, holotype of P. peduncularis var. elongata Yü et C. L. Li and P. remota Soják, PE).
- Plate 53. Potentilla peduncularis D. Don var. peduncularis (Wu et al. 75-973, lectotype of P. peduncularis var. abbreviata Yü et C. L. Li, PE).
- Plate 54. Potentilla peduncularis D. Don var. peduncularis (Wu et al. 75-973, isotype of P. peduncularis var. abbreviata Yü et C. L. Li, PE).
- Plate 55. Potentilla peduncularis D. Don var. peduncularis (Wu et al. 75-974, syntype of P. peduncularis var. abbreviata Yü et C. L. Li, PE).
- Plate 56. Potentilla contigua Soják (Chang 2448, holotype of P. peduncularis D. Don var. glabriuscula Yü et C. L. Li, PE).
- Plate 57. Potentilla peduncularis D. Don var. vittata (Soják) H. Ikeda et H. Ohba (Ludlow, Sherriff & Elliot 13966, holotype of P. vittata Soják var. vittata, BM).
- Plate 58. Potentilla peduncularis D. Don var. vittata (Soják) H. Ikeda et H. Ohba. a: Ludlow, Sherriff & Elliot 13966, isotype of P. vittata Soják var. vittata, E; b: Ludlow, Sherriff & Elliot 14296, isotype of P. oxyodonta Soják, E).
- Plate 59. Potentilla peduncularis D. Don var. vittata (Soják) H. Ikeda et H. Ohba. (Ludlow, Sherriff & Elliot 13159, holotype of P. vittata Soják var. pluriflora Soják, BM).
- Plate 60. Potentilla peduncularis D. Don var. vittata (Soják) H. Ikeda et H. Ohba. (Ludlow, Sherriff & Elliot 14296, holotype of P. oxyodonta Soják, BM).
- Plate 61. Potentilla peduncularis D. Don var. shweliensis (Fletcher) H. Ikeda et H. Ohba (Forrest 15929, holotype of P. shweliensis Fletcher, E).
- Plate 62. Potentilla leuconota D. Don var. leuconota. a-right: Hooker f. s.n. a-left & b: Wallich s.n., holotype of P. leuconota D. Don, BM.
- Plate 63. Lower: Potentilla contigua Soják (Wallich 1016,

syntype of P. velutina Wall.); upper: P. peduncularis D. Don var. peduncularis (Collector unknown s.n.). These specimens are in K.

plate 64. Potentilla contigua Soják (Clarke 9787, holotype of P. peduncularis D. Don var. clarkei Hook. f., K).

plate 65. Potentilla cardotiana Hand.-Mazz. var. cardotiana (Delavay s.n., holotype of P. leuconota D. Don var. corymbosa Card. & P. cardotiana Hand.-Mazz., P).

Plate 66. Potentilla cardotiana Hand.-Mazz. var. nepalensis H. Ikeda et H. Ohba (Suzuki et al. 8880805, holotype P. cardotiana var. nepalensis, TI).

Plate 67. Potentilla tristis Soják (Stainton, Sykes & Williams 835, BM).

Plate 68. Potentilla commutata Lehm. var. commutata (Hu 2631A, GH).

Plate 69. Potentilla leuconota D. Don var. leuconota. Lower: Wallich 1021, holotype of P. leuconota(?); upper: Madden s.n.
These specimens are in K.

Plate 70. Potentilla leuconota D. Don var. leuconota (Wallich s.n., syntype of P. velutina Wall., BM).

Plate 71. Potentilla leuconota D. Don var. leuconota (Wallich s.n., syntype of P. velutina Wall., BM).

Plate 72. P. leuconota D. Don var. leuconota. Upper: Wallich s.n., holotype of P. leuconota (?); lower: Duthie 3980.
These specimens are in BM.

Plate 73. Potentilla leuconota D. Don var. omeiensis H. Ikeda et H. Ohba (Fang 2872, isotypes of P. leuconota var. omeiensis, upper-GH, lower-US).

Plate 74. Potentilla leuconota D. Don var. omeiensis H. Ikeda et H. Ohba (Fang 2872, holotype of P. leuconota var. omeiensis, E).

Plate 75. Potentilla leuconota D. Don var. brachyphyllaria Card. (Soulié 690, lectotype of P. leuconota var. brachyphyllaria, P).

Plate 76. Potentilla leuconota D. Don var. brachyphyllaria Card. (Soulié s.n., syntype of P. leuconota var. brachyphyllaria, P).

Plate 77. Potentilla leuconota D. Don var. brachyphyllaria Card. (Soulié 2447, syntype of P. leuconota var. brachyphyllaria, P).

- Plate 78. Potentilla leuconota D. Don var. brachyphyllaria Card. (Soulié 2447, syntype of P. leuconota var. brachyphyllaria, P).
- Plate 79. Potentilla leuconota D. Don var. brachyphyllaria Card. (Soulié 2447, syntype of P. leuconota var. brachyphyllaria, P).
- Plate 80. Potentilla montisvictoriae H. Ikeda et H. Ohba (Cooper 6002, holotype of P. montisvictoriae, E).
- Plate 81. Potentilla montisvictoriae H. Ikeda et H. Ohba (Cooper 6002, isotype of P. montisvictoriae, E).
- Plate 82. Potentilla wenchuensis H. Ikeda et H. Ohba (Hu 1942, holotype of P. wenchuensis, GH).
- Plate 83. Potentilla wenchuensis H. Ikeda et H. Ohba (collector unknown 0947, PE).
- Plate 84. Potentilla gombalana Hand.-Mazz. (Smith 10714, isotype of P. gombalana, PE).
- Plate 85. Potentilla gombalana Hand.-Mazz. (Pratt s.n., K).
- Plate 86. Potentilla smithiana Hand.-Mazz. (Smith 10380, isotype of P. smithiana, E).
- Plate 87. Potentilla smithiana Hand.-Mazz. (Smith 10380, isotype of P. smithiana, GH).
- Plate 88. Potentilla smithiana Hand.-Mazz. (Smith 10380, isotypes of P. smithiana, a-A, b-NY).
- Plate 89. Potentilla smithiana Hand.-Mazz. (Smith 10380, isotype of P. smithiana, PE).
- Plate 90. Potentilla taronensis Wu ex Yü et C. L. Li (Yü 20915, holotype of P. taronensis, PE).

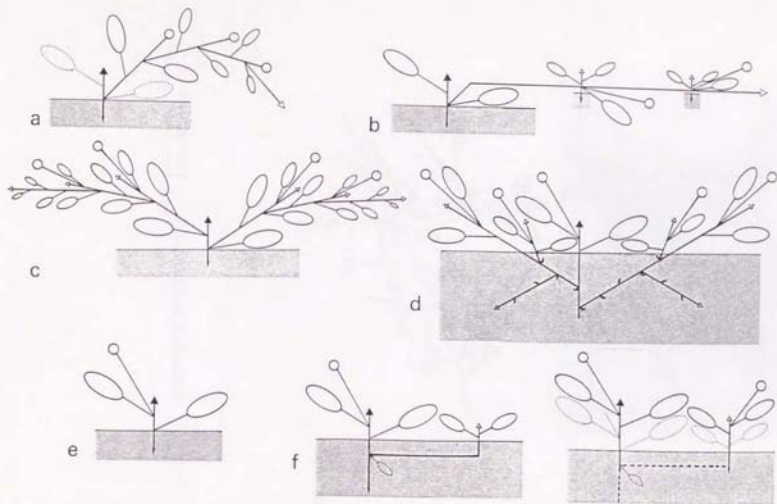


Fig. 1. Branching types, branching patterns and life forms of species of sect. *Leptostylae*. Branching types: a, sympodial branching; b-f, monopodial branching. Branching patterns: a, *Smithiana*-type; b, *Anserina*-type; c, *Microphylla*-type; d, *Peduncularis*-type; e, *Leuconota*-type; f, *Aristata*-type. Life forms: a & b, stoloniferous form; c, cushion form; d, rhizomatous form; e & f, rosette form.

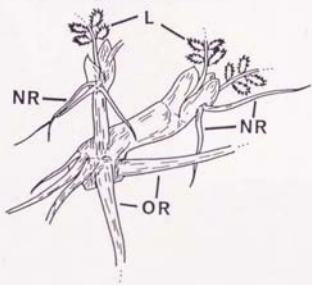


Fig. 2. Branching of *Potentilla aristata*. L: leaf. NR: new root. OR: old root.

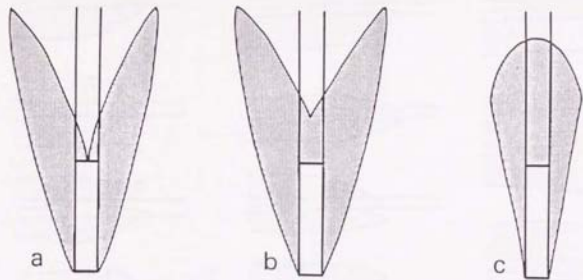


Fig. 3. Schematic figures of three types of auricles of radical leaves. a: Two triangular auricles with acute tips (B-type). b: Two auricles variously connate (C-type). c: One auricle with entire margin (D-type).

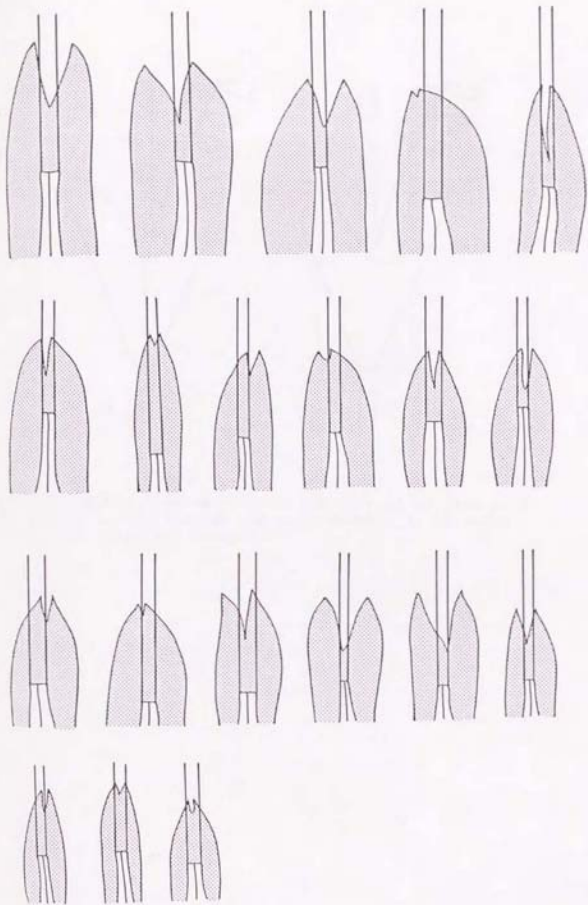


Fig. 4. Variation of connation of auricles of radical leaves of *Potentilla leuconota* collected in Nepal.

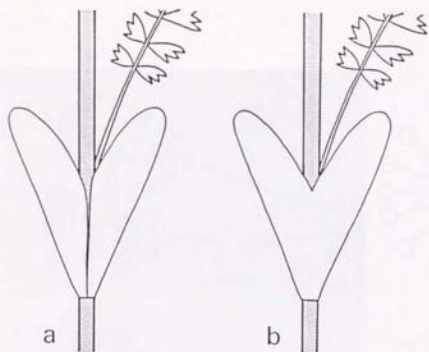


Fig. 5. Schematic figures of stipules of cauline leaves. a: Auricles surround stems and not connate. b: Auricles surround stems and connate.

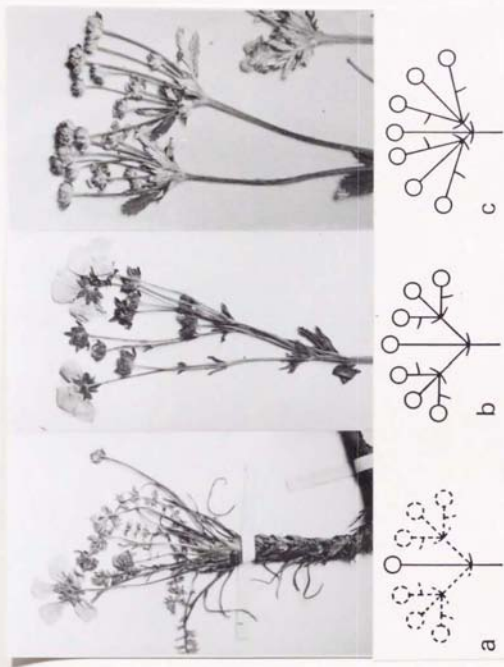


Fig. 6. Three types of inflorescence. a: Inflorescence with a single flower. b: Inflorescence with some flowers. c: Umbel-like inflorescence.

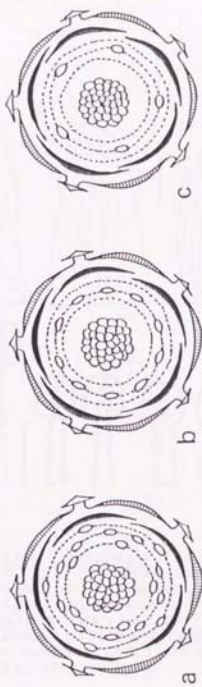


Fig. 7. Floral diagrams of three types of stamens. a: Stamens 20, arranged in three whorls. b: Stamens 10, arranged in one whorl. c: Stamens 5, arranged in one whorl.

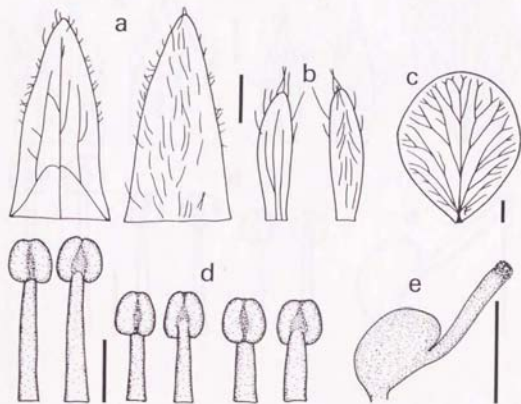


Fig. 8. *Potentilla microphylla* D. Don var. *microphylla* (Suzuki et al. 8880718, T1). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

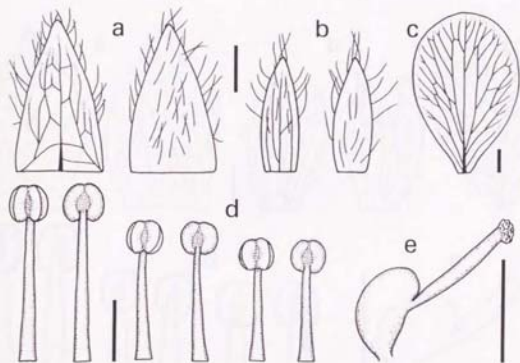


Fig. 9. *Potentilla microphylla* D. Don var. *tapetodes* (Soják) H. Ikeda et H. Ohba (Ludlow, Sherriff & Hicks 16425, holotype of *P. tapetodes* Soják, BM). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

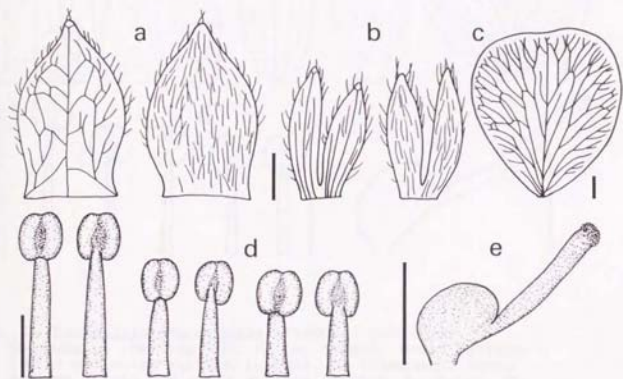


Fig. 10. *Potentilla aristata* Soják (Suzuki et al. 8880689, TI). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

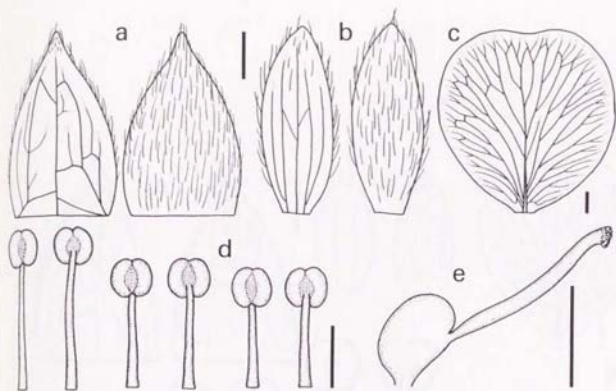


Fig. 11. *Potentilla stenophylla* (Franch.) Diels var. *stenophylla* (Delavay 105, P). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

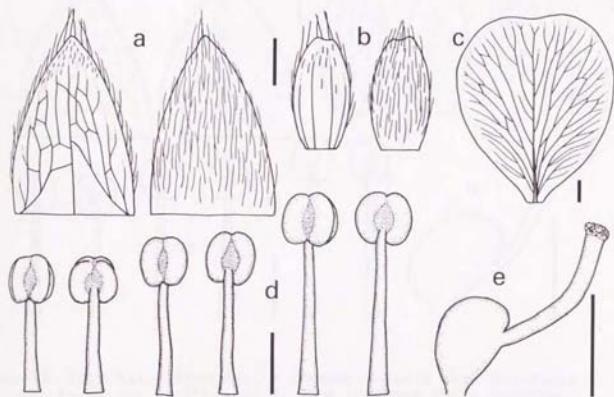


Fig. 12. *Potentilla stenophylla* (Franch.) Diels var. *emergens* Card. (Soulié 2548, syntype of *P. stenophylla* var. *emergens*, P). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (right two), oppositipetalous ones (left two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

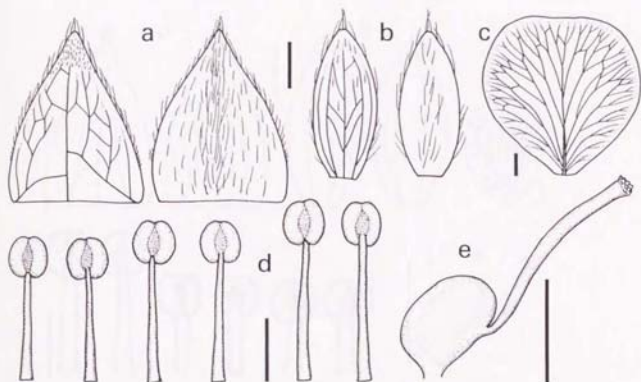


Fig. 13. *Potentilla stenophylla* (Franch.) Diels var. *taliensis* (W. W. Smith) H. Ikeda et H. Ohba (Forrest 7017, holotype of *P. taliensis* W. W. Smith, E). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (right two), oppositipetalous ones (left two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

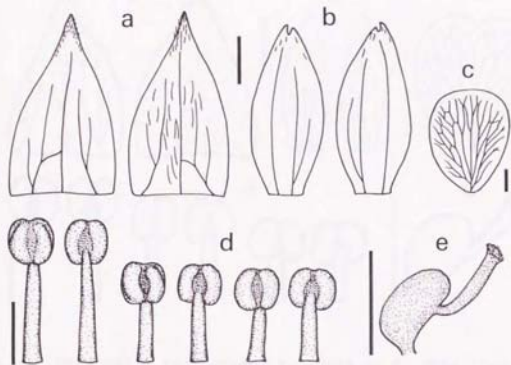


Fig. 14. *Potentilla turfosa* Hand.-Mazz. var. *turfosa* (Yü 22231, PE). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

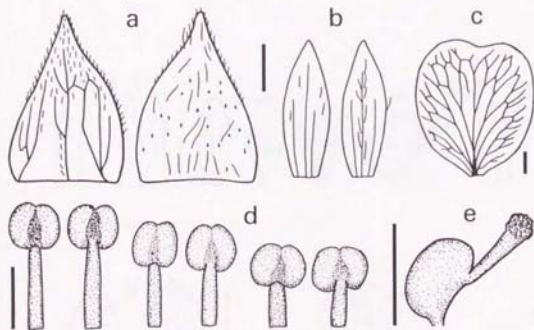


Fig. 15. *Potentilla turfosoidea* H. Ikeda et H. Ohba (Suzuki et al. 8882822, collected from the type locality of *P. turfosoidea*, TI). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

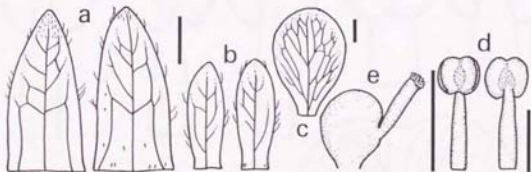
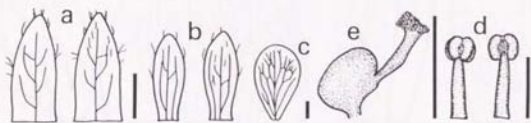


Fig. 16. *Potentilla glabriuscula* (Yü et C. L. Li) Soják var. *glabriuscula* (upper, Yü 19788, P) and var. *oligandra* (Soják) H. Ikeda et H. Ohba (lower, Ludlow, Sherriff & Elliot 14362, holotype of *P. oligandra* Soják, BM). a: Sepals, inner surface (left) and outer surface (right). b: Sepals, inner surface (left) and outer surface (right). c: Petal. d: Stamens, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

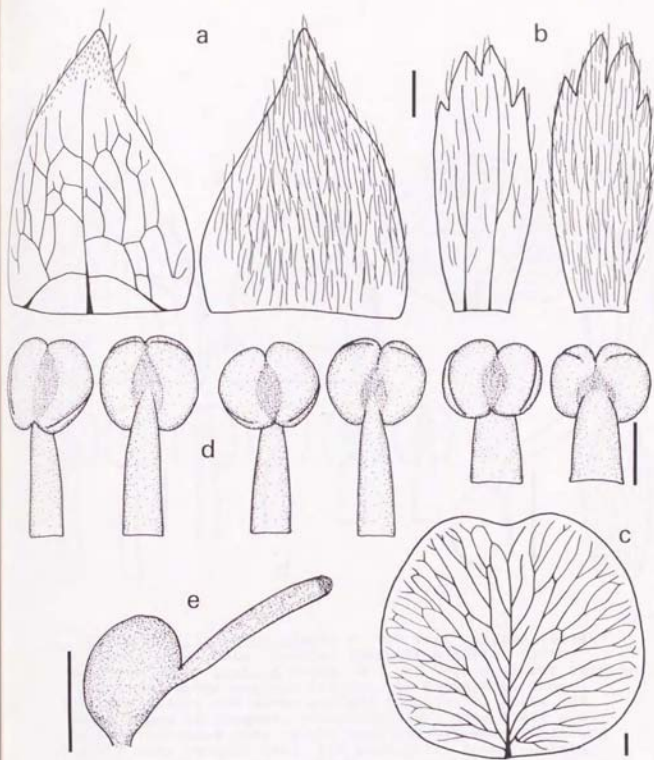


Fig. 17. *Potentilla peduncularis* D. Don var. *peduncularis* (Suzuki et al. 8880802, TI). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

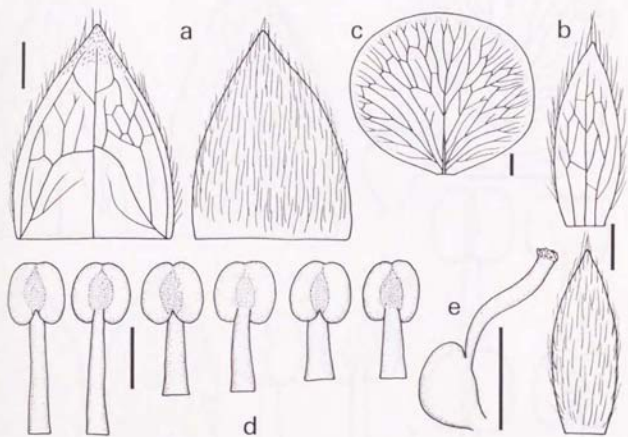


Fig. 18. *Potentilla peduncularis* D. Don var. *vittata* (Soják)
 H. Ikeda et H. Ohba (Ludlow, Sherriff & Elliot 13966,
 holotype of *P. vittata* Soják, BM). a: Sepals, inner surface
 (left) and outer surface (right). b: Episepals, inner
 surface (left) and outer surface (right). c: Petal. d:
 Three types of stamens, alternipetalous ones (left two),
 oppositipetalous ones (right two) and between petals and
 sepals ones (middle two). For each pair, inner surface
 (left) and outer surface (right). e: Pistil. Bars indicate
 1 mm.

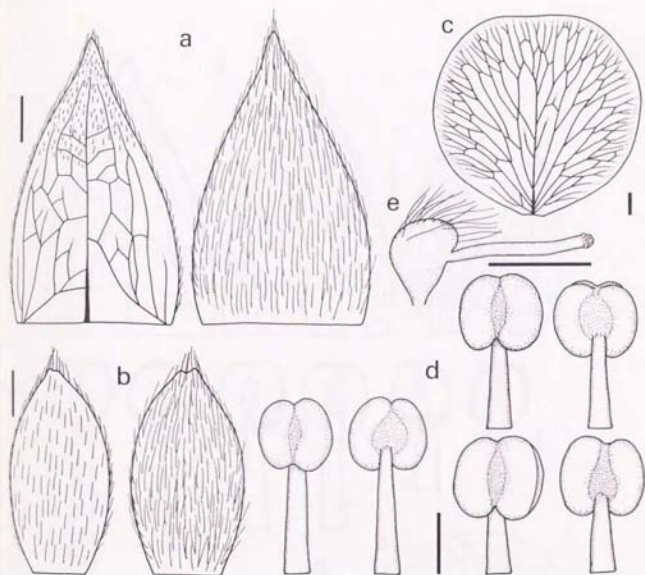


Fig. 19. *Potentilla peduncularis* D. Don var. *shweliensis* (Fletcher) H. Ikeda et H. Ohba (Forrest 15929, holotype of *P. shweliensis* Fletcher, E) a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (lower right two) and between petals and sepals ones (upper right two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

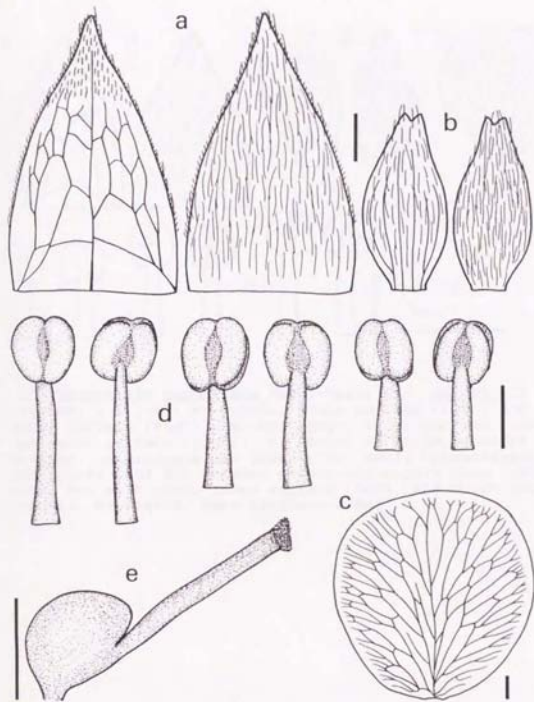


Fig. 20. *Potentilla contigua* Soják (Minaki et al. 9080157, TI). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

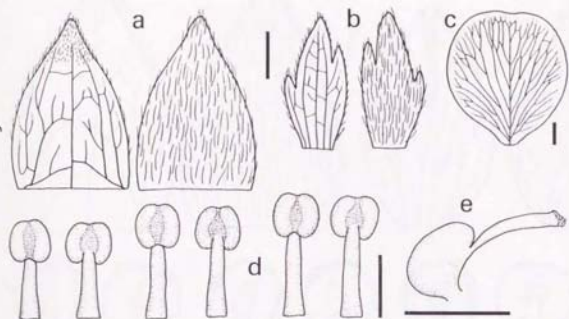


Fig. 21. *Potentilla cardotiana* Hand.-Mazz. var. *cardotiana* (Delavay s.n., P). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (right two), oppositipetalous ones (left two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

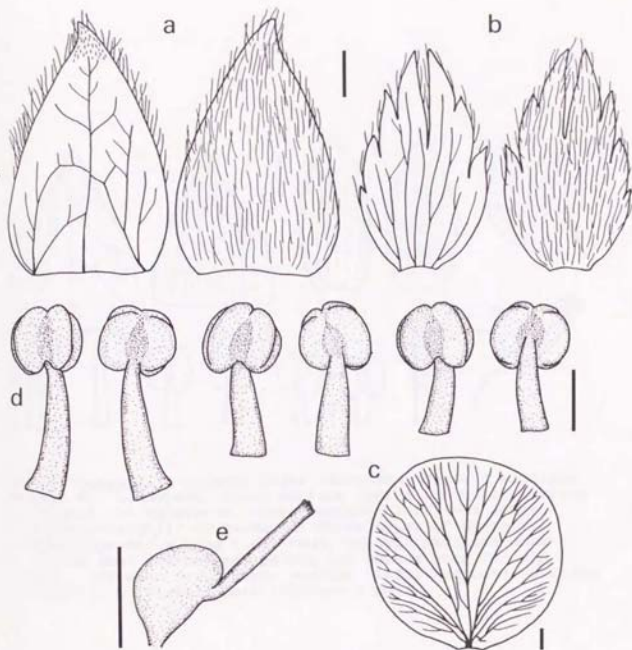


Fig. 22. *Potentilla cardotiana* Hand.-Mazz. var. *nepalensis* H. Ikeda et H. Ohba (Minaki et al. 9080357, collected from the type locality of *P. cardotiana* var. *nepalensis*, TI). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

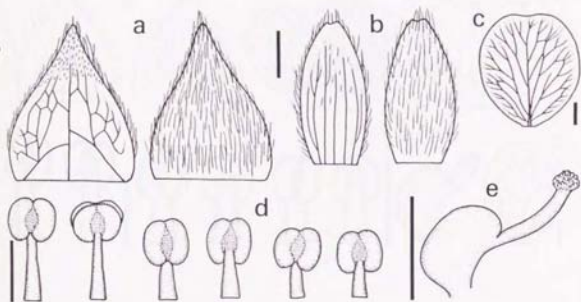


Fig. 23. *Potentilla tristis* Soják (Stainton, Sykes & Williams 865, E). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

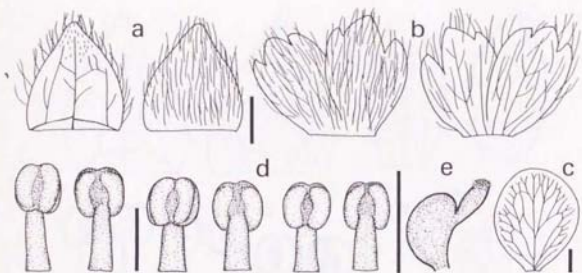


Fig. 24. *Potentilla commutata* Lehm. var. *commutata* (Suzuki et al. 8880608, TI). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

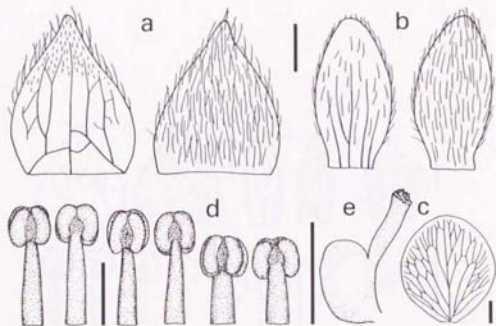


Fig. 25. *Potentilla commutata* Lehm. var. *major* H. Ikeda et H. Ohba (Minaki et al. 9080222, collected from the type locality of *P. commutata* var. *major*, TI). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

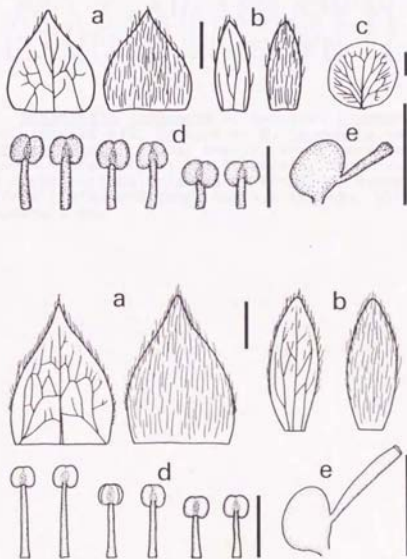


Fig. 26. *Potentilla leuconota* D. Don var. *leuconota* (upper, Suzuki et al. 8880569, TI), var. *omeiensis* H. Ikeda et H. Ohba (lower, Fang 2872, holotype of *P. leuconota* var. *omeiensis*, E). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

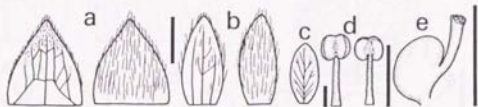


Fig. 27. *Potentilla leuconota* D. Don var. *brachyphyllaria* Card. (Soulié 690, syntype of *P. leuconota* var. *brachyphyllaria*, P). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Stamens, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

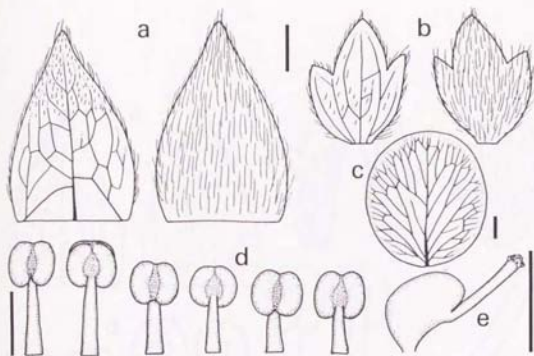


Fig. 28. *Potentilla wenchuensis* H. Ikeda et H. Ohba (collector unknown 0947, PE). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

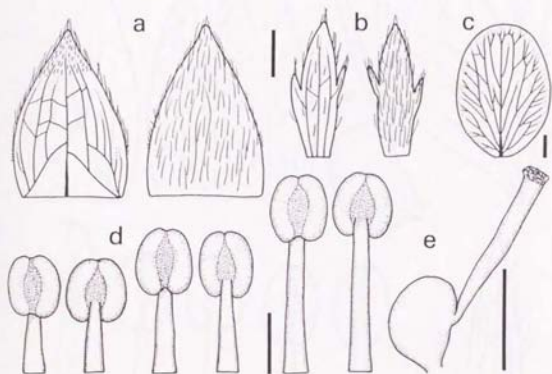


Fig. 29. *Potentilla anserina* L. (Takatsuki et al. 9370002, TI). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (right two), oppositipetalous ones (left two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

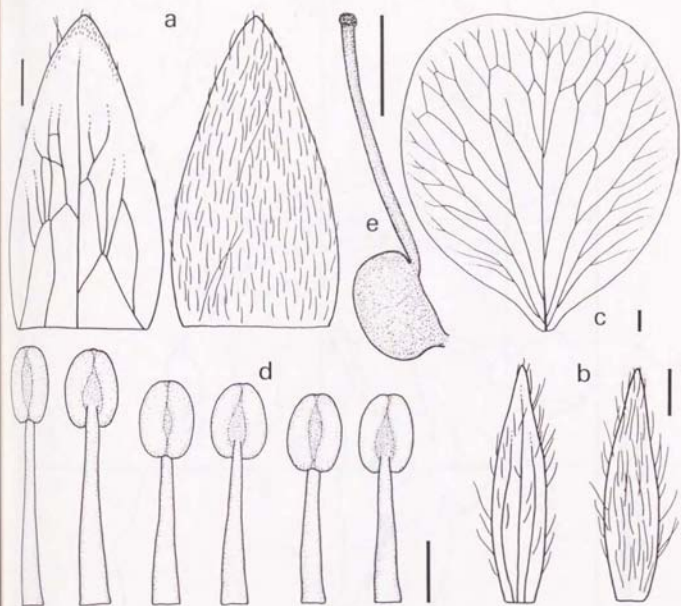


Fig. 30. *Potentilla gombalana* Hand.-Mazz. (Smith 10714, isotype of *P. gombalana*, BM). a: Sepals, inner surface (left) and outer surface (right). b: Episepals, inner surface (left) and outer surface (right). c: Petal. d: Three types of stamens, alternipetalous ones (left two), oppositipetalous ones (right two) and between petals and sepals ones (middle two). For each pair, inner surface (left) and outer surface (right). e: Pistil. Bars indicate 1 mm.

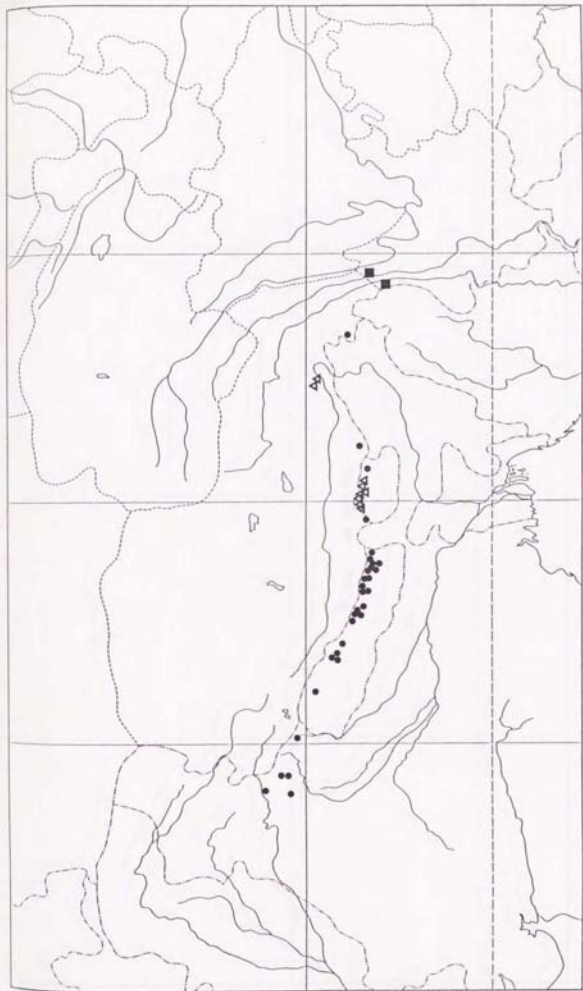


Fig. 31. Distribution map of *Potentilla microphylla* var. *microphylla* (•), var. *tapetodes* (Δ) and var. *luteopillosa* (■).

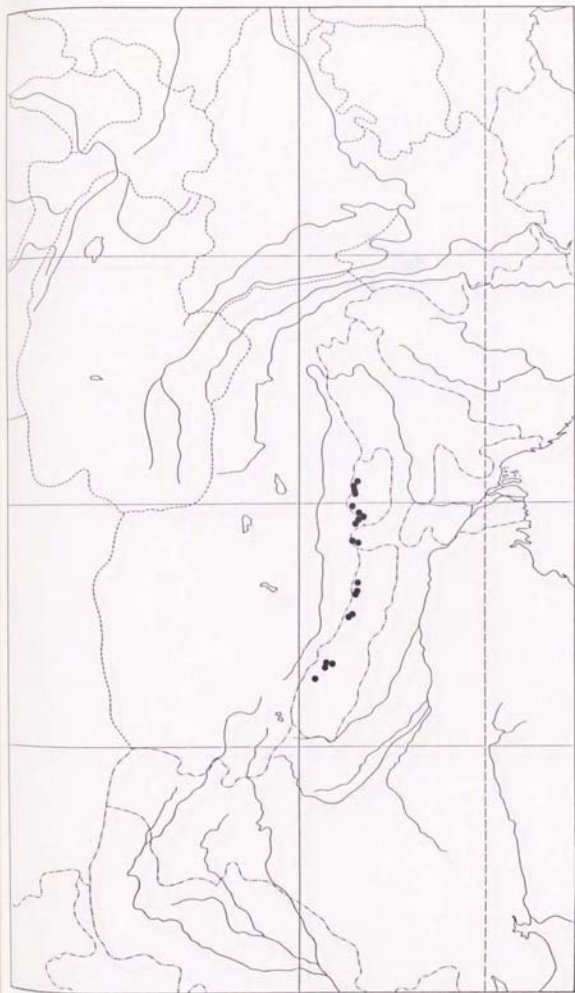


Fig. 32. Distribution map of *Potentilla aristata*.

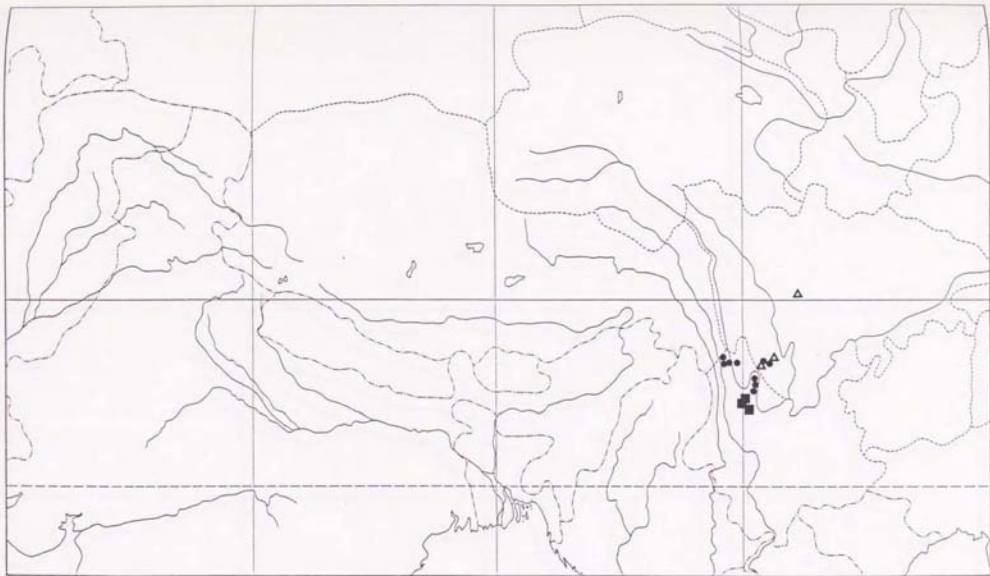


Fig. 33. Distribution map of *Potentilla stenophylla* var. *stenophylla* (•), var. *emergens* (Δ), var. *taliensis* (■) and var. *cristata* (○).

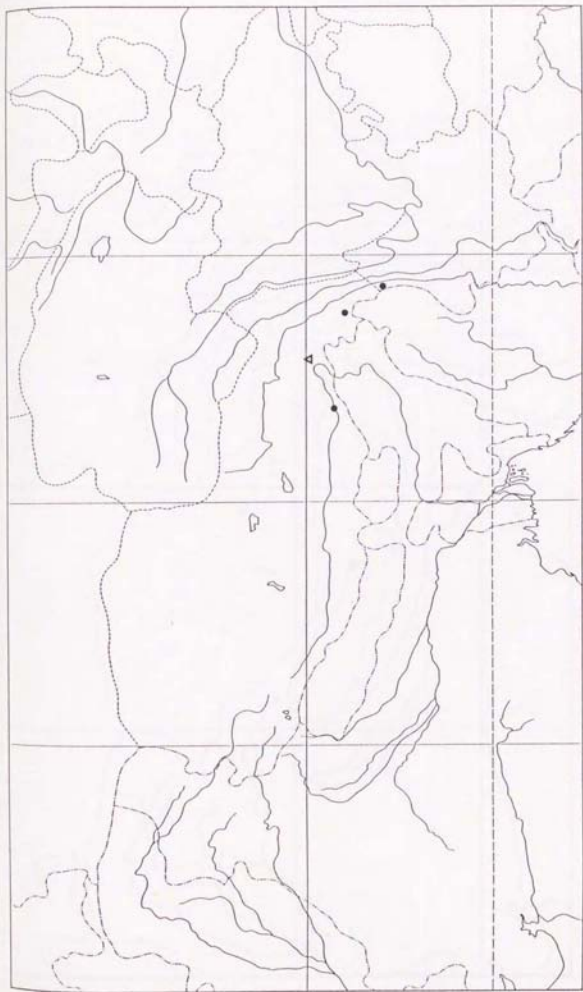


Fig. 34. Distribution map of *Potentilla turfosa* var. *turfosa* (•) and var. *gracillima* (Δ).

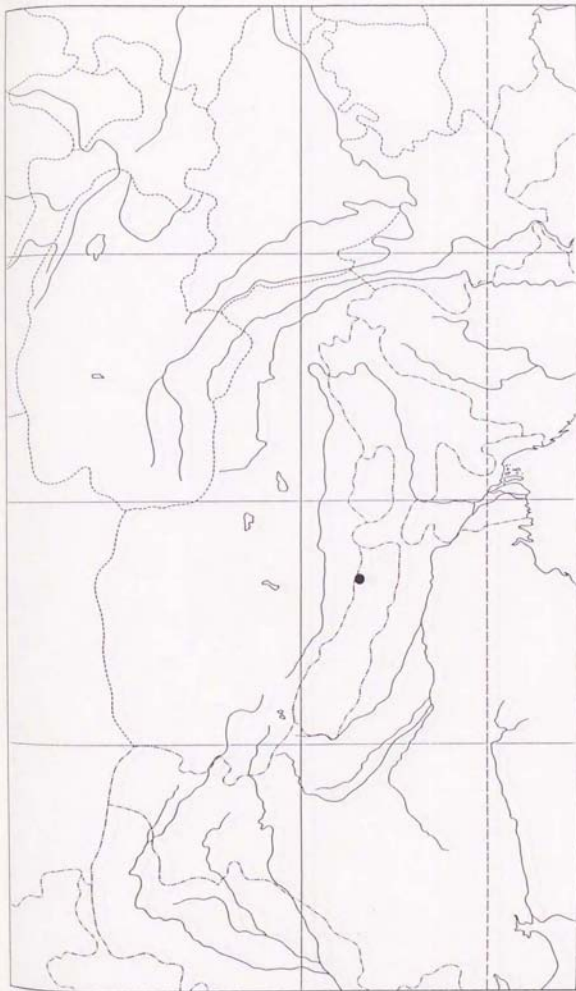


Fig. 35. Distribution map of *Potentilla turfosoidea*.

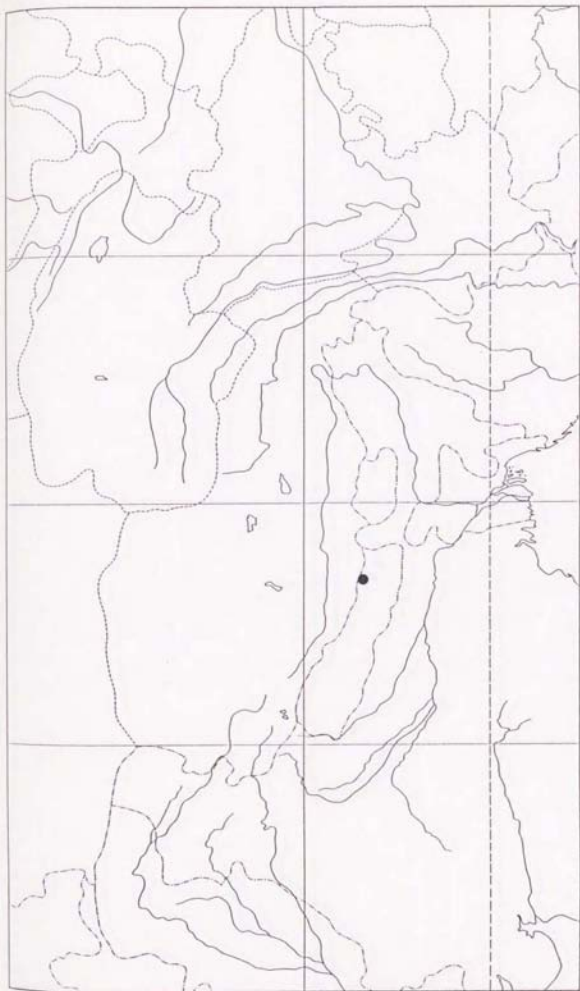


Fig. 36. Distribution map of *Potentilla makaluensis*.

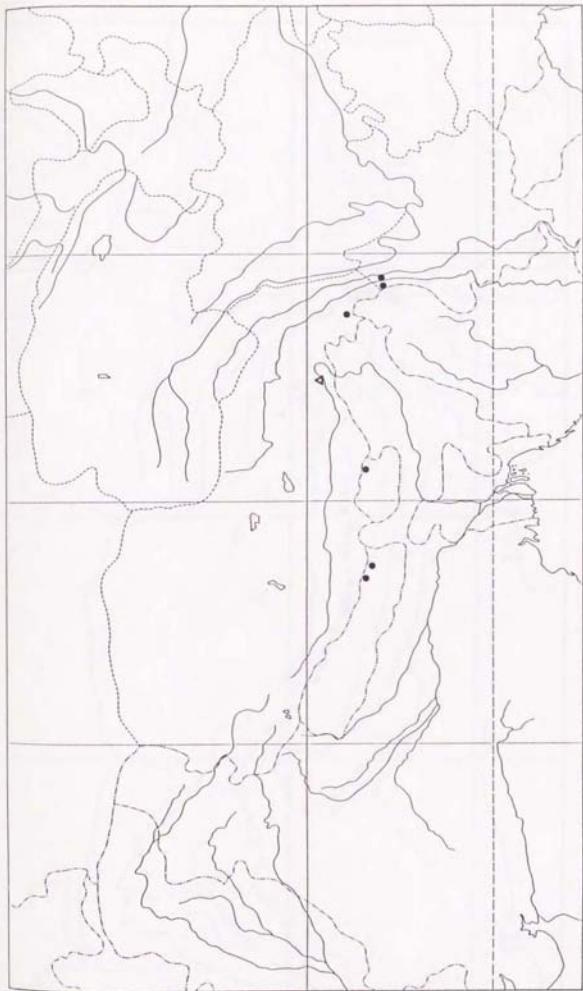


Fig. 37. Distribution map of *Potentilla glabriuscula* var. *glabriuscula* (•) and var. *oligandra* (Δ).

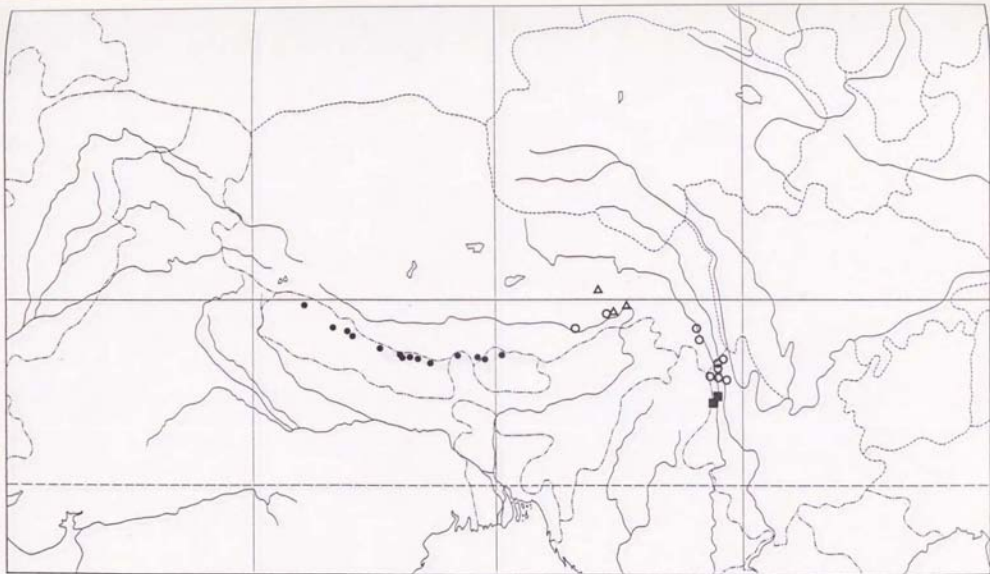


Fig. 38. Distribution map of *Potentilla peduncularis* var. *peduncularis* (•), var. *vittata* (▲), var. *shweliensis* (■) and var. *stenophylloides* (○).

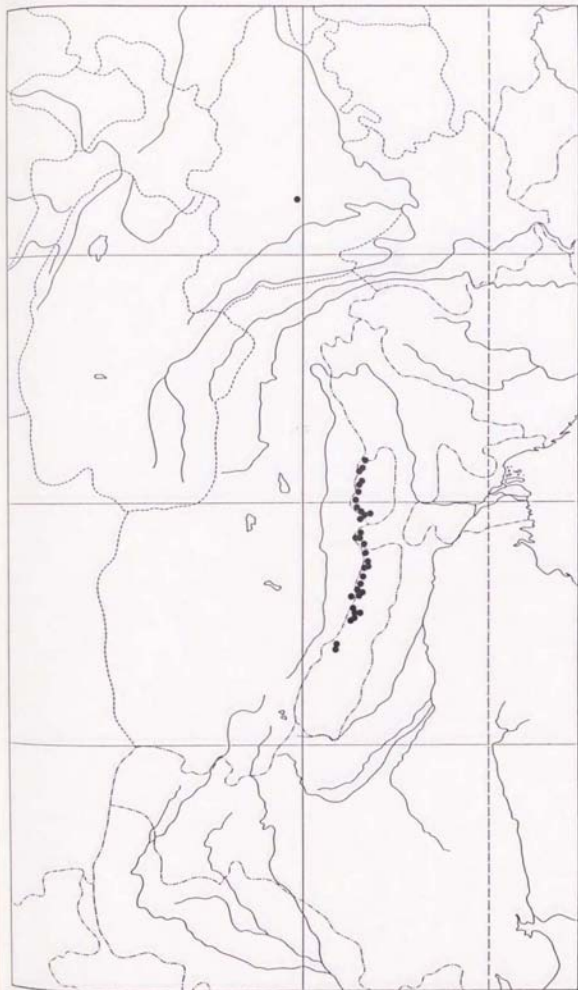


Fig. 39. Distribution map of *Potentilla contigua*.

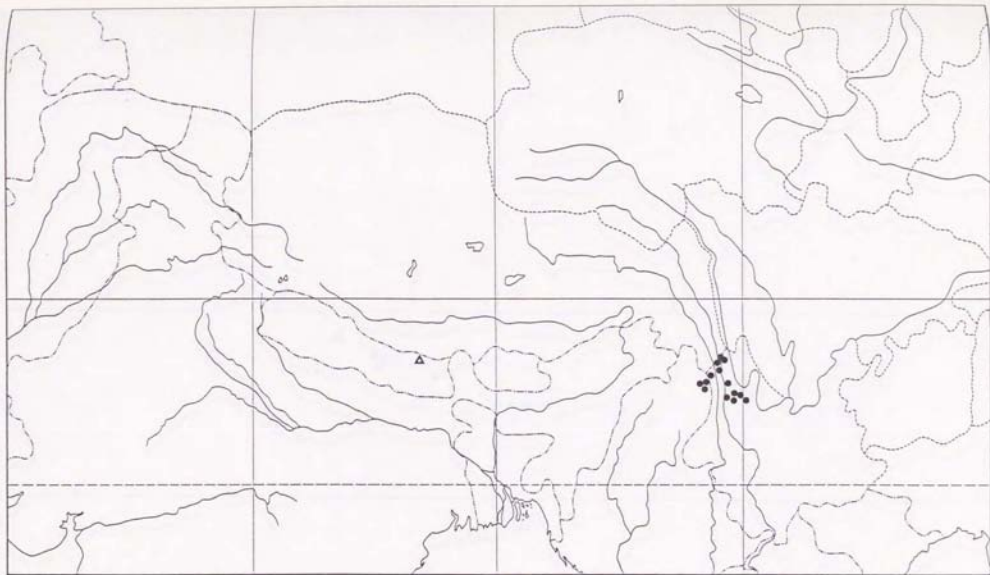


Fig. 40. Distribution map of Potentilla cardotiana var. cardotiana (•) and var. nepalensis (Δ).

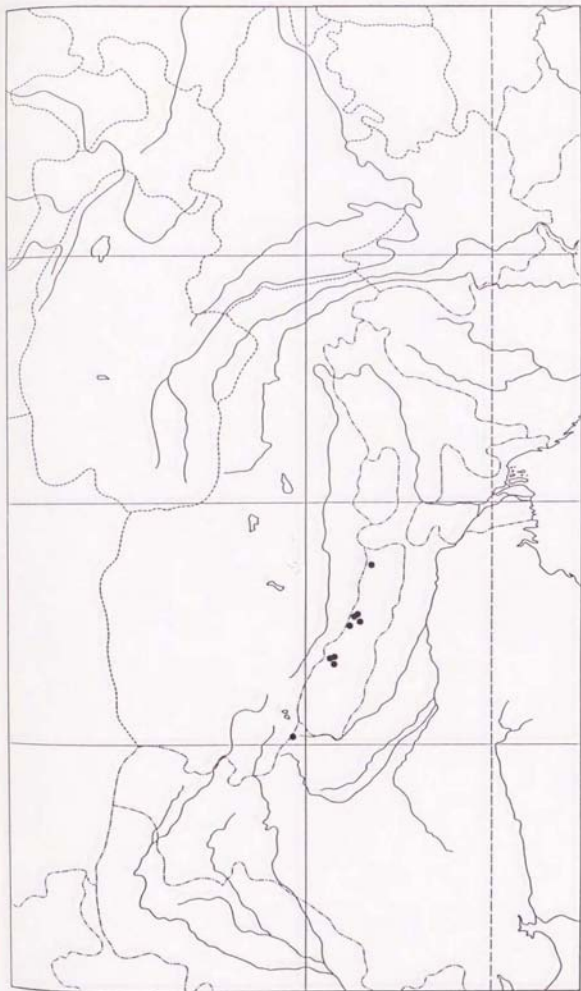


Fig. 41. Distribution map of *Potentilla tristis*.

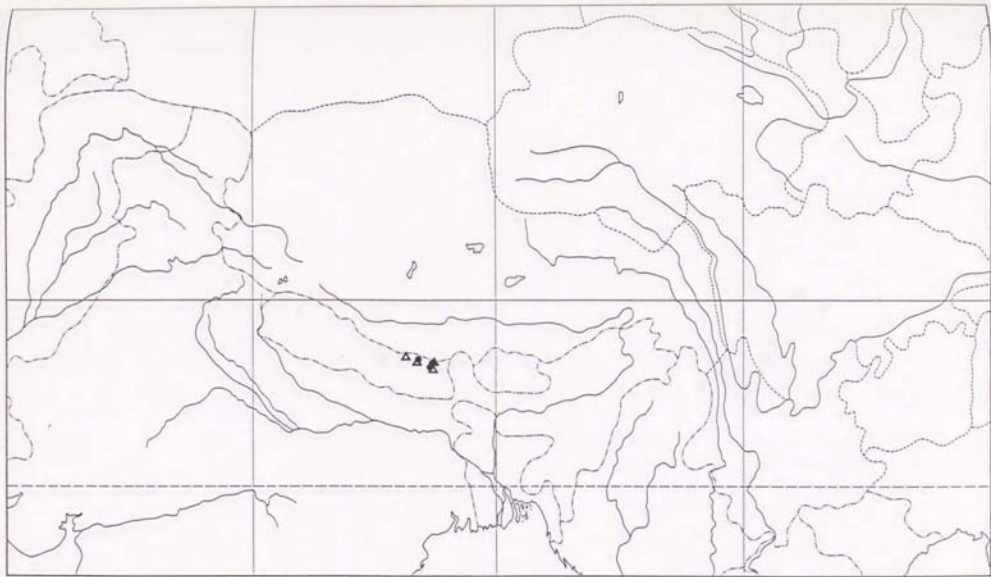


Fig. 42. Distribution map of *Potentilla commutata* var. commutata (•) and var. major (Δ).

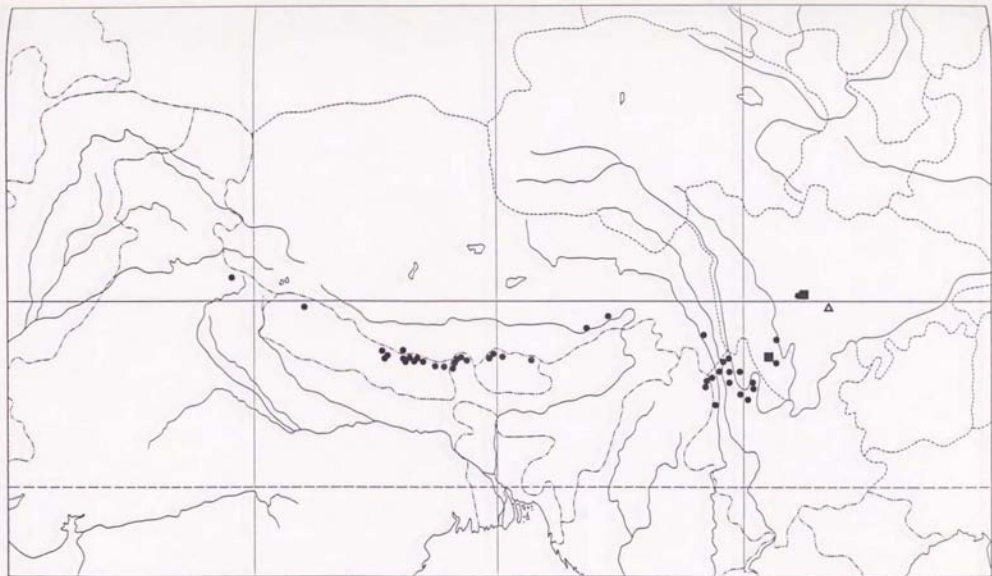


Fig. 43. Distribution map of *Potentilla leuconota* var. *leuconota* (*), var. *omeiensis* (Δ) and var. *brachyphyllaria* (■).

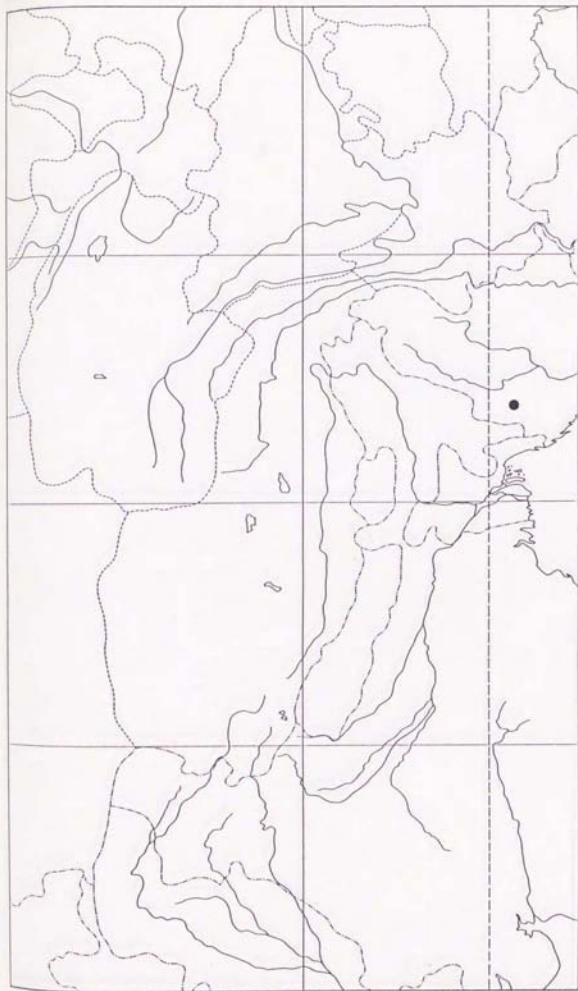


Fig. 44. Distribution map of *Potentilla montisvictoriae*.

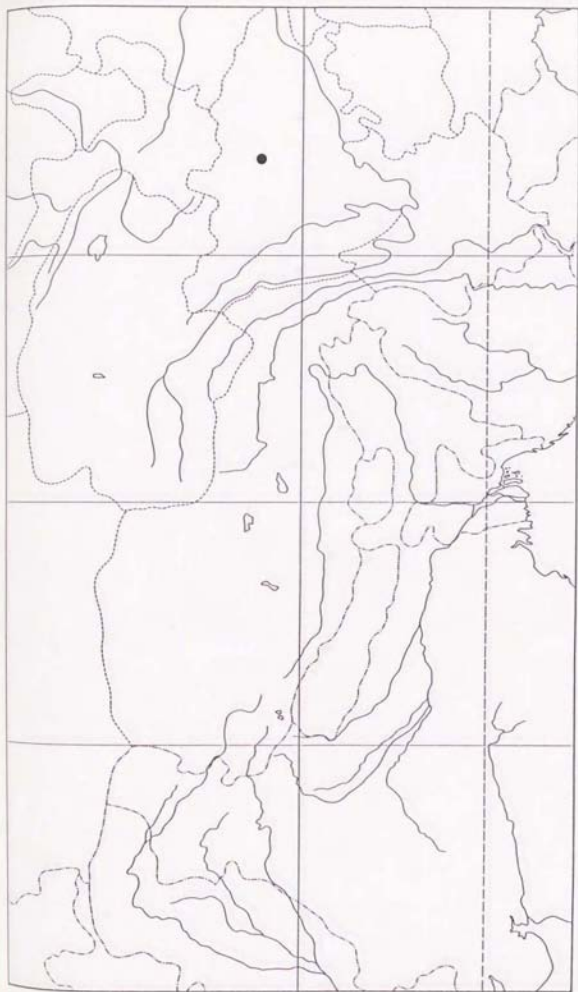


Fig. 45. Distribution map of *Potentilla wenchuensis*.

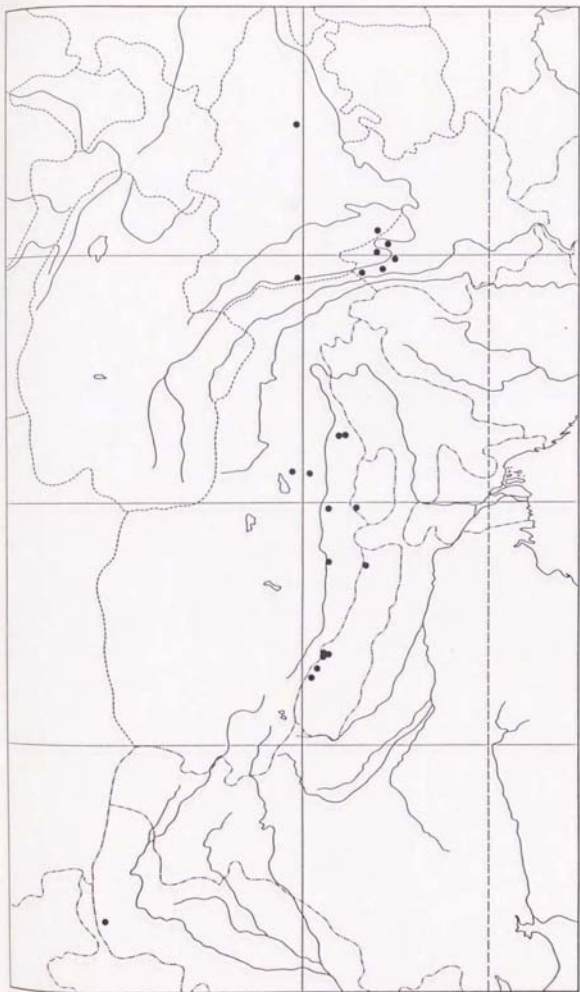


Fig. 46. Distribution map of *Potentilla anserina*.

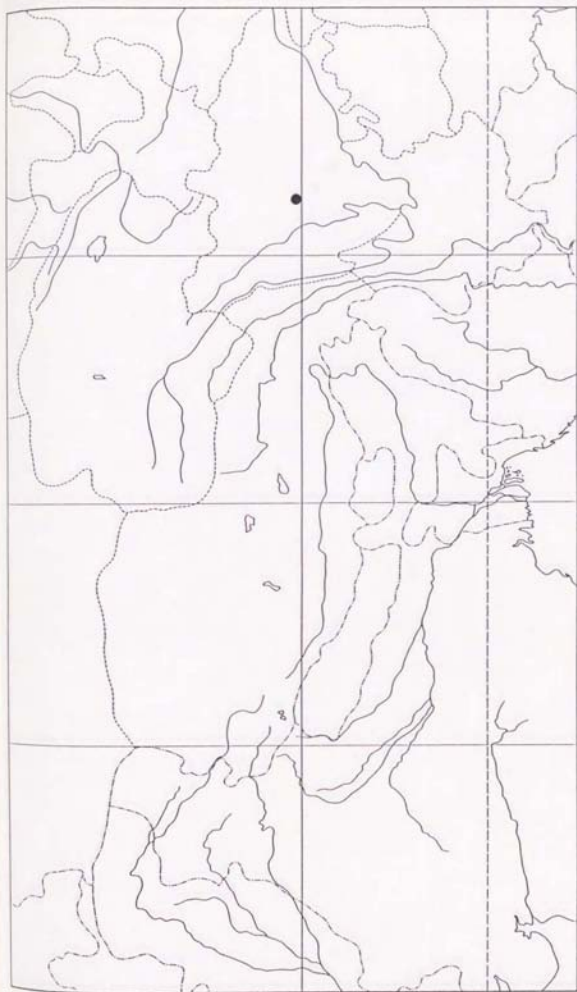


Fig. 47. Distribution map of *Potentilla gombalana*.

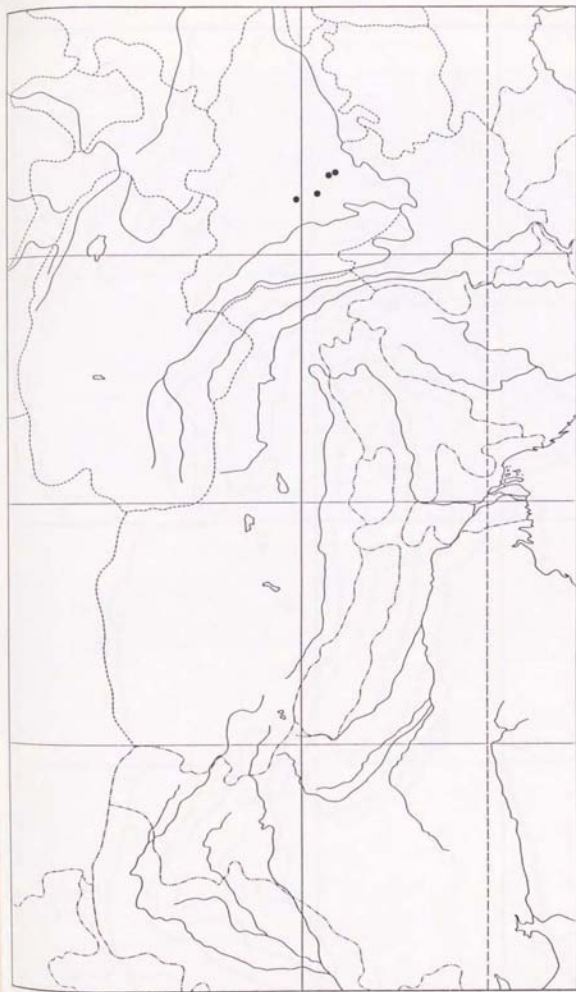


Fig. 48. Distribution map of *Potentilla smithiana*.

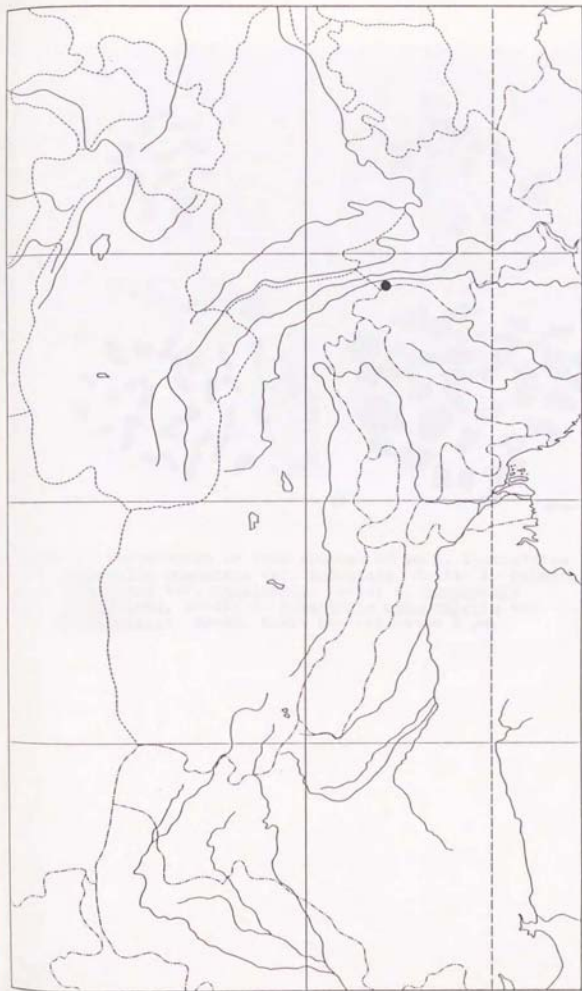


Fig. 49. Distribution map of Potentilla taronensis.

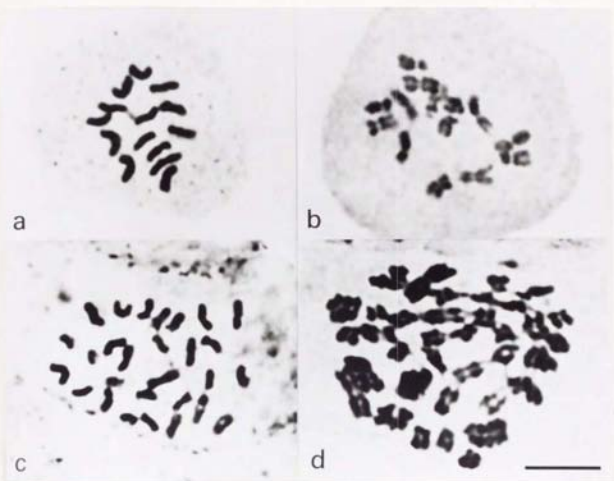
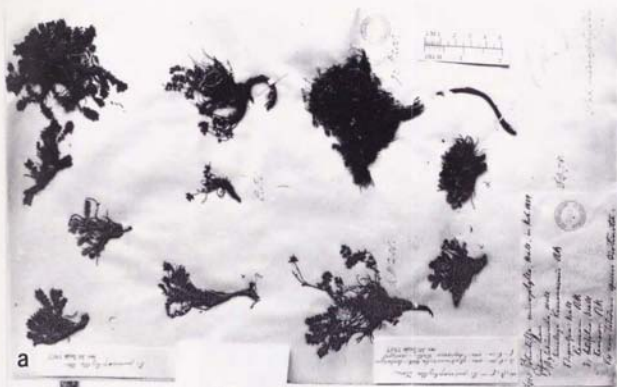


Plate 1. Chromosomes of four species of sect. *Leptostylae*: a. *Potentilla commutata* var. *commutata*, $2n=14$; b. *Potentilla cardotiana* var. *nepalensis*, $2n=14$; c. *Potentilla turfosoidea*, $2n=28$; d. *Potentilla peduncularis* var. *peduncularis*, $2n=42$. Scale bar indicates 5 μ m.



a



b

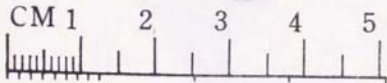
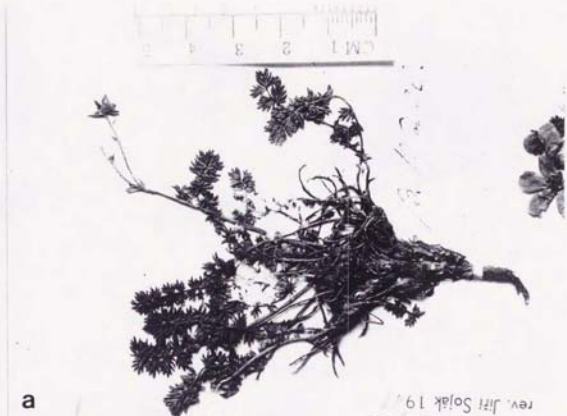
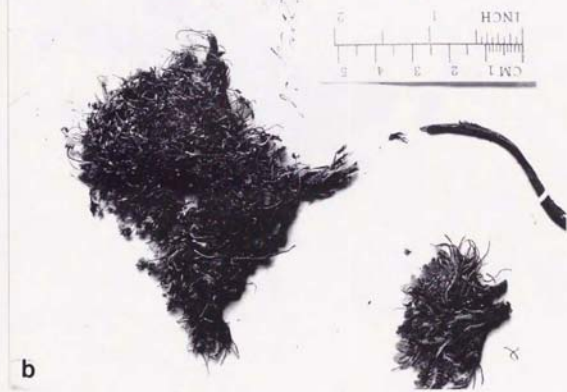


Plate 2 & 3. *Potentilla microphylla* D. Don. 2-a. Upper right two, lower middle left & 3-a: var. *microphylla* (Wallich 1010B, lectotype of *P. microphylla* var. *glabriuscula* Wall. ex Lehm.); lower middle right & 3-b: var. *microphylla* (Wallich 1010γ, isotype of *P. microphylla* var. *depressa* Wall. ex Lehm.); others in 2-a & 2-b: var. *microphylla* (Wallich 1010α). All specimens are in K (Herb. Hook. f.).



a



b

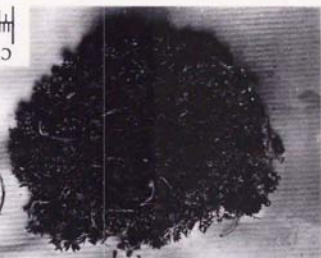
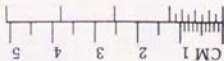
Plate 3.



a

b

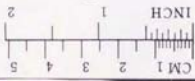
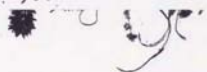
Plate 4 & 5. 4-a. Upper two & 5-a: *Potentilla microphylla* D. Don var. *microphylla* (Wallich 10107, lectotype of *P. microphylla* var. *depressa* Wall. ex Lehm.); middle right two & 4-b: *P. microphylla* var. *microphylla* (Wallich 10108, isotype of *P. microphylla* var. *glabriuscula* Wall. ex Lehm.); middle left one & 5-b: *P. commutata* Lehm. (Wallich 10106, lectotype of *P. microphylla* var. *latifolia* Wall. ex Lehm.); lower right: *P. microphylla* var. *microphylla* (Duthie 1082); lower left: *P. microphylla* var. *microphylla* (Edgeworth 281). All specimens are in K (Herb. Benth.).



Potentilla microphylla Nutt. f. *serotina*
Himalaya Kaimosiensis Wallich 1829

H. F. 1010

a



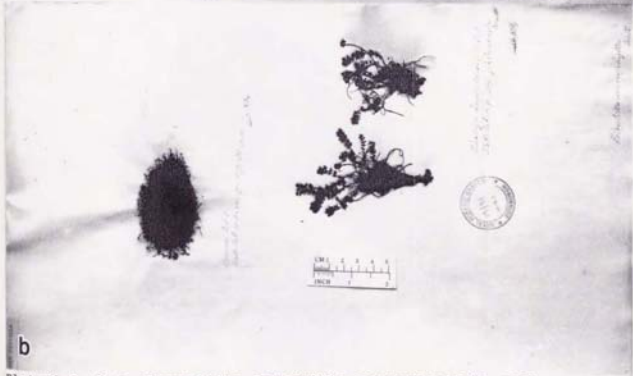
Potentilla microphylla Nutt. f. *serotina*
Himalaya Kaimosiensis Wallich 1829

H. F. 1010

b



a

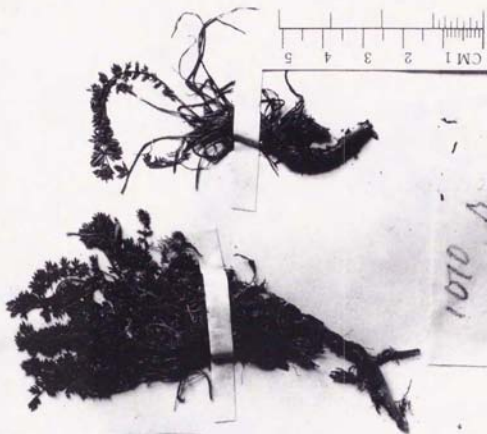


b

Plate 6-8. 6-a. Upper left: *Potentilla commutata* Lehm. var. *commutata* (Hook. f. s.n.); upper right: *P. coriandrifolia* D. Don (Wallich 1018, type of *P. coriandrifolia*); upper middle left: *P. aristata* Soják (Hook. f. s.n.); upper middle right: *P. microphylla* D. Don var. *tapetodes* (Soják) H. Ikeda et H. Ohba (Hook. f. s.n.); lower middle left & 7-a: *P. microphylla* var. *microphylla* (Wallich 1010 β , isotype of *P. microphylla* var. *glabriuscula* Wall. ex Lehm.); lower middle right & 7-b: *P. microphylla* var. *microphylla* (Wallich 1010 γ , isotype of *P. microphylla* var. *depressa* Wall. ex Lehm.); lower: *P. microphylla* var. *microphylla* (Strachey & Winterbottom 19). All specimens are in BM.
 6-b. Upper & 8-b: *P. microphylla* var. *microphylla* (Wallich 1010 γ , isotype of *P. microphylla* var. *depressa* Wall. ex Lehm.); lower & 8-a: *P. microphylla* var. *microphylla* (Wallich 1010 β , isotype of *P. microphylla* var. *glabriuscula* Wall. ex Lehm.). The two specimens are in E.

Callitriche maritima Coll. P. S. H.

a



1070
Var. glaberrima, Wall.

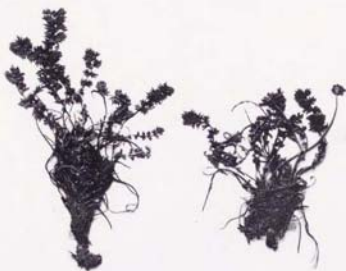
HERB. N. Y. BOT. GARDEN

b



CM 1 2 3 4 5
INCH 1 2

Plate 7.



a



b

Plate 8.

Transferred from
THE BOSTON SOCIETY OF NATURAL HISTORY to
THE GRAY HERBARIUM of HARVARD UNIVERSITY,
October 2, 1911

Wall. ex
1010. 2



Potentilla microphylla
Gray ex 1010

Potentilla microphylla

Plate 9. *Potentilla microphylla* D. Don var. *microphylla*
(Wallich 1010y, isotype of *P. microphylla* var. *depressa*
Wall. ex Lehm., GH).



Potentilla microphylla Walp. L.
n. 1010 J.
J. L. L.

Plate 10. *Potentilla microphylla* D. Don var. *microphylla* (Wallich 1010), isotype of *P. microphylla* var. *depressa* Wall. ex Lehm., E).



10110

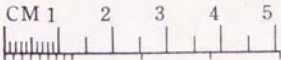
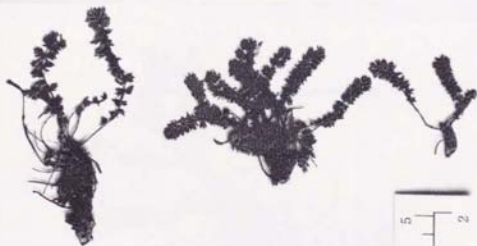


Plate 11. *Potentilla microphylla* D. Don var. *microphylla* (Wallich 1010β, isotype of *P. microphylla* var. *glabriuscula* Wall. ex Lehm., L).



Potentilla microphylla var. *microphylla* (Wallich)

10108, isotype of *P. microphylla* var. *glabriuscula* Wall. ex

Lehm., E.

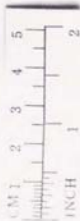


Plate 12. *Potentilla microphylla* D. Don var. *microphylla* (Wallich 10108, isotype of *P. microphylla* var. *glabriuscula* Wall. ex Lehm., E).

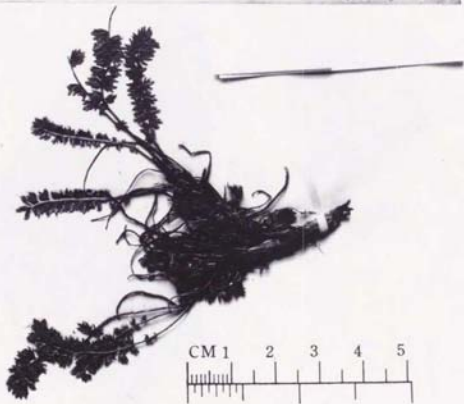


Plate 13. *Potentilla microphylla* D. Don var. *microphylla* (Wallich 10108, isotype of *P. microphylla* var. *glabriuscula* Wall. ex Lehm., NY).

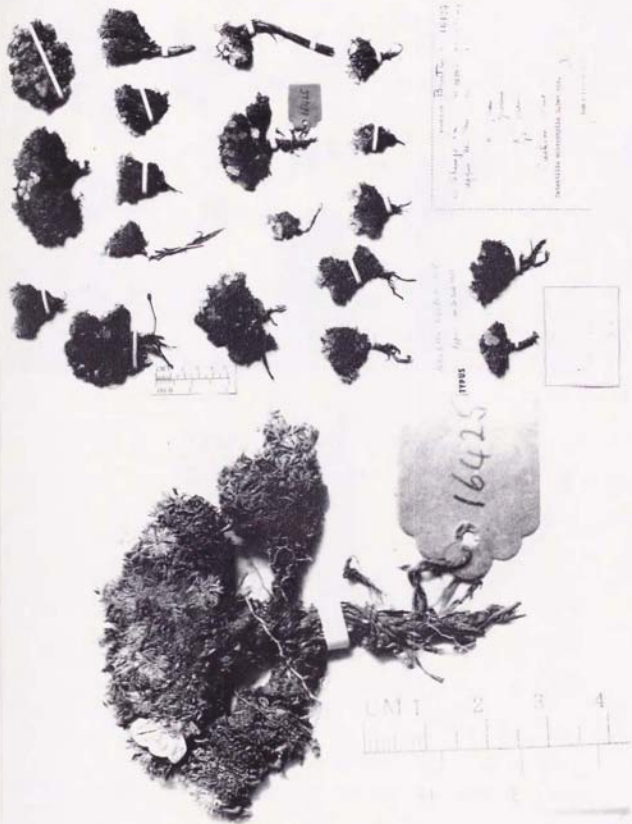


Plate 14. *Potentilla microphylla* D. Don var. *tapetodes* (Soják) H. Ikeda et H. Ohba (Ludlow, Sherriff & Hicks 16425, holotype of *P. tapetodes* Soják, BM).

中国科学院植物研究所

植物标本

NO. 23238

DATE: 1958

BY: H. IKEDA

COLLECTED AT: YÜ

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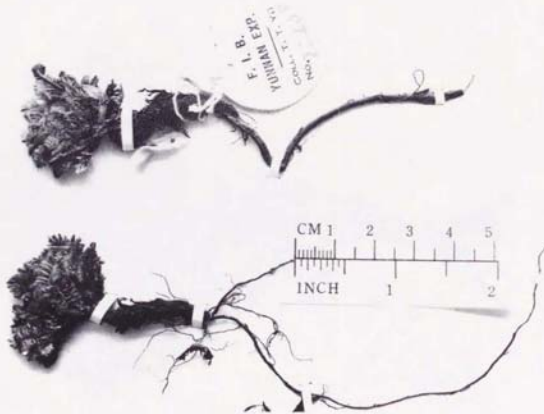
NO. 23238

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Leaflets of
Potentilla luteopilosa (Yü et C. L. Li)

Leaflets of
Potentilla luteopilosa (Yü et C. L. Li)

Leaflets of
Potentilla luteopilosa (Yü et C. L. Li)

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Potentilla luteopilosa (Yü et C. L. Li)

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Leaflets of
Potentilla luteopilosa (Yü et C. L. Li)

Leaflets of
Potentilla luteopilosa (Yü et C. L. Li)

Plate 16. *Potentilla microphylla* D. Don var. *luteopilosa* (Yü et C. L. Li) H. Ikeda et H. Ohba (Yü 23238, lectotype of *P. luteopilosa* Yü et C. L. Li, PE).



Plate 17. *Potentilla microphylla* D. Don var. *luteopilosa* (Yü et C. L. Li) H. Ikeda et H. Ohba (Yü 23238, isotype of *P. luteopilosa* Yü et C. L. Li, PE).

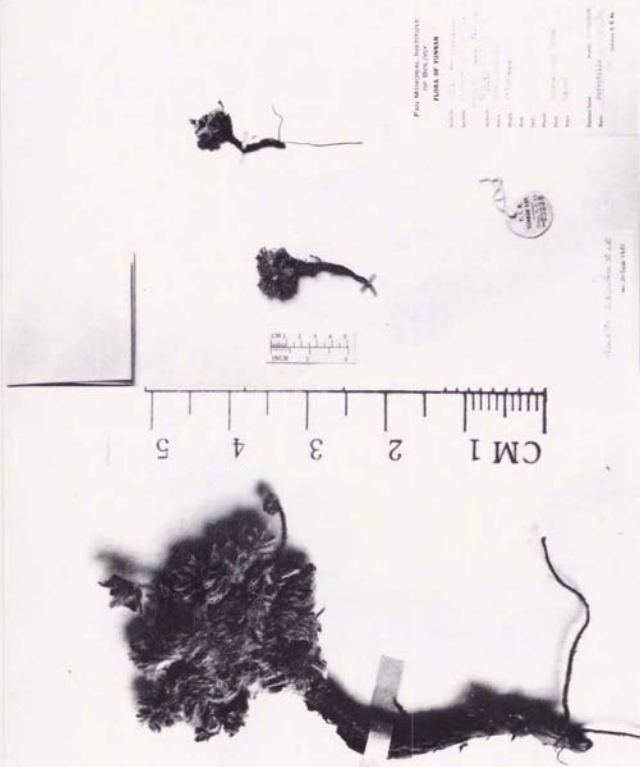


Plate 18. *Potentilla microphylla* D. Don var. *luteopilosa* (Yü et C. L. Li) H. Ikeda et H. Ohba (Yü 23238, isotype of *P. luteopilosa* Yü et C. L. Li, E).



Plate 19. Potentilla microphylla D. Don var. luteopilosa (YÜ et C. L. Li) H. Ikeda et H. Ohba (YÜ 23238, isotype of P. luteopilosa YÜ et C. L. Li, GH).

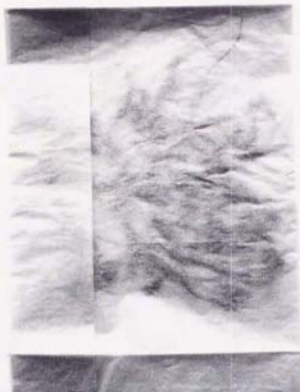
中国科学院植物研究所
 标本号: 6738
 采集地: 甘肃岷县
 采集人: 俞德纯等
 采集日期: 1958.10.25

中国科学院植物研究所
 标本号: 6738

Potentilla microphylla D. Don
 var. *luteopilosa* (Yü et C. L. Li) H. Ikeda et H. Ohba

俞德纯等采集

CM 1 2 3 4 5



中国科学院植物研究所
 标本号: 6738



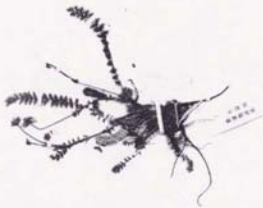
中国科学院植物研究所
 标本号: 6738

Plate 20. *Potentilla microphylla* D. Don var. *luteopilosa* (Yü et C. L. Li) H. Ikeda et H. Ohba (Feng 6738, syntype of *P. luteopilosa* Yü et C. L. Li, PE).



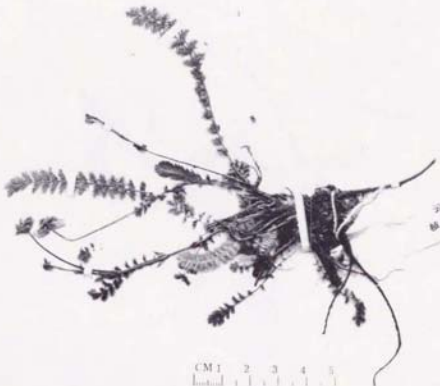
Plate 21. *Potentilla aristata* Soják (Ludlow, Sherriff & Hicks
 19067, holotype of *P. aristata*, E).

中国科学院植物研究所
 标本号: 75-618
 采集地: 云南
 采集人: 俞大维等
 采集日期: 1958.10.15
 鉴定人: 俞大维
 鉴定日期: 1959.10.15



中国科学院植物研究所
 标本号: 75-618
 采集地: 云南
 采集人: 俞大维等
 采集日期: 1958.10.15

中国科学院植物研究所
 标本号: 75-618
 采集地: 云南
 采集人: 俞大维等
 采集日期: 1958.10.15



云南省
 植物研究所



Plate 22. *Potentilla aristata* Soják (Wu 75-618, holotype of *P. microphylla* D. Don var. *multijuga* Yü et C. L. Li, PE).



Plate 24. Potentilla stenophylla (Franch.) Diels (Delavay 105, P).



Plate 25. *Potentilla stenophylla* (Franch.) Diels (Maire s.n.,
syntype of *P. millefolium* Lév., P).

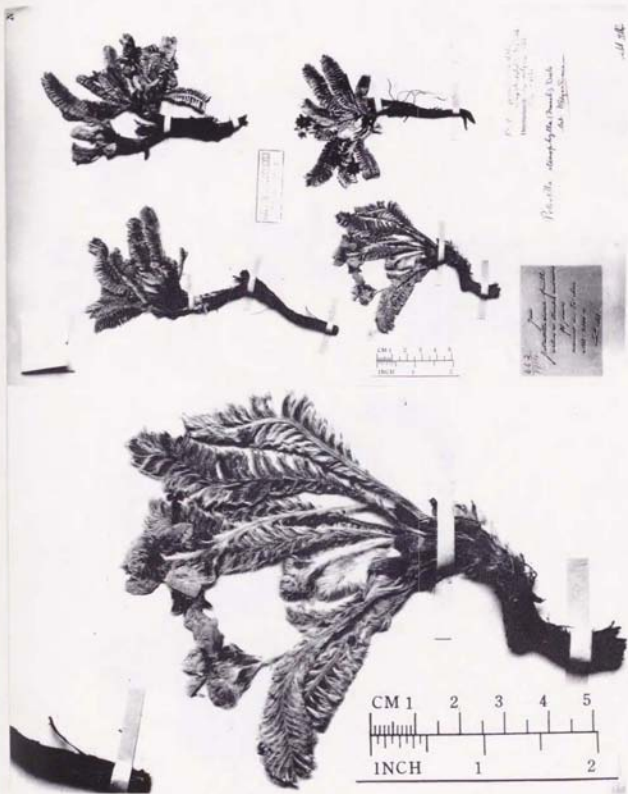


Plate 26. *Potentilla stenophylla* (Franch.) Diels (Maire s.n.,
 syntype of *P. millefolium* Lév., E).

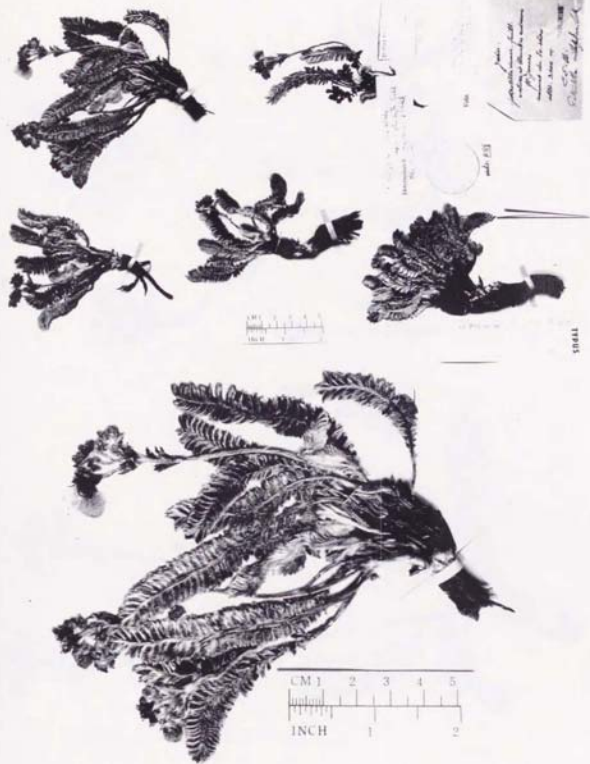


Plate 27. *Potentilla stenophylla* (Franch.) Diels (Maire s.n.,
 syntype of *P. millefolium* Lév., E).

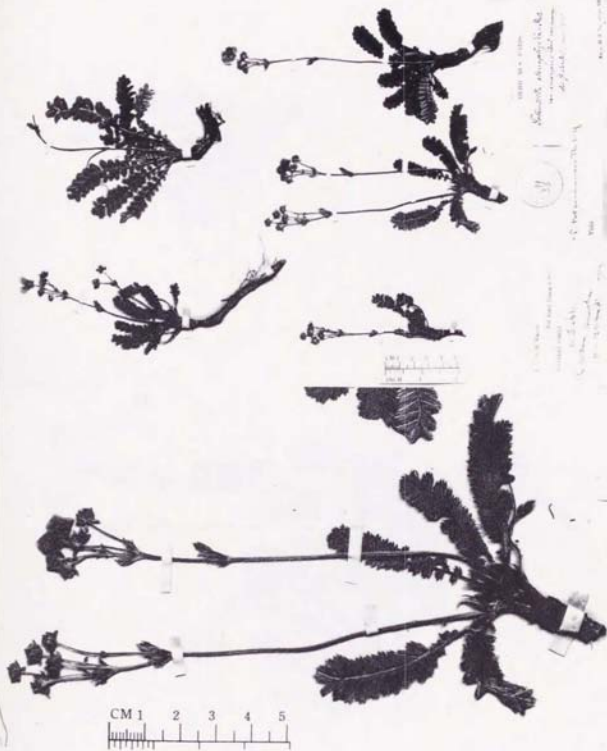


Plate 28. *Potentilla stenophylla* (Franch.) Diels var. emergens
 Card. (Wilson 3461, syntype of *P. stenophylla* var. emergens,
 P).

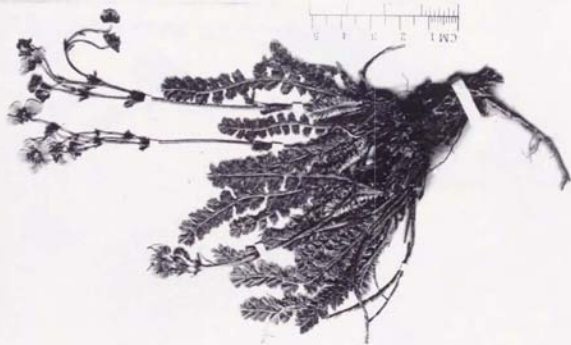


Plate 29. *Potentilla stenophylla* (Franch.) Diels var. emergens
Card. (Soulié 91, syntype of *P. stenophylla* var. emergens, P).

3



Plate 30. *Potentilla stenophylla* (Franch.) Diels var. *emergens* Card. (Soulié 893, syntype of *P. stenophylla* var. *emergens*, P).

1890
Mussot, *Potentilla stenophylla* Franch.
var. *emergens* Card.
in *Flora* par. 100.

31

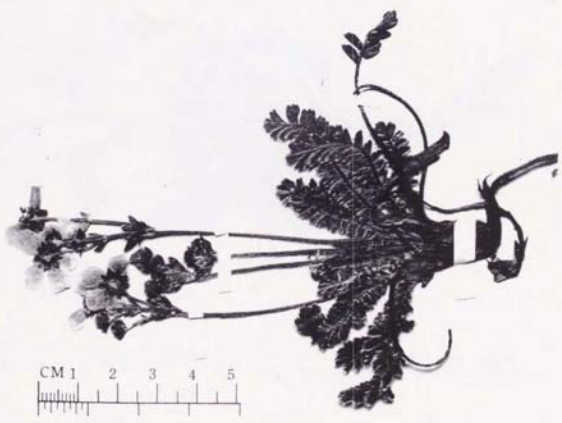


Plate 31. *Potentilla stenophylla* (Franch.) Diels var. *emergens*
Card. (Mussot 110, syntype of *P. stenophylla* var. *emergens*, P).

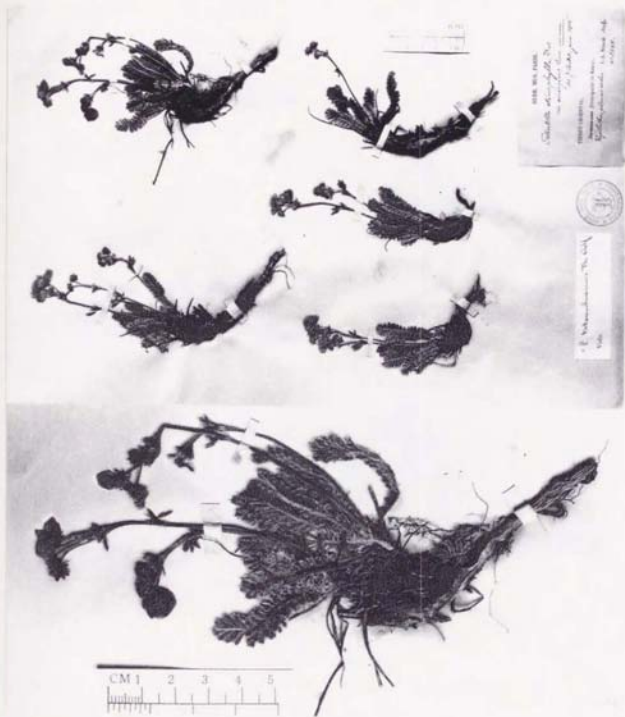


Plate 32. *Potentilla stenophylla* (Franch.) Diels var. *emergens*
 Card. (Soulié 2548, lectotype of *P. stenophylla* var. *emergens*,
 P).

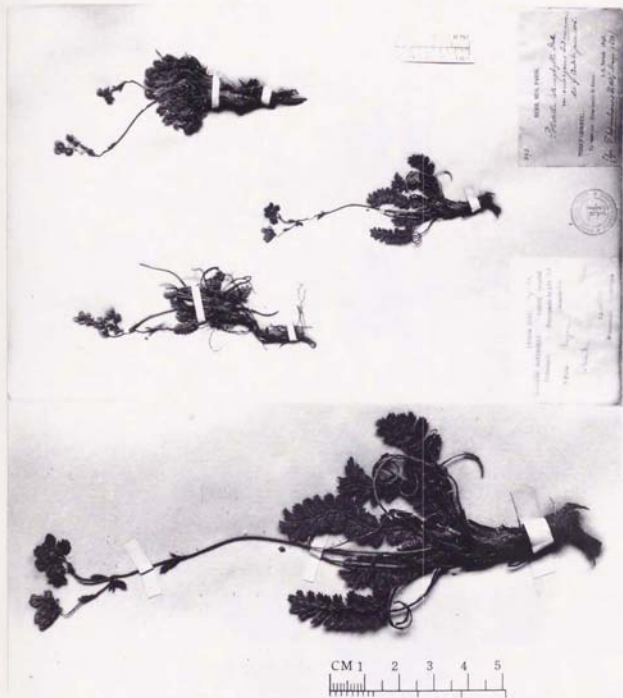


Plate 33. *Potentilla stenophylla* (Franch.) Diels var. *emergens* Card. (Soulie 893, syntype of *P. stenophylla* var. *emergens*, P).



Plate 34. *Potentilla stenophylla* (Franch.) Diels var. *emergens*
Card. (Mussot 110, syntype of *P. stenophylla* var. *emergens*, P).

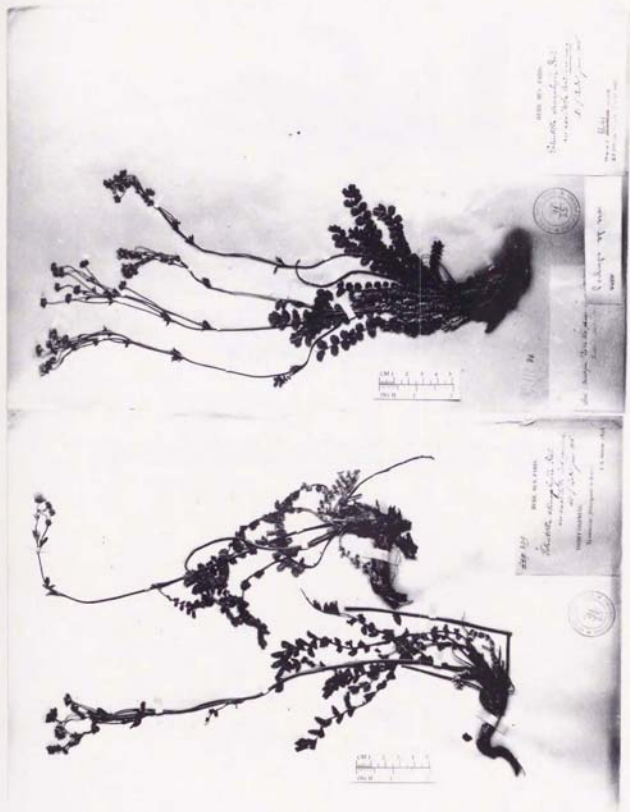
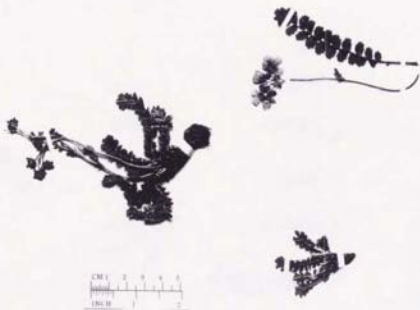


Plate 35. *Potentilla stenophylla* (Franch.) Diels var. *emergens* Card. a: Soulié 88, syntype of *P. stenophylla* var. *exaltata* Card., P. b: Soulié 539, syntype of *P. stenophylla* var. *exaltata* Card., P).



Plate 36. *Potentilla stenophylla* (Franch.) Diels var. *emergens* Card. (Soulie 659, syntype of *P. stenophylla* var. *exaltata* Card., P).



341
Potentilla stenophylla
 var. *emergens*
Potentilla stenophylla (Franch.) Diels
Potentilla stenophylla (Franch.) Diels
 var. *emergens*
 1937-1938
 Prof. Dr. H. G. Reichenow

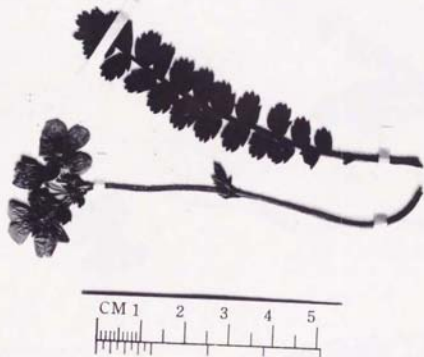


Plate 37. *Potentilla stenophylla* (Franch.) Diels var. *emergens*
 Card. (Potanin 303, lectotype of *P. tatsienluensis* Th. Wolf,
 DR).

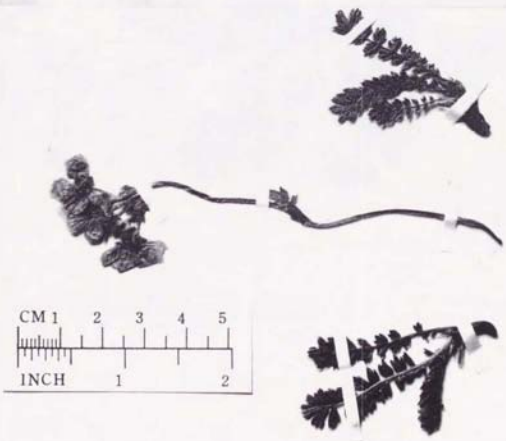
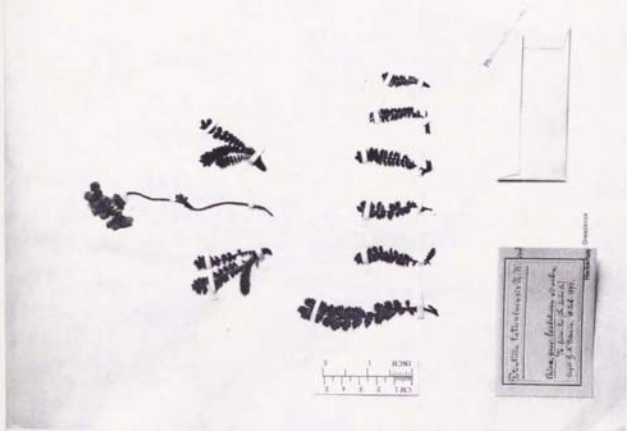


Plate 38. *Potentilla stenophylla* (Franch.) Diels var. *emergens*
 Card. (Potanin 303, syntype of *P. tatsienluensis* Th. Wolf, DR).

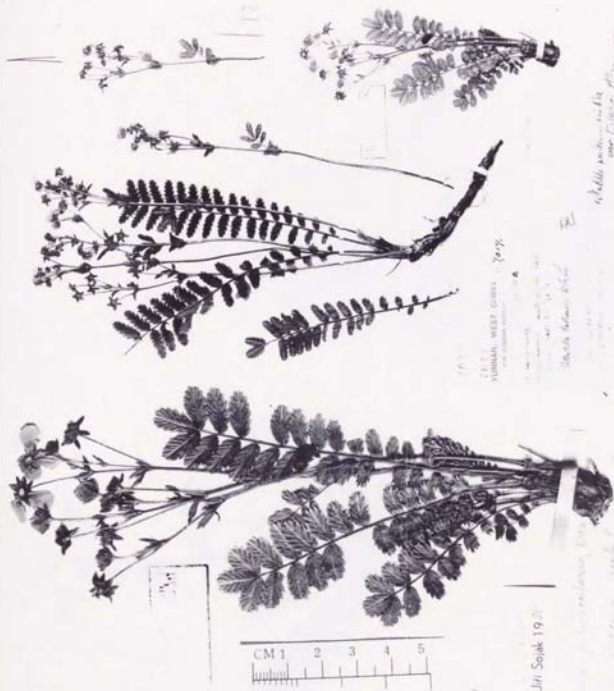


Plate 39. *Potentilla stenophylla* (Franch.) Diels var. *taliensis* (W. W. Smith) H. Ikeda et H. Ohba (Forrest 7017, holotype of *P. taliensis* W. W. Smith, E).



Plate 40. *Potentilla stenophylla* (Franch.) Diels var. *taliensis* (W. W. Smith) H. Ikeda et H. Ohba (Forrest 7017, isotype of *P. taliensis* W. W. Smith, K).

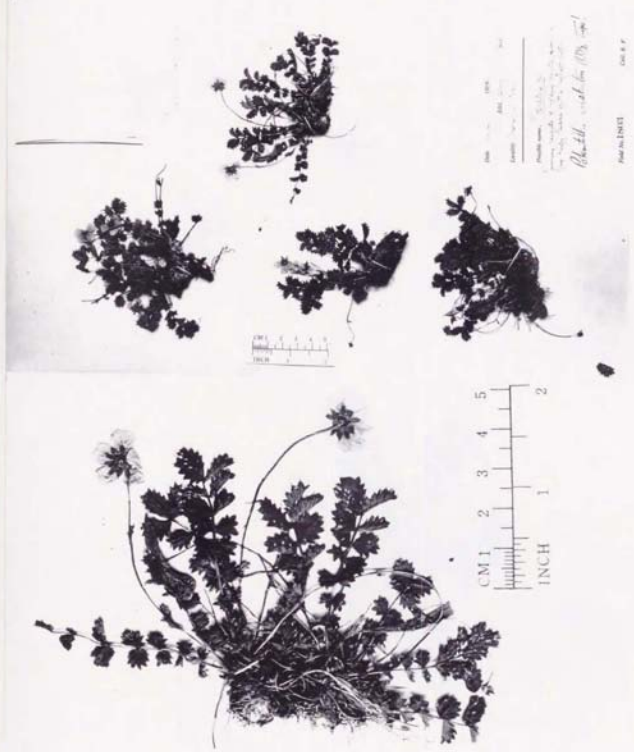


Plate 41. *Potentilla stenophylla* (Franch.) Diels var. *cristata*
 (Fletcher) H. Ikeda et H. Ohba (Farrer 1803, holotype of *P.*
cristata Fletcher, E).

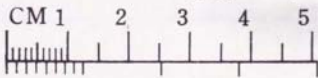
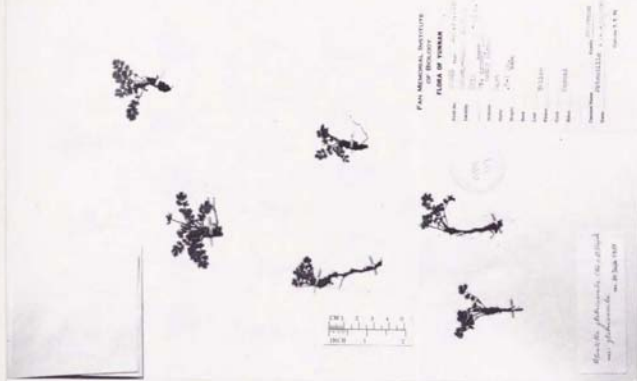


Plate 42. *Potentilla glabriuscula* (Yü et C. L. Li) Soják var.
glabriuscula (YÜ 22265, isotype of *Sibbaldia glabriuscula* Yü et
 C. L. Li, E).

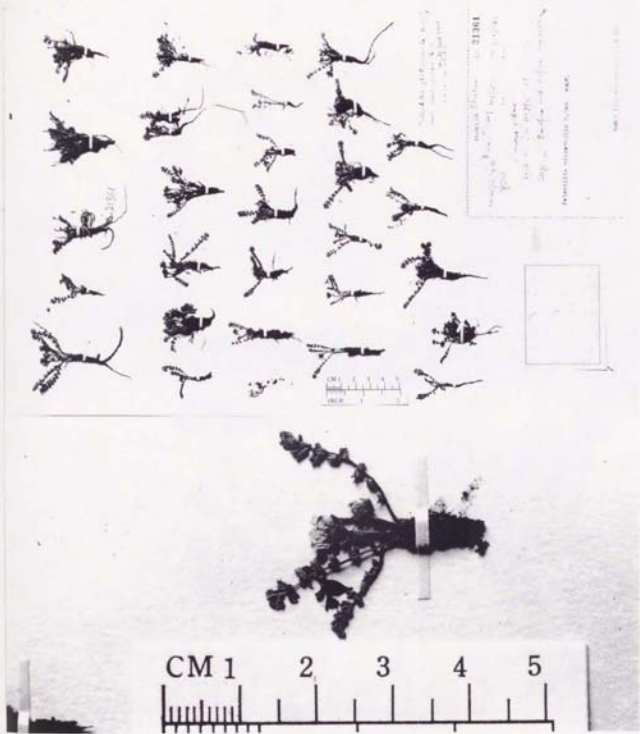


Plate 43. *Potentilla glabriuscula* (Yü et C. L. Li) Soják var.
glabriuscula (Ludlow, Sherriff & Hicks 21361, BM).



Plate 44. *Potentilla glabriuscula* (Yü et C. L. Li) Soják var.
glabriuscula (Ludlow, Sherriff & Hicks 21361, E).



Plate 45. *Potentilla glabriuscula* (Yü et C. L. Li) Soják var. *oligandra* (Soják) H. Ikeda et H. Ohba (Ludlow, Sherriff & Elliot 14362, holotype of *P. oligandra* Soják, BM).

CM 1 2 3 4 5



Plate 46. *Potentilla glabriuscula* (Yü et C. L. Li) Soják var. *oligandra* (Soják) H. Ikeda et H. Ohba (Ludlow, Sherriff & Elliot I4362, isotype of *P. oligandra* Soják, E).



var. *glabriuscula* (Yü)

BY PERMISSION OF THE AUTHOR

PLANTS OF NORTH EAST THIBET

Herbarium, Botanic Garden, Cambridge, Mass., U.S.A.

© Leonard C. Sherriff, 1958

Printed in the U.S.A.

Number 14362

Date 10/10/58

Author Yü et al.

Title

Plate

Fig.

Potentilla glabriuscula (Yü et C. L. Li) Soják var. *oligandra* (Soják) H. Ikeda et H. Ohba

var. *glabriuscula*

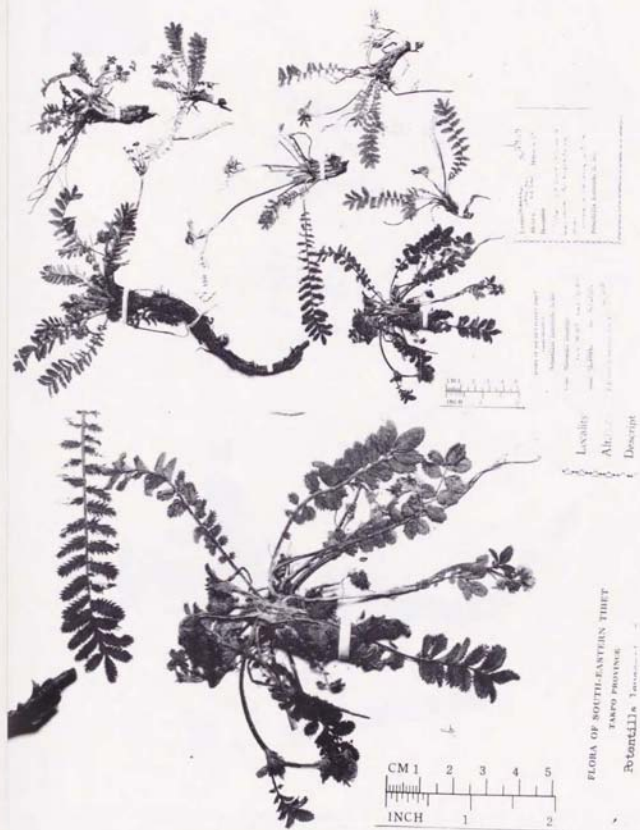


Plate 48. a. Upper right, lower left & b: *Potentilla turfosa* Hand.-Mazz. var. *turfosa* (Ludlow, Sherriff & Taylor 3950, BM). Others: *P. leuconota* var. *leuconota*.



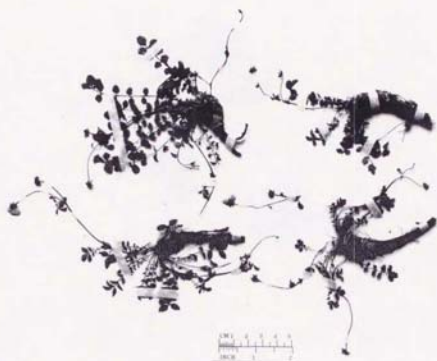
西藏植物

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 191 10. 22. 1934. 10. 22. 1934.
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 198 10. 22. 1934. 10. 22. 1934.
 199 10. 22. 1934. 10. 22. 1934.
 200 10. 22. 1934. 10. 22. 1934.

亞依生 洪德元



Plate 49. *Potentilla turfosa* Hand.-Mazz. var. *gracillima* (Yü et C. L. Li) H. Ikeda et H. Ohba (Ying & Hung 1180, holotype of *P. gracillima* Yü et C. L. Li, PE).



Botanical Illustration by K. Suzuki, 1988
 Originals deposited at the University of Tokyo
 Herbarium, Tokyo, Japan

Plate 50. Potentilla turfoides H. Ikeda et H. Ohba (Suzuki et al.
 8880570, holotype of P. turfoides, TI).
 1988



Plate 50. *Potentilla turfoides* H. Ikeda et H. Ohba (Suzuki et al.
 8880570, holotype of *P. turfoides*, TI).



Plate 51. *Potentilla peduncularis* D. Don var. *peduncularis* (Wallich s.n., holotype of *P. peduncularis*, BM).

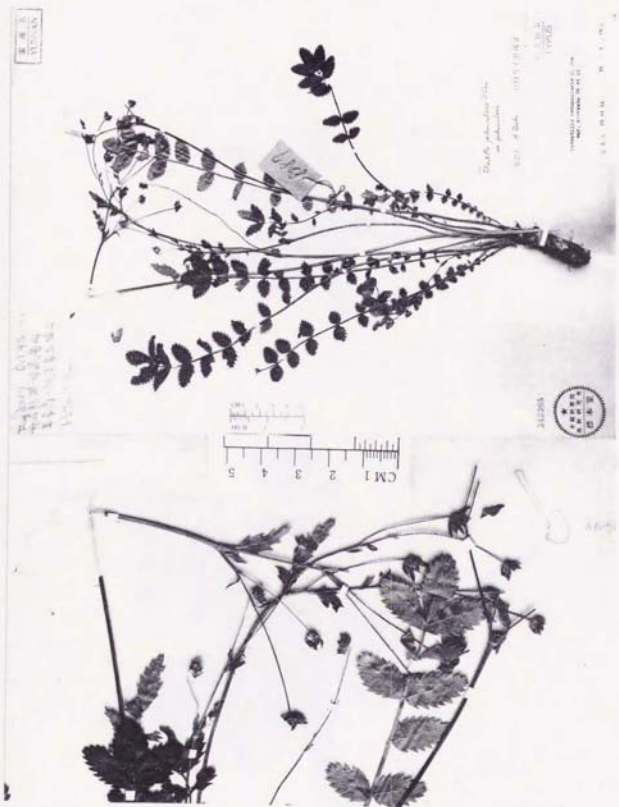


Plate 52. *Potentilla peduncularis* D. Don var. *peduncularis* (Feng 8287, holotype of *P. peduncularis* var. *elongata* Yü et C. L. Li and *P. remota* Soják, PE).

HERBARIUM

NO.	75-973
DATE	1953
COLLECTOR	Wu et al.
LOCALITY	
PLANT	
FRUIT	
LEAF	
STEM	
ROOT	
SEED	
OTHER	



Potentilla peduncularis C. Don
C. L. Li, PE. 1953

Small specimen of *Potentilla peduncularis*
(*Potentilla peduncularis* var. *abbreviata* Yü et
C. L. Li, PE. 1953)



Plate 53. *Potentilla peduncularis* D. Don var. *peduncularis* (Wu et al. 75-973, lectotype of *P. peduncularis* var. *abbreviata* Yü et C. L. Li, PE).



Plate 54. *Potentilla peduncularis* D. Don var. *peduncularis* (Wu et al. 75-973, isotype of *P. peduncularis* var. *abbreviata* Yu et C. L. Li, PE).

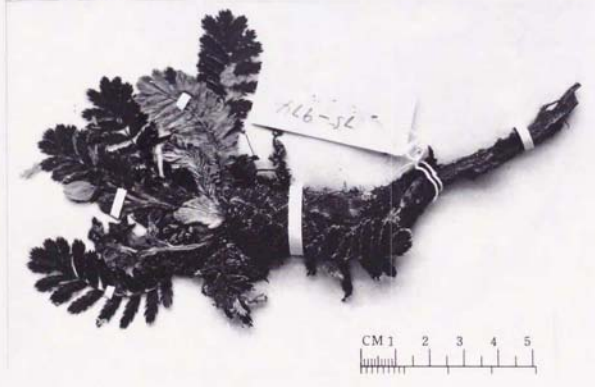


Plate 55. *Potentilla peduncularis* D. Don var. *peduncularis* (Wu et al. 75-974, syntype of *P. peduncularis* var. *abbreviata* Yü et C. L. Li, PE).



Plate 56. *Potentilla contigua* Soják (Chang 2448, holotype of *P. peduncularis* D. Don var. *glabriuscula* Yü et C. L. Li, PE).



Plate 58. *Potentilla peduncularis* D. Don var. *vittata* (Soják) H. Ikeda et H. Ohba. a: Ludlow, Sherriff & Elliot 13966, isotype of *P. vittata* Soják var. *vittata*, E; b: Ludlow, Sherriff & Elliot 14296, isotype of *P. oxyodonta* Soják, κ).



Plate 59. *Potentilla peduncularis* D. Don var. *vittata* (Soják) H. Ikeda et H. Ohba. (Ludlow, Sherriff & Elliot 13159, holotype of *P. vittata* Soják var. *pluriflora* Soják, nm).

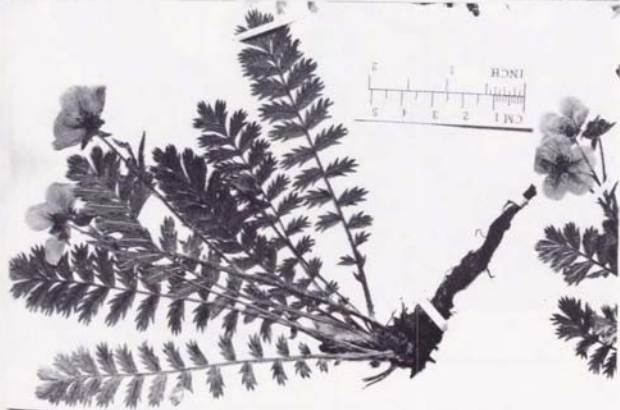
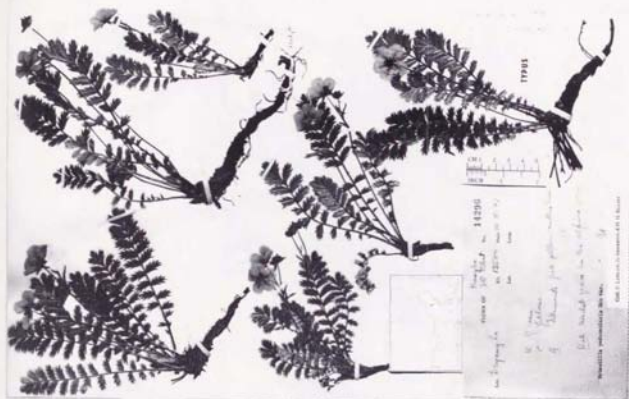


Plate 60. *Potentilla peduncularis* D. Don var. *vittata* (Soják) H. Ikeda et H. Ohba. (Ludlow, Sherriff & Elliot 14296, holotype of *P. oxyodonta* Soják, n. sp.).



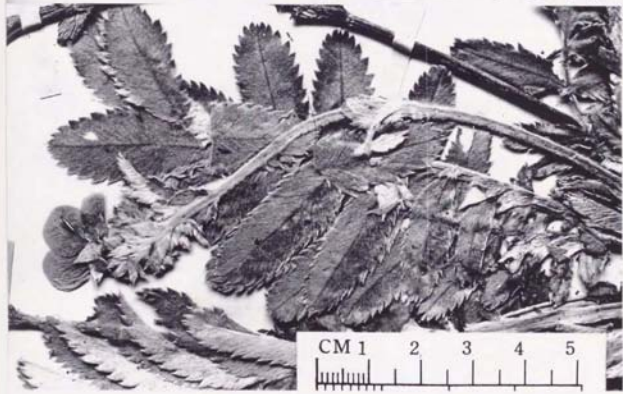
HERBARIUM
EDINBURGH

YUNNAN, WEST CHINA, 26
at present in the
herbarium of the
University of Cambridge

Forrest 15929, holotype of
Potentilla peduncularis
Fletcher, E.

Yunnan, China, 26

Forrest 15929, holotype of
Potentilla peduncularis
Fletcher, E.



CM 1 2 3 4 5

Plate 61. *Potentilla peduncularis* D. Don var. *shweliensis* (Fletcher) H. Ikeda et H. Ohba (Forrest 15929, holotype of *P. shweliensis* Fletcher, E).

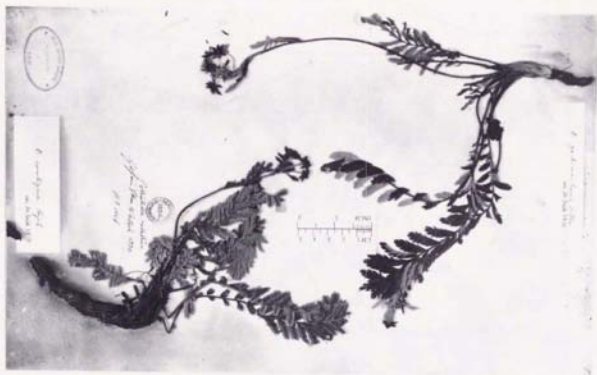


Plate 63. Lower: *Potentilla contigua* Soják (Wallich 1016, syntype of *P. velutina* Wall.); upper: *P. peduncularis* D. Don var. *peduncularis* (Collector unknown s.n.). These specimens are in K.



Potentilla
var. *Clarkei*

Plate 64. *Potentilla contigua* Soják (Clarke 9787, holotype of *P. peduncularis* D. Don var. *clarkei* Hook. f., K).



Handwritten notes and a small label, possibly containing collection data or specimen identification.

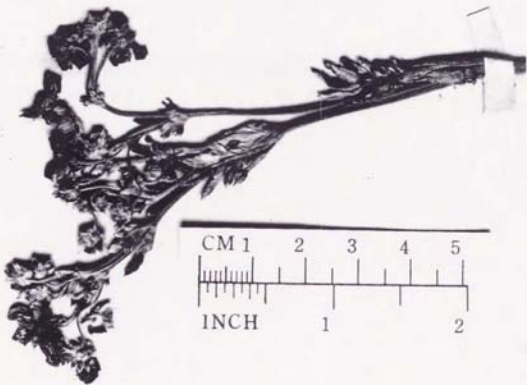


Plate 65. *Potentilla cardotiana* Hand.-Mazz. var. *cardotiana*

(Delavay s.n., holotype of *P. leuconota* D. Don var. *corymbosa* Card. & *P. cardotiana* Hand.-Mazz., P).



Plate 66. *Potentilla cardotiana* Hand.-Mazz. var. *nepalensis* H.
Ikeda et H. Ohba (Suzuki et al. 8880805, holotype *P. cardotiana*
var. *nepalensis*, TI).

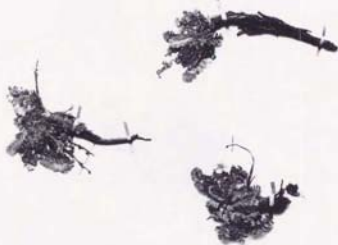
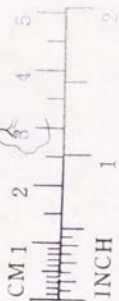


Plate 67. Potentilla tristis Soják (Stainton, Sykes & Williams 835, BM).

Plate 68. *Potentilla commutata* (Hu 2631A, GH).
Herbarium of the Chinese Academy of Sciences, Beijing, China.
Potentilla commutata (L.) C. W. Smith
Plate 68, var. *commutata* (Hu 2631A, GH).
No. 2631A, var. *commutata* (Hu 2631A, GH).
No. 2631A, var. *commutata* (Hu 2631A, GH).

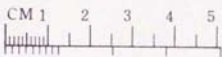


Plate 68. *Potentilla commutata* Lehm. var. *commutata* (Hu 2631A, GH).



Plate 69. *Potentilla leuconota* D. Don var. *leuconota*. Lower:
 Wallich 1021, holotype of *P. leuconota*(?); upper: Madden s.n.
 These specimens are in K.

Potentilla leuconota
Don
syn. *Potentilla velutina*
Wall.

HERB. B. G. DON



Plate 70. *Potentilla leuconota* D. Don var. leuconota (Wallich s.n.,
syntype of *P. velutina* Wall., BM).

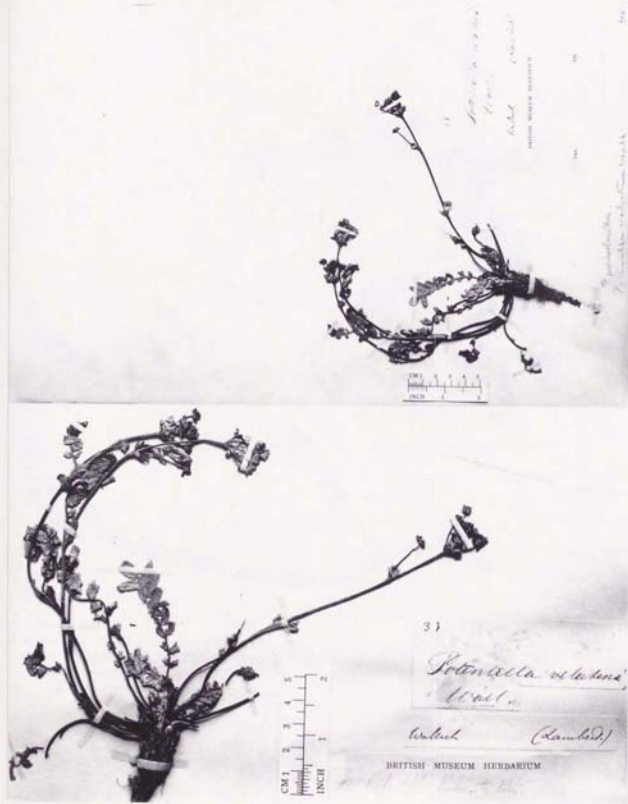


Plate 71. *Potentilla leuconota* D. Don var. *leuconota* (Wallich s.n.,
syntype of *P. velutina* Wall., BM).



Plate 72. *P. leuconota* D. Don var. *leuconota*. Upper: Wallich s.n., holotype of *P. leuconota* (?); lower: Duthie 3980. These specimens are in BM.



Plate 75. *Potentilla leuconota* D. Don var. *brachyphyllaris* Card.
 (Soulifé 690, lectotype of *P. leuconota* var. *brachyphyllaris*,
 P).

HERB. MUS. PARIS
D. Don, *Potentilla leuconota* var. *brachyphyllaris* Card.
1847, *Ann. Bot. Soc. Lond.* 1: 107, t. 1, f. 10.
1848, *Ann. Bot. Soc. Lond.* 1: 107, t. 1, f. 10.
1849, *Ann. Bot. Soc. Lond.* 1: 107, t. 1, f. 10.
1850, *Ann. Bot. Soc. Lond.* 1: 107, t. 1, f. 10.



Plate 76. *Potentilla leuconota* D. Don var. *brachyphyllaris* Card.
(Soulié s.n., syntype of *P. leuconota* var. *brachyphyllaris*, P).



Plate 77. *Potentilla leuconota* D. Don var. *brachyphyllaria* Card.
 (Soulé 2447, syntype of *P. leuconota* var. *brachyphyllaria*, P).

2447. MARK WITH NAME
Potentilla leuconota, D.
 var. *brachyphyllaria*, Card.
 (Soulie 2447, syntype of *P. leuconota*
 var. *brachyphyllaria*, P.)
 Herbar. Acad. Sci. Paris.
 Dec. 1847. (P. de la Roche)
 No. 2447.



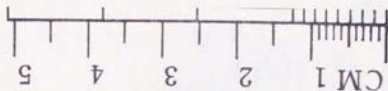
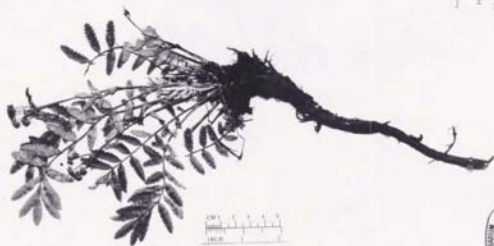
Plate 78. *Potentilla leuconota* D. Don var. *brachyphyllaria* Card.
 (Soulie 2447, syntype of *P. leuconota* var. *brachyphyllaria*, P).



Plate 80. *Potentilla montisvictoriae* H. Ikeda et H. Ohba
(Cooper 6002, holotype of *P. montisvictoriae*, E).



Plate 81. *Potentilla montisvictoriae* H. Ikeda et H. Ohba (Cooper 6002, isotype of *P. montisvictoriae*, E).



No. 1000
 P. 1000
 Institute of Botany
 Chinese Academy of Sciences
 Beijing, China
 1954



Plate 82. *Potentilla wenchuensis* H. Ikeda et H. Ohba (Hu 1942,
 holotype of *P. wenchuensis*, GH).



Plate 83. *Potentilla wenchuensis* H. Ikeda et H. Ohba (collector unknown 0947, PE).



Plate 84. *Potentilla gombalana* Hand.-Mazz. (Smith 10714, isotype of *P. gombalana*, PE).



Plate 85. Potentilla gombalana Hand.-Mazz. (Pratt s.n., K).



SMITH
PLANT & ANIMAL
GARDEN

HERBARIUM
UNIVERSITY OF CALIFORNIA

Herbarium of the University of California
The University of California, Berkeley, California
The University of California, Berkeley, California

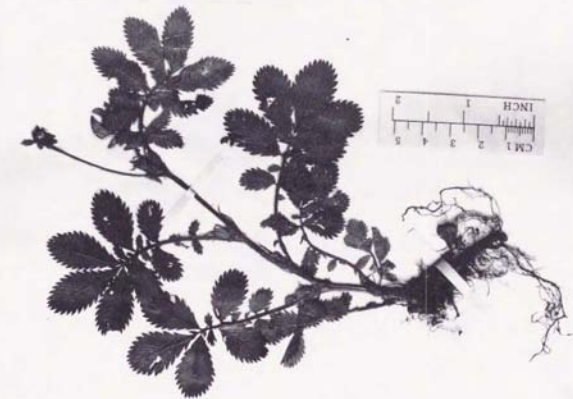
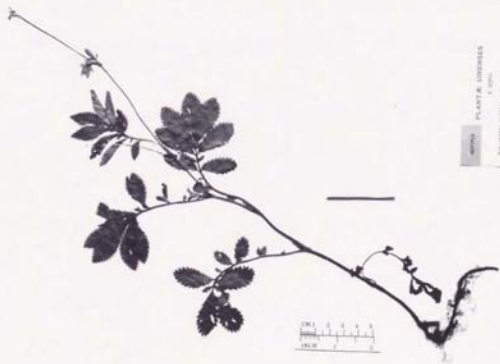


Plate 87. *Potentilla smithiana* Hand.-Mazz. (Smith 10380,
isotype of *P. smithiana*, GH).



PLANTAE ERDESII
 F. A. S. P.
 Potentilla smithiana Hand.-Mazz.
 Herbarium of the University of Zurich, Zurich.
 No. 10380, a-A, b-NY, 1934
 Prof. Dr. H. S. Gentry, 1934



PLANTAE ERDESII
 F. A. S. P.
 Potentilla smithiana Hand.-Mazz.
 Herbarium of the University of Zurich, Zurich.
 No. 10380, a-A, b-NY, 1934
 Prof. Dr. H. S. Gentry, 1934

U.S. DEPT. OF AGRICULTURE
 BUREAU OF PLANT INDUSTRY
 WASHINGTON, D. C.

Plate 88. *Potentilla smithiana* Hand.-Mazz. (Smith 10380, isotypes of *P. smithiana*, a-A, b-NY).



Plate 89. Potentilla smithiana Hand.-Mazz. (Smith 10380, isotype of P. smithiana, PE).



POTENTILLACEAE

黃山馬兜鈴

HERB. NY

NO. 20915

PE

1958

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Herb. Botany, Cal. U.
1958

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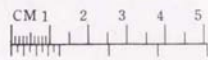
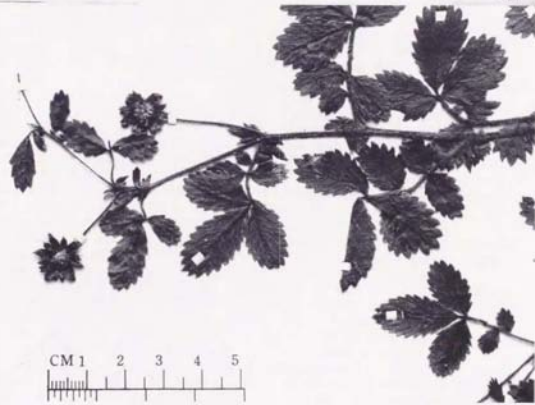


Plate 90. *Potentilla taronensis* Wu ex Yü et C. L. Li (Yü 20915, holotype of *P. taronensis*, PE).

APPENDIX

SPECIMENS EXAMINED

1. *Potentilla microphylla* D. Donla. var. *microphylla*

INDIA. NW INDIA: Kashmir, Punjab, Rupin Pass, Dhaola Dhar Range, Simla Hill States, 31°22'N 78°09'E, 13500 ft. (Ludlow & Sheriff 7504, 2 Aug. 1939, BM, E); Simla, summit of Murale, 12800 ft. (Watt 13570, 15 June 1891, E); Murule, 12400 ft. (Watt 8643, 24 Aug. 1888, E); Punjab, Mussoorie, Kidar Kantha, 14000 ft. (Drummond 24275, 10 June 1904, K, E); Saharumpore (Jacquemont s.n., P); Garhwal, Pakiar Koshi, 10500 ft. (Strachey & Winterbottom 19 in 1853, GH, P); loc. cit., Bishtola, 3800 m (Rau 10226, 15 June 1959, E, TI); loc. cit., Pilkantha, 12000-13000 ft. (Duthie 3976, 9 Sept. 1885, K); loc. cit., near the Kuari Pass, 12000-13000 ft. (Duthie 3977, 8 Sept. 1885, K); loc. cit., above Bhrwam, 13000-14000 ft. (Duthie 3978, 16 Sept. 1885); loc. cit., Hemkund, 4200 m (Bhattacharyya 29459, 17 Aug. 1963, TI); Tihri-Garhwal, Rhudghera, 15000-16000 ft. (Duthie 1070, 20 July 1883, BM); Kumaon (Blinkworth s.n., BM); loc. cit., Nulapa Gadh, Darma, 12000-13000 ft. (Duthie 5517, 5 Aug. 1886, K).

IND. OR. Without precise locality (Wallich 1010, K); (Wallich 1010b, E, B, L, NY); (Wallich 1010c, E, GH, DR).

NEPAL. W NEPAL: Bhurshula Lekh, near Jumla, 12500 ft. (Polunin, Sykes & Williams 4542, 11 July 1952, BM, E, GH); Babaria Lekh (Jibrikot - Jumla), c. 13000 ft. (Polunin, Sykes & Williams 2120, 29 Aug. 1952, BM, E, GH); Babaria Lekh, 14000 ft. (Polunin, Sykes & Williams 75, 8 July 1952, BM, E, GH); Balangra Pass, c. 14000 ft. (Polunin, Sykes & Williams 2536, 21 July 1952, BM, E, GH, P). C NEPAL: without precise locality (Dhwoj 107 in 1928, E, BM); (Dhwoj 26 in 1929, E); (Scully s.n., Sept. 1880, K); Tukucha, Kali Gandaki, 13500 ft. (Stainton, Sykes & Williams 1137, 15 June 1954, E, GH, P); Dhaulagiri Zone, Mustang Distr., around Yak Kharka, 4210 m (Suzuki et al. 8860918 & 8881657, 31 Aug. 1988, TI); Thinggaon, Muktinath Himal, 15000 ft. (Stainton, Sykes & Williams 1292, 22 June 1954, E, GH); Rambrong, Lamjung Himal, 13500 ft. (Stainton, Sykes & Williams 6111, 3 June 1954, E, GH); above Sauwala Khola, 14000 ft. (Stainton, Sykes & Williams 3012, 5 July 1954, E, GH); Mul Kharka, Chilime Khola, 4100 m (Kanai & Shakya 670487-138 & 670488-148, 3 July 1970, TI); Bagmati Zone, Rasuwa Distr., Gosainkund - Gopte, 3500-4400 m (Kanai et al. s.n., 25 Aug. 1972, TI); loc. cit., 4490 m (Suzuki & Noshiro 541059, 2 June 1985, TI); Gosainkund, 4000 m (Matsumura s.n., 5 June 1968, TI); loc. cit., 17000 ft. (Wigram 64, 14 Oct. 1927, E); loc. cit., 4000-4400 m (Kanai et al. s.n., 24 Aug. 1972, TI); loc. cit., 4400 m (Minaki et al. 9081020, 21 Sept. 1990, TI); above Gosainkunde, 4500 m (Maser 206, 7 June 1967, US); Langtang, c. 16500 ft. (Polunin 628, June 1949, BM); Brangechen Kharka, c. 16000 ft. (Polunin 290, 11 June 1949, BM); Langtang, Langshisa Kharka - Morimoto Peak, 3910-4850 m (Noshiro 9154575, 2 Sept. 1991, TI); Gadkje - Surja Kund, 3920-4450 m (Malla & Kanai 674887, 26 Aug. 1969, TI); Rolwaling Khola, Na - Yalung Kharka, 4050-4750 m (Ohba et al. 8331903, 7 Sept. 1983, TI). E NEPAL: Khinti Khaola, Panch

Pokhari, 27°44'N 86°25'E, 15000 ft. (Stainton 4798, 15 July 1964, TI); Janakpur Zone, Ramechhap Distr., Dubikharka - Baula Pokhari, 3720-4000 m (Ohba et al. 8580206, 9 July 1985, TI); loc. cit., Baula Pokhari - Chhu-Ningma, 3960-4040 m (Ohba et al. 8530218, 8580252, 11 July 1985, TI); loc. cit., Thare Og - Neju (Njashung Dingma), 3651-4877 m (Ohba et al. 8580581 & 8530606, 30 July 1985, TI); Lumding Khola or Khola South, Dudh Kund, 27°43'N 86°36'E, 14000 ft. (Lyon 2010, 7 June 1964, TI); Dudh Kund, 17000 ft. (Dhwoj 245 in 1930, E); Mount Everest Exped., 15000 ft. (Wollaston 71, July 1921, K); Everest region, S of Cho Oyu, 5200 m (Miehe 1073, 21 Sept. 1982, BM); loc. cit., Machhermo/Pangka, 4930 m (Miehe 1038, 15 Sept. 1982, BM); Koshi Zone, Sankhuwa Sabha Distr., around Makalu B.C., 4870 m (Suzuki et al. 8880718, 26 July 1988, TI); loc. cit., around Merek (Mera), 4450 m (Suzuki et al. 8880691, 22 July 1988, TI); loc. cit., around Cha Ding Kharka, c. 4500 m (Minaki et al. 9080305, 9 Aug. 1990, TI); loc. cit., 4500 m (Minaki et al. 9080331, 11 Aug. 1990, TI); Arun Valley, Maghang Khola, E of Num, 13500 ft. (Stainton 836, 3 July 1956, BM, E, GH); Koshi Zone, Sankhuwa Sabha Distr., Jaljale Himal, Khokling - Jaljale, 4000 m (Ohba et al. 9130081, 21 July 1991, TI); loc. cit., Jaljale - Tin Pokhari, 4030-4170 m (Ohba et al. 9153244 & 9130088, 22 July 1991, TI); loc. cit., Tin Pokhari - Banduke, 4130-4150 m (Ohba et al. 9130097 & 9130102, 24 July 1991, TI); Gosa (near Kobche) - Banduke Pokhari (Duo Tulo Pokhari), 4100-420 m (Kanai et al. s.n., 14 June 1972, TI); around Banduke, 4280 m (Ohba et al. 9130107, 25 July 1991, TI); loc. cit., 4400 m (Ohba et al. 9130156, 29 July 1991, TI); Banduke Pokhari (Duo Tulo Pokhari) - Saju Pokhari, 4000-4200 m (Kanai et al. s.n., 15 June 1972, TI); Bomrang - Singoa Kharka, 4140-4630 m (Ohba et al. 9130343, 10 Aug. 1991, TI); Hile Chok - Ghopte (Tal Pokhari), 4000 m (Kanai et al. 720384, 12 June 1972, TI); Kipuphu - Topke Gola, 3600-4800 m (Kanai et al. s.n., 27 June 1972, TI); Topke Gola - Thudam, 4450 m (Yoshida s.n., 1 July 1987, TI); Thudam - Kipuphu, 3400-4500 m (Kanai et al. s.n., 26 June 1972, TI); Satbhैया, 27°28'N 88°03'E, 14000 ft. (Williams 816, 22 June 1969, BM).
BHUTAN. Kangelamo Pass, 16000 ft. (Watt 5476, 25 June 1881, E); above Dahwowa, c. 11500 ft. (Herb. Reid s.n., 8 Sept. 1885, E); Jobrikha, Byaus, c. 14500 ft. (Herb. Reid s.n., 1 Aug. 1886, E); Me la, 14000 ft. (Ludlow & Sherriff 402, 5 Aug. 1933, BM); loc. cit. (South side), 13000 ft. (Ludlow, Sherriff & Hicks 20354, 9 June 1949, BM, E).
TIBET. Chumbi, Ley-nong (King's collector 548, 2 July 1884, P); loc. cit., La-ri-tung (King's collector s.n. in 1882, L).
ASSAM. Tulung La - Pen La, 15000-17000 ft. (Kingdon-Ward 11699, 14 June 1935, BM); Kaso, Delei valley, 28°21'N 96°37'E, 14000 ft. (Kingdon-Ward 8407, 2 July 1928, K).
TIBET. Ramjen Tibet (Nepal border) (Nand s.n., 26 June 1937, E); Gurkha Nesum (Nand s.n., 22 July 1937, E).

1b. var. tapetodes (Soják) H. Ikeda et H. Ohba
SIKKIM. Without precise locality, 17000-18000 ft. (Hooker f. s.n., P); 14000-18000 ft. (Hooker f. s.n., E, L, GH, NY); (Hooker f. & Thomson s.n., NY); Chola Pass, 14500 ft. (Cooper 861, 12 Sept. 1913, E); Kang Pupehuthang, 16000 ft. (Ribu &

Rhomoo 5208, 6 Sept. 1911, E); Nachegeh, Slouor, 16000 ft. (Smith & Cave 1720, 22 July 1909, L); Rongsa Llouoh, 15500 ft. (Smith & Cave 2018, 28 July 1909, TI).

BHUTAN. Yak La, Timpu, 10000 ft. (Cooper 1853, 25 July 1914, E); Shinje La, upper Mo Chu, 15500 ft. (Ludlow, Sherriff & Hicks 16425, 5 June 1949, BM, E); Kangla Karchu La, Po Chu Drainage, 16000 ft. (Ludlow, Sherriff & Hicks 16590, 20 June 1949, E); upper Mangde Chu, 14000 ft. (Ludlow, Sherriff & Hicks 16792, 11 July 1949, BM, E); Gaffoo La, 14500 ft. (Ludlow, Sherriff & Hicks 17324, 21 Sept. 1949, BM); Dungshinggang (Black Mountain), 15000 ft. (Ludlow & Sherriff 3303, 24 June 1937, BM, E); Pangotang, Tsampa, 13500-14000 ft. (Ludlow, Sherriff & Hicks 19145, 14 June 1949, BM); Jaasiegem Pumthang, 14000 ft. (Cooper 4023, 20 June 1915, E).

TIBET. Doshong La, 14000 ft. (Ludlow, Sherriff & Elliot 15294, 21 June 1947, E); Nyima La, 15000-17000 ft. (Kingdon-Ward 5826, 21 July 1924, E); Uying Chi Xian, 4450 m (Ecology-High Mts. Team 15683, 17 Sept. 1980, PE).

E HIMALAYA. Chumolari, 16000 ft. (Lepcha 474, 12 Sept. 1912, E).

1c. var. luteopilosa (Yü et C. Li) H. Ikeda et H. Ohba

TIBET. Cona Xian, north of Bo Shan Ko, 4500 m (Wu et al. 75-1004, 17 July 1975, PE); loc. cit., 1 km east of Bo Shan Ko, 4500 m (Vegetation-Tibet Team 2327, 6 Aug. 1974, PE); Yadong, 4250 m (collector unknown 44-7066, 24 June 1975, PE); loc. cit., 4500-4600 m (Qinghai-Xizang Exped. 750348, 15 June 1975, PE).

CHINA. YUNNAN: Gonshan, 4100 m (Yü 23238, 4 Oct. 1938, PE, GH, E); Deqin, 3800-3900 m (Feng 6738, 18 Aug. 1940, PE); loc. cit., 3900-4200 m (Feng 6442, 9 Aug. 1940, PE). **SICHUAN:** Mt. Mitsuga, W of Muli Gomba, 3050-4875 m (Rock 16247, June 1928, E, US).

2. Potentilla aristata Soják

NEPAL. W NEPAL: near Jangla Bhanjyang, 13000 ft. (Polunin, Sykes & Williams 2332, 29 June 1952, E, GH). **C NEPAL:** Taglung, S of Tukucha, Kali Gandaki, 14000 ft. (Polunin, Sykes & Williams 1844, 16 July 1954, E, GH); Tukucha, Kali Gandaki, 11500 ft. (Polunin, Sykes & Williams 1157, E, GH, L); Dhaulagiri Zone, Mustang Distr., Tukuche - Yak Kharka, 2590-3850 m (Suzuki et al. 8881647, 30 Aug. 1988, TI); loc. cit., Yak Kharka - Tukuche, 3650 m (Suzuki et al. 8881695, 1 Sept. 1988, TI); loc. cit., Throng Phedi, 4000 m (Ohba et al. 8342039, 24 July 1983, TI); Mul Kharka, Chilime Khola, 4000 m (Kanai & Shakya 672232, 2 July 1970, TI); Langtang, Pangsang Lekh, 4300 m (Miehe & Miehe 2250, 20 May 1986, BM); loc. cit., Pangsang Lekh, 4050 m (Miehe & Miehe 10037, 29 Aug. 1986, BM); loc. cit., Dokatsche, SE of Schiabru Kedo, 3970 m (Miehe & Miehe 1217, 28 Apr. 1986, BM); loc. cit., Syabru, Tarutsche, 4040 m (Miehe & Miehe 14750a, 23 Oct. 1986, BM); loc. cit., Naukunda Lekh, 4350 m (Miehe & Miehe 9270, 15 Aug. 1986, BM); loc. cit., 4050 m (Miehe & Miehe 9124, 16 Aug. 1986, BM); loc. cit., 3980 m (Miehe & Miehe 9322, 17 Aug. 1986, BM); Gosainkund, 4400 m (Minaki et al. 9081014, 21 Sept. 1990, TI);

Gosainkund - Gopte, 3500-4400 m (Kanai et al. s.n., 25 Aug. 1972, TI); Singum - Gosainkund, 3200-4200 m (Kanai et al. s.n., 23 Aug. 1972, TI); Langtang, Surdscha Kunda, 4730 m (Miehe & Miehe 9013, 14 Aug. 1986, BM); loc. cit., Dupku Danda, C Keldang, 4300 m (Miehe & Miehe 6970, 28 July 1986, BM); loc. cit., Ganja La, Sudsete, 4630 m (Miehe & Miehe 6620, 24 July 1986, BM); loc. cit., Kyangjin, 3730 m (Miehe & Miehe 11447, 11 Sept. 1986, BM); loc. cit., Yala, 4760 m (Miehe & Miehe 493, 13 July 1986, BM); loc. cit., Tikeapsa, 4430 m (Miehe & Miehe 4328, 27 June 1986, BM); loc. cit., 4490 m (Miehe & Miehe 4225, 28 June 1986, BM); loc. cit., Nubawadang, 4500 m (Miehe & Miehe 11609, 11675, 13 Sept. 1986, BM); loc. cit., 4100 m (Miehe & Miehe 11665, 13 Sept. 1986, BM); loc. cit., 3980 m (Miehe & Miehe 11779, 15 Sept. 1986, BM); loc. cit., Langschisa Karka, 4310 m (Miehe & Miehe 11927, 17 Sept. 1986, BM); loc. cit., Pemdang, Kanpo, 4650 m (Miehe & Miehe 13113, 13139, 30 Sept. 1986, BM); loc. cit., 4660 m (Miehe & Miehe 13526, 13691, 7 Oct. 1986, BM); loc. cit., Nyeng Tscha, 4800 m (Miehe & Miehe 13974, 12 Oct. 1986, BM); Janakpur Zone, Ramechhap Distr., Thare Og - Bigphera Lho Glacier, 4150-5000 m (Ohba et al. 8530487, 25 July 1985, TI); Rolwaling, 27°55'N 86°23'E, 13500 ft. (Stainton 4693, 28 June 1964, BM, TI); Rolwaling Himal, Ramuzala, 3400 m (Yoda s.n., 8 June 1963, TI). **E NEPAL:** Tak Tor, 12000-13000 ft. (Dhwoj 047 in 1930, E, TI); Omlasa Khumbu, Solukhumbu Distr., Chumawa - Namchebazar, 3450 m (Tabata et al. 10609, 11 June 1978, TI); Namche Bazar, 3400 m (Matsumura s.n., 7 July 1968, TI); Everest region, near Dole, 4370 m (Miehe 967, 9 Sept. 1982, BM); Jargeng Khola, 14000-15000 ft. (Lowndes L1129, 5 July 1950, BM); Koshi Zone, Sankhuwa Sabha Distr., Merek (Mera) - Makalu Base Camp, 4450-4680 m (Suzuki et al. 8880697, 23 July 1988, TI); loc. cit., Makalu Base Camp - Ta Dasa, 3900-4680 m (Suzuki et al. 88810619, 27 July 1988, TI); loc. cit., around Merek (Mera), 4650 m (Suzuki et al. 8880689, 22 July 1988, TI); loc. cit., Ta Dasa - Merek (Mera), 4200 m (Suzuki et al. 8880667, 21 July 1988, TI); loc. cit., Jaljale Himal, Shuwan Kharka (near Panch Pokhari) - Topke Gola, 3675 m (Ohba et al. 9130308, 7 Aug. 1991, TI); loc. cit., Topke Gola, 3570 m (Ohba et al. 9130317, 9 Aug. 1991, TI) Tamur Valley, Mewa Khola, Topke Gola, 12500 ft. (Stainton 269, 14 May 1956, E, GH); loc. cit., c. 12000 ft. (Bear 8298, 7 July 1971, TI).

SIKKIM. Without precise locality, 12000-14000 ft. (Hooker f. s.n., P); (Anderson s.n., P); Kangpupchuthang, 16000 ft. (Ribu & Rhomoo 5228, 6 Sept. 1911, E); Jongri (collector unknown 417, June 1882, GH); loc. cit., 14000 ft. (Watt 5790, Aug. 1881, K, E); loc. cit., 4000-4200 m (Hara et al. 2645, 21 May 1960, TI); along the Choktsering Chu, N of Jongri, 4000-4500 m (Hara et al. 2644, 25 May 1960, TI).

BHUTAN. Ha Valley, 10000 ft. (Ludlow & Sherriff 64, 8 June 1933, E); Yale La - Shodu, 3800-4600 m (Kanai et al. 3286, 23 May 1967, TI); Laya, upper Mo Chu, 11500 ft. (Ludlow, Sherriff & Hicks 16436, 6 June 1949, E, L); Changsethang (Mangde Chu), 14000-14500 ft. (Ludlow & Sherriff 3405, 8 July 1937, E); Marlung, Tsampa, 14500 ft. (Ludlow, Sherriff & Hicks 19422, 13 July 1949, E); Kantanang, Tsampa, 13000 ft. (Ludlow, Sherriff & Hicks 19067, 7 June 1949, E); Champa Pumthang, 12000 ft.

(Cooper 4004, 19 June 1915, E).

TIBET. Jelep La - Yatung, 12000 ft. (Gauld 2024, 30 May 1939, E); Phari (Dungboo s.n., July 1879, K, E); loc. cit., 14000 ft. (Cave s.n., 24 Oct. 1916, E, GH); Chumbi, Chingra (Dungboo s.n., 7 July 1878, K); Tassi Chu (King's collector 480, 16 June 1884, P); Jilung, 3800 m (Wu et al. 75-618, 5 July 1975, PE).

E HIMALAYA. Kokling, 14000 ft. (Ribu & Rhomoo 910, 12 Aug. 1913, E); Megu, 14000 ft. (Ribu & Rhomoo 6465 in 1913, E); Yampung, 13000 ft. (Cave s.n., 1 Sept. 1919, E).

3. *Potentilla stenophylla* (Franch.) Diels

3a. var. *stenophylla*

CHINA. YUNNAN: without precise locality (Delavay 105, 4 Aug. 1884, P); (Delavay 747, 25 Sept. 1884, P); (Forrest 28559, E); (Forrest 30836, E); (Kingdon-Ward 4206, E); Io-chan, 3400 m (Maire s.n., P, E); Bei-ma Shan, 28 12'N, 12000 ft. (Forrest 14679, Aug. 1917, E); upper Kiukiang Valley, (Clulung) Thugum, 4300 m (Yü 19799, 8 Aug. 1938, E); Sila, 4000 m (Yü 22737, 29 Sept. 1938, PE); A-tun-tze, 15000 ft. (Kingdon-Ward 34, July 1911, E); Huann-fu-ping, A-tun-tze, 3400 m (Wang 69040, Aug. 1935, PE); loc. cit. 3500 m (Wang 69051, Aug. 1935, PE, GH); Dokeria, A-tun-tze, 3100 m (Wang 64964, 3-5, Aug. 1935, GH); mountains of Hung-po, west of Tung-chu-ling, overlooking Mekong, and west of Pei-ma shan, 15000 ft. (Rock 22905, May-June 1932, GH, E); Bai-mar-shan, A-tun-tze, 3400 m (Wang 69578, Sept. 1935, PE); Weihsi, Wungehuling, Nankung, 3900 m (Yü 8840, 11 July 1937, PE, GH); loc. cit., N of Tungchu-ling, 4100 m (Yü 10633, 6 Nov. 1937, E); Chungtien, Lichiashica, 3600 m (Yü 10982, 17 Nov. 1937, E); loc. cit., Pica, 3200 m (Yü 11935, 5 July 1937, PE); loc. cit., Juatze, 3600 m (Yü 12263, 19 July 1937, PE); loc. cit., Kongsinshu, 3400 m (Yü 11754, 24 June 1937, PE); W frank of Haba Snow Range (Feng 1377, 23 June 1939, GH); Haba - Dugwantsun, Dschungdien (Chungtien), 4050 m (Handel-Mazzetti 6878, 22 June 1915, E); Likiang Hsien, 2700 m (Wang 71691, July 1935, PE, GH); Likiang River divide, 12000 ft. (Kingdon-Ward 4083, 15 June 1921, E); Likiang, 3600 m (Forrest 1960, 20 June 1914, K); western frank of the Likiang Range, 27 20'N, 13000-14000 ft. (Forrest 5806, June 1910, E, P); NW Likiang, I-chi (Ching 20974, 3 July 1939, B); eastern frank of the Likiang Range, 27 20'N, 12000-13000 ft. (Forrest 5884, June 1910, E, P); loc. cit., 11000-12000 ft. (Forrest 2924, Sept. 1906, E); eastern frank of Likiang Snow Range, Yangtze watershed, 15000 ft. (Rock 4202, 30 May-6 June 1922, E); loc. cit. (Rock 4984, May-Oct. 1922, US, E); loc. cit. (Rock 5000, May-Oct. 1922, E); loc. cit. (Rock 9431, June 1923, E, GH, K, P, US). **SICHUAN:** Mt. Mitzuga, W of Muli Gomba, 4300 m (Rock 16181, June 1928, GH, US); Mu-li, Ghwa-to, 4000 m (Yü 7413, 27 July 1937, PE); Kaushu shan - Leirong, SE of Muli, 14000 ft. (Rock 24084, May-July 1932, GH, E, B); Konkaling, Snow Range, 4000 m (Yü 13133, 2 Sept. 1937, PE, GH, E); Mt. Konka, Risonquembra, Konkaling, 5050-5250 m (Rock 16410, June 1928, GH, E, US); Hi-ma-la, Tsa-wa-rung, 3800 m (Wang 65654, Aug. 1935, PE, GH); loc. cit., 3700 m (Wang 65673, Aug. 1935, PE, GH).

3b. var. emergens Card.
SIKKIM. Kunkola, 15000 ft. (Hooker f. s.n., 21 Aug. 1849, K).
TIBET. 15000 ft. (Younghusband s.n., 5 July 1903, E).
CHINA. SICHUAN: without precise locality, 10000-13000 ft.
(Wilson 3461, July 1903, P, BM); (collector unknown 1927, 29
June 1973, PE); Mu-li, Wa-chin, Hoo-shan, 3900 m (Yü 6573, 22
June 1937, PE, A); loc. cit., Jin-chang (Yü 14580, 20 Oct.
1937, GH, BM); loc. cit., Ching-chang, 5750 m (Yü 6518, 21
June 1937, PE); loc. cit., Wa-ti, 3800 m (Yü 6421, 19 June
1937, PE, GH); loc. cit., Deongomba, 3900 m (Yü 6211, 14 June
1937, PE); Mu-li, Ku-lu, 3600-4000 m (Yü 7097, 15 July 1937,
PE, GH); Kiu-lung, Metikonga, Tsangpi, 4000 m (Yü 6792, 5 July
1937, PE, KUN); Kangting-hsien, Ta-pao-shan, 2900-3280 m (Liu
1123, 17 Aug. 1934, ??); loc. cit. 3140 m (Liu 859, 24 July
1934, PE); loc. cit., 3200 m (Liu 911, 26 July 1934, PE);
Kangting (Tachienlu) distr., Yulingkong, c. 3600 m (Smith
10668, 22 July 1934, BM, GH, PE); loc. cit., Tapaoshan, c.
4000 m (Smith 12757, 4 Oct. 1934, BM); Tatsienlu (Soulié 539
in 1893, P); loc. cit. (Soulié 893 in 1893, P); loc. cit.
(Soulié 2291 in 1893, P); loc. cit. (Mussot 110 in 1897, P);
loc. cit. (McLaren's collector ACL in 1938, P, E); loc. cit.
(Potanin 303, 18 July 1893, DR); loc. cit. (Potanin s.n., 18
July 1893, DR); Kiala, Tongolo (Soulié 88 & 91, July-Aug.
1891, P); loc. cit. (Soulié 659 in 1893, P); loc. cit.,
Kaplaho (Soulié 2548 in 1894, P); Suhgnan, c. 3600 m (Smith
2563, 9 July 1922, GH, E, NY); Recre, 14800 ft. (Wilson 3462,
7 June 1904, GH).
E HIMALAYA. Temu La, 16000 ft. (Lepcha 377, 12 Sept. 1912, E,
GH).

3c. var. taliensis (W. W. Smith) H. Ikeda et H. Ohba
CHINA. YUNNAN: without precise locality (Delavay 747, 4 Aug.
1884, P); 4000 m (Delavay s.n., 19 Aug. 1887, P); (Delavay
s.n., GH); (Forrest 30875 in 1931, E, BM, TI); Yanbi County,
Dashr Chan, western slope of Dianchang Shan, 3100-3900 m (Kato
et al. 337, 23 July 1988); Dali Xian, near the summit of
Dianchang Shan mountain range, vicinity of Yinglofeng Peak, W
of Dali city, 25°42'N 100°05'E, c. 3900 m (Bartholomew et al.
1032, 11-12 July 1984, GH, E, TI); Tali Range, 25°40'N,
10000-11000 ft., (G. Forrest 7017, Aug. 1910, E, K); Ta-li-
Hsien, 4000 m (Tsai 53985, 31 July 1933, PE, GH); Tali, Cang
Shan (Ching 25019, 8 Oct. 1939, PE); loc. cit., Cang Shan Xi
Matang (Liou 22390 & 22402, 31 Oct. 1946, PE); loc. cit., Cang
Shan (Wu et al. 1538, 31 May 1955, PE).

3d. var. cristata (Fletcher) H. Ikeda et H. Ohba
BURMA. N BURMA: Moku-ji Pass, 12200 ft. (Farrer 1803, 4 Aug.
1920, E).

4. Potentilla turfosa Hand.-Mazz.

4a. var. turfosa
TIBET. Chianang, Langong, 28°48'N 93°42'E, 13500 ft. (Ludlow,
Sherriff & Taylor 3950, 4 June 1935, BM); Adung Valley, 28°20'N
97°40'E, 14000-15000 ft. (Kingdon-Ward 9915, 8 Aug. 1931, BM);
Mo Tuo, Nage - Daxong La, 3900 m (Qinghai-Xizang Exped. 74-
3880, 1 Aug. 1974, PE).

CHINA. YUNNAN: Gongshan, 3600 m (Yü 22231, 8 Aug. 1938, PE); Taron-Taru Divide, Valley of Bucahwang, 2600 m (Yü 20099, 3 Sept. 1938, PE, E); Kiukiang Valley, (Taron), Monting, 1350 m (Yü 20199, 10 Sept. 1938, KUN).

4b. var. gracillima (Yü et C. Li) H. Ikeda et H. Ohba
TIBET. Bomi, 4200 m (Ying & Hung 1180, PE); Mo Tuo (Qinghai-Xizang Exped. Veg. 3264, 17 Sept. 1974, PE); loc. cit., Na Ge - Daxong La, 3800 m (Qinghai-Xizang Exped. 74-3893, 1 Aug. 1974, PE).

5. Potentilla turfosoidea H. Ikeda et H. Ohba

NEPAL. E NEPAL: Arun Valley, Barun Khola, N of Num, 12500 ft. (Stainton 620, 12 June 1956, E, GH); Koshi Zone, Sankhuwa Sabha Distr., around Cha Ding Kharka, 3970 m (Minaki et al. 9080302 & 9080303, 9 Aug. 1990, TI); loc. cit., Cha Ding Kharka - Sipton Pass (Keke La) - Khongma (Kauma), 4000 m (Suzuki et al. 8882822, 30 July 1988, TI); loc. cit., 3510-4127 m (Minaki et al. 9080150 & 9080164, 5 Aug. 1990, TI); loc. cit., Kongma (Kauma) - Numbuk (Mumbuk), 3500-4070 m (Suzuki et al. 8880575, 17 July 1988, TI); loc. cit., around Kongma (Kauma), 3500 m (Suzuki et al. 8880570, 16 July 1988, TI); loc. cit., Khongma (Kauma) - Tashi Gaun (Tashigaon), 2160-3500 m (Suzuki et al. 8880822, 31 July 1988, TI).

6. Potentilla makaluensis H. Ikeda et H. Ohba

NEPAL. E NEPAL: Koshi Zone, Sankhuwa Sabha Distr., around Cha Ding Kharka, 3970 m (Minaki et al. 9080216, 7 Aug. 1990); loc. cit., Shipton Pass, 4120 m (Suzuki et al. 8880826, 30 Jul. 1988, TI); loc. cit., Khongma - Siptong Pass (Keke La) - Cha Ding Kharka, 3510-4127 m (Minaki et al. 9080155 & 9080159, 5 Aug. 1990, TI).

7. Potentilla glabriuscula (Yü et C. Li) Soják

7a. var. glabriuscula
NEPAL. E NEPAL: Arun Valley, Barun Khola, N of Num, 12500 ft. (Stainton 545, 7 June 1956, BM, E, GH); Koshi Zone, Sankhuwa Sabha Distr., around Cha Ding Kharka, 4500 m (Minaki et al. 9080330, 11 Aug. 1990, TI); loc. cit., Shipton Pass, 4190 m (Minaki et al. 9080223, 9 Aug. 1990, TI); loc. cit., Khongma - Siptong Pass (Keke La) - Cha Ding Kharka, 3510-4127 m (Minaki et al. 9080160 & 9080167, 5 Aug. 1990, TI); loc. cit., Tashi Gaun - Bhainsi Kharka, 2150-2560 m (Minaki et al. 9080105, 3 Aug. 1990, TI); loc. cit., Jaljale Himal, Jaljale - Tin Pokhari, 4030-4130 m (Ohba et al. 9153242b, 22 July 1991, TI); loc. cit., Jaljale Himal, around Banduke, 4400 m (Ohba et al. 9130157, 29 July 1991, TI).

SIKKIM. Without precise locality, 12000-14000 ft. (Hooker f. s.n., E); Nangma Pass, Llonok, 16000 ft. (Smith & Cave 2254, 8 Aug. 1909, E).

BHUTAN. Narim Thang, 13500 ft. (Ludlow, Sherriff & Hicks 21361, 27 July 1949, BM, E); Adung Valley, 28°20'N 97°40'E,

14000 ft. (Kingdon-Ward 9856, 26 July 1931, BM).

TIBET. Za Yu Xian, 4200 m (Qinghai-Xizang Exped. 73-1127, 13 Aug. 1973, PE); Mo Tuo Xian (Ecology-High Mts. Team 14765, 2 Sept. 1980, PE); Mo Tuo Xian, Nage - Daxong La, 3800 m (Qinghai-Xizang Exped. 74-3893, 1 Aug. 1974, PE).

CHINA. YUNNAN: upper Kiukiang Valley (Clulung), Tsugum, 4300 m (Yü 19788, 8 Aug. 1938, PE, E); Mekong-Salwin Divide, Sila, 3800 m (Yü 22265, 10 Aug. 1938, E); Schondsula, between Landsang-djiang (Mekong) and Lu-djiang (Salween), 28°06'N, 4175 m (Handel-Mazzetti 9685, 4 Aug. 1916, E, K).

7b. var. oligandra (Soják) H. Ikeda et H. Ohba

TIBET. Doshong La, 13500 ft. (Ludlow, Sherriff & Elliot 14362, 16 Aug. 1947, BM, E).

8. Potentilla peduncularis D. Don

8a. var. peduncularis

NEPAL. Balu Gang (Nand s.n., 12 July 1937, E). W NEPAL: Thakurji Lekh, S of Jumla, 13000 ft. (Stainton Sykes & Williams 4800, 20 July 1952, E, GH). C NEPAL: without precise locality (Dhwoj 74 in 1928, E); (Dhwoj 199 in 1929, E); (Kanai et al. s.n., 11 Sept. 1970, TI); Michet, 13000-14500 ft. (Wigram 137, 16 Sept. 1927, E, K); Larjung, S of Tukucha, Kali Gandaki, 10000 ft. (Stainton Sykes & Williams 1949, 23 July 1954, E, GH); Annapurna Himal, Seti Khola, 12500 ft. (Stainton, Sykes & Williams 6570, 2 Aug. 1954, E); Rambong, Lamjung Himal, 12000 ft. (Stainton Sykes & Williams 5980, 28 June 1954, E, GH, P); above Sauwala Khola, 12500 ft. (Stainton, Sykes & Williams 4390, 13 Sept. 1954, E, GH); Cotiola - Gadje, 3540 m (Kanai & Malla 67810, 25 Aug. 1969, TI) Gosainkund (Minaki et al. 9081017, 22 Sept. 1990, TI); Khare Khola, Bitta Kharka - Patale Pokhari, 3300-4100 m (Ohba et al. 8331979, 12 Sept. 1983, TI); loc. cit., Patale Pokhari - Phedi Kharka, 2100-4000 m (Ohba et al. 8351493, 13 Sept. 1983, TI). E NEPAL: Mount Everest Expedition, 14000 ft. (Wollaston 69, Aug. 1921, K); Jak Jor, 11000-13000 ft. (Dhwoj 41 in 1930, E); Dubikharka - Baula Pokhari, 3720-4000 m (Ohba et al. 8530183, 8530199, 9 July 1985, TI); Baula Pokhari - Chhu Ningma, 3960-4100 m (Ohba et al. 8530239, 11 July 1985, TI); Sagarmata Zone, Solukhumbu Distr., Thosa Kharka - Beni Kharka (Dambuk), 3670-4350 m (Ohba et al. 8581085B, 22 Aug. 1985, TI); Koshi Zone, Sankhuwa Sabha Distr., Ta Dasa - Merek (Mera), 3900-4450 m (Suzuki et al. 8820765, 21 July 1988, TI); loc. cit., Phemathang Kharka - Cha Ding Kharka, 3750 m (Suzuki et al. 8880766, 29 July 1988, TI); loc. cit., Cha Ding Kharka, 4000 m (Suzuki et al. 8880802, 30 July 1988, TI); loc. cit., 3970 m (Minaki et al. 9070198, 9 Aug. 1990, TI); loc. cit., around Cha Ding Kharka, 3970 m (Minaki et al. 9080169, 9080202A, 9080206 & 9080207, 6-9 Aug. 1990, TI); loc. cit., Siptong Pass (Keke La) - Sano Pokhari, 3930-4127 m (Minaki et al. 9080352, 12 Aug. 1990, TI); loc. cit., Cha Ding Kharka - Siptong Pass (Keke La) - Khongma, 3510-4127 m (Minaki et al. 9080356 & 9080366, 12 Aug. 1990, TI); loc. cit., 3510-4127 m (Minaki et al. 9080151, 5 Aug. 1990, TI); loc. cit., Khongma (Kauma) - Numbuk (Mumbuk), 3500-4070 m (Suzuki et al. 8880603,

17 July 1988, TI); loc. cit., around Khongma (Kauma), 3500 m (Suzuki et al. 8880568, 16 July 1988, TI); loc. cit., Jaljale Himal, Khokling - Jaljale, 3420-4030 m (Ohba et al. 9135074, 21 July 1991, TI); loc. cit., Jaljale - Tin Pokhari, 4030-4170 m (Ohba et al. 9130084, 22 July 1991, TI); loc. cit., around Tin Pokhari, 4130 m (Ohba et al. 9130094, 23 July 1991, TI); loc. cit., around Banduke, 4150 m (Ohba et al. 9130110, 9130152, 9130153, 9130178, 9130179 & 9130234, 26 July-2 Aug. 1991, TI); Banduke Pokhari (Duo Tulo Pokhari) - Saju Pokhari, 4100 m (Kanai et al. 720512, 15 June 1972, TI); Koshi Zone, Sankhuwa Sabha Distr., Jomle - Goja, 4000-4190 m (Ohba et al. 9130241 & 9130244, 5 Aug. 1991, TI); loc. cit., Shuwan Kharaka (near Panch Pokhari) - Topke Gola, 3570-4360 m (Ohba et al. 9130302A, 7 Aug. 1991, TI); loc. cit., Topke Gola - Bomrang, 3570-4550 m (Ohba et al. 9130329, 9 Aug. 1991, TI); Topke Gola, 3600 m (Kanai et al. 720551, 16 June 1972, TI); loc. cit., c. 12500 ft. (Beer 8263, 3 July 1971, TI); Thudam - Kipuphu, 3400-4500 m (Kanai et al. s.n., 26 June 1972, TI).
SIKKIM. Chu La (King's collector 4484, 5 Aug. 1877, P); Shaitanpokri, 12500 ft. (Cooper 771, 3 Sept. 1913, E); Mingbil, 14000 ft. (Cooper 910, 19 Sept. 1913, E); Shuthang - Jongri, 13300 ft. (Mitra 9606, 4 June 1954, TI); Jongri, 13000 ft. (Clarke 26190B, 15 Oct. 1875, K).
BHUTAN. Parshong, Timpu, 13000 ft. (Cooper 1966, 27 July 1914, E); Gafoo La, upper Pho Chu, 14500 ft. (Ludlow, Sherriff & Hicks 16766, 7 July 1949, E).
TIBET. Without precise locality (collector unknown 248 in 1884, E); Chumbi (Cooper 645, 24 Aug. 1913, E); Bomi, 3400-4000 m (Qinghai-Xizang Exped. 10082 in 1976, PE); Cona, 4800 m (Qinghai-Xizang Exped. 75/973, 12 Sept. 1975, PE); loc. cit., 4300-4600 m (Wu et al. 75-974, 18 July 1975, PE).

8b. var. vittata (Soják) H. Ikeda et H. Ohba
SIKKIM. Without precise locality (Hooker f. s.n. in 1849, K).
TIBET. Without precise locality, 11500 ft. (Ludlow, Sherriff & Elliot 13779, 27 May 1947, BM); Ba La, Pasum Chu, 14000 ft. (Ludlow, Sherriff & Elliot 13966, 22 June 1947, BM, E); Deyang La, 13500 ft. (Ludlow, Sherriff & Elliot 14296, 10 Aug. 1947, BM, E); Showa La, 9500 ft. (Ludlow, Sherriff & Elliot 13159, 13 June 1947, BM, E); Bomi (Qinghai-Xizang Exped. 10082 in 1976, PE).

8c. var. shweliensis (Fletcher) H. Ikeda et H. Ohba
CHINA. YUNNAN: Shweli-Salwin Divide, 25 30'N, 11000 ft., (G. Forrest 15929, July 1917, E); loc. cit., 25 25'N, 11000 ft. (G. Forrest 17513, July 1918, GH).

8d. var. stenophylloides H. Ikeda et H. Ohba
TIBET. Chichchar, Tsari, 14500-15000 ft. (Ludlow & Sherriff 2152, 13 June 1936, E); Kongbo, Lusha Chu, 29°20'N 94°35'E, 14000 ft. (Ludlow, Sherriff & Taylor 3956, 4 June 1938, E); loc. cit., 12000 ft. (Ludlow, Sherriff & Taylor 4759, 9 June 1938, E); loc. cit., 12500 ft. (Ludlow, Sherriff & Taylor 4722, 10 June 1938, E); Chawchi Pass, 12800 ft. (R. F. 1888, 30 Aug. 1920, E); Uying Chi Xian, 4800 m (Qinghai-Xizang Exped. 3408, 26 Sept. 1974, PE); Bomi Xian, 95°30'E 29°55'N,

4250 m (Ying & Hong 651012, 23 Aug. 1965, PE); Uying Chi Xian, 4800 m (collector unknown 3203, 12 June 1972, PE).

CHINA. YUNNAN: upper Kiukiang Valley (Clulung), S of Lungtsahmuru, 3900 m (Yü 19875, 10 Aug. 1938, PE, GH, E); loc. cit., Tsugum, 4300 m (Yü 19799, 8 Aug. 1938, PE, GH); loc. cit., 3800 m (Yü 19759, 7 Aug. 1938, PE, GH, E); Salwin-Kiuchiang divide, 28°40'N 98°15'E (Forrest 19301, Oct. 1919, E); Mt. Kenichunpo, Salwin and Irrawady divide, 14000 ft. (Rock 21971, May-July 1932, GH, E, US, NY); Mt. Kenichunpo, W of Champutong, upper Salwin River, 14500 ft. (Rock 22523, Oct. 1932, GH, E); Dokerla, A-tun-tze, 3100 m (Wang 64967, 3-5 Aug. 1935, PE); Atuntze, Paimashan, Sanyungpa, 4150 m (Yü 9276, 29 July 1937, PE, GH); Bai-mar-shan, A-tun-tze, 3400 m (Wang 69578, Sept. 1935, GH); Huann-fu-ping, A-tun-tze, 3700 m (Wang 68748, 68818, 68864, Aug. 1935, PE, GH); loc. cit., 3600 m (Wang 69040, Aug. 1935, GH); Lung-pan-la Champu-tung, 3500 m (Wang 67068, Oct. 1935, GH); Mts. Tjonatong, upper Salwin River (Rock 22321, June-July 1932, GH, E, NY, US); Tsarung, Mt. Wuli-la, E of Salwin River, N of Alulaka (Rock 22420, June-July 1932, GH, E, NY, US); Fuchuan range, W of Mekong-Salwin divide, W of Wei-hsi, 14500-15000 ft. (Rock 23281, Aug.-Sept. 1932, GH, E, US, NY); Mekong-Salwin Divide, Sewalongba, 3400 m (Yü 22563, 28 Aug. 1938, GH, E); loc. cit., Sila, 4000 m (Yü 22348, 22759, 3 Oct. 1938, GH, E); Weihsi, N of Tungchuling, 4000 m (Yü 10655, 8 Nov. 1937, GH); loc. cit., 4100 m (Yü 10633, 6 Nov. 1937, GH); loc. cit., 4100 m (Yü 10633, 6 Nov. 1937, GH, E); Wei Hsi, Ma K7a Ho (MacLaren's collector 151D, 5 April 1933, E); Tsekou (Soulié s.n., E, K); loc. cit. (Soulié 1147, GH); loc. cit. (Soulié 1247 in 1899, P); loc. cit. (Manberg s.n., K).

9. *Potentilla contigua* Soják

NEPAL. C NEPAL: without precise locality (Dhwoj 10 in 1928, E, TI); (Dhwoj 198 in 1928, E); Michet, 13000-14500 ft. (Wigram 137, 16 Sept. 1927, E); Annapurna Himal, Seti Khola, 13500 ft. (Stainton, Sykes & Williams 8614, 14 Sept. 1954, E); above Sauwala Khola, 12500 ft. (Stainton, Sykes & Williams 2987, 5 June 1954, E, GH); Rambrong, Lamjung Himal, 13500 ft. (Stainton, Sykes & Williams 6106, 3 July 1954, US); Oo Kharka - Mul Kharka, 3700 m (Kanai & Shakya 672193, 1 July 1970, TI); Langtang, Pangsang Lekh, 3750 m (Miehe & Miehe 2171, 21 May 1986, BM); loc. cit., 3700 m (Miehe & Miehe 2392, 26 May 1986, BM); loc. cit., Schabru, 4400 m (Miehe & Miehe 14706, 24 Oct. 1986, BM); loc. cit., 4040 m (Miehe & Miehe 14748a, 23 Oct. 1986, BM); loc. cit., 4160 m (Miehe & Miehe 14802, 24 Oct. 1986, BM); loc. cit., Schattlang, Schabru, 4150 m (Miehe & Miehe 14818, 25 Oct. 1986, BM); loc. cit., Dokamhe, SE Schabru Kedo, 3970 m (Miehe & Miehe 1223, 28 Apr. 1986, BM); loc. cit., Naukunda Lekh, 4050 m (Miehe & Miehe 9150, 16 Aug. 1986, BM); loc. cit., 3970 m (Miehe & Miehe 9181, 16 Aug. 1986, BM); Gosainkund, 4100 m (Matsumura s.n., 5 June 1968, TI); loc. cit., 4000-4400 m (Hara et al. 721895, 24 Aug. 1972, TI); above Gosainkunde, 4500 m (Maser 214, 7 June 1967, US); Bagmati Zone, Rasuwa Distr., Gosainkund - Gopte, 3350-4300 m (Suzuki & Noshiro 541067, 2 June 1985, TI); Langtang, Surdscha Kund, 4270 m (Miehe & Miehe 8496 & 8472, 10 Aug. 1986, BM);

loc. cit., 4660 m (Miehe & Miehe 8509, 13 Aug. 1986, BM); Gadkje - Surja Kund, 4200 m (Malla & Kanai 674872, 26 Aug. 1969, TI); loc. cit., Tangsep, 4250 m (Miehe & Miehe 10795, 4 Sept. 1986, BM); loc. cit., 4580 m (Miehe & Miehe 10632, 4 Sept. 1986, BM); loc. cit., NW Malemchi, 4340 m (Miehe & Miehe 16432, 20 Nov. 1986, BM); loc. cit., Dupku Danda, 4200 m (Miehe & Miehe 7200, 7539 & 7544, 29-31 July 1986, BM); loc. cit., 3950-4000 m (Miehe & Miehe 7238, 30, 31 July 1986, BM); loc. cit., 3960 m (Miehe & Miehe 7500, 1 Aug. 1986, BM); Bagmati Zone, Sindhu Palchok Distr., S of Ganja La, 4100 m (Nicolson 2635, 26 Sept. 1966, US); Langtang, Yurung and Gatshe (Miehe & Miehe 8259, 9 Aug. 1986, BM); Thyangbooha, 4000 m (Zimmermann 656, 4 June 1952, E). **E NEPAL:** Rolwaling, 27°55'N 86°23'E, 12500 ft. (Stanton 4678, 25 June 1964, TI); Jata Pokhari - Panch Pokhari, 4220-4600 m (Ohba et al. 8530306, 16 July 1985, TI); Jata Pokhari, 14000-15000 ft. (Dhwoj 632 in 1930, E); Tangba, 14000-15000 ft. (Dhwoj 221 in 1930, E, TI); Thare Og - Phedi Kharka, 4150 m (Ohba 8530520-bis, 26 July 1985, TI); Yalung Kharka - Pam Lhang, 4300-5300 m (Ohba et al. 8351381 & 8351382, 8 Sept. 1983, TI); Muzu Khola of Inchu Khola (Inukhu Khola), Dudh Kosi (valley), 12000 ft. (Lyon 2057, 18 June 1964, TI); Khumbu, Khumbila, above Kunde, c. 14000 ft. (Schilling 1002, 1 Aug. 1966, TI); Arun valley, Kasuwa Khola, N of Num, 12500 ft. (Stanton 538, 5 June 1956, E, GH); Koshi Zone, Sankhuwa Sabha Distr., Ta Dasa - Merek (Mera), 3900-4450 m (Suzuki et al. 8820766, 21 July 1988, TI); loc. cit., around Cha Ding Kharka, 3970 m (Minaki et al. 9080202B, 9080203, 9080204 & 9080205, 7 Aug. 1990, TI); loc. cit., Cha Ding Kharka - Siptong Pass (Keke La) - Khongma (Kauma), 3900 m (Suzuki et al. 8880807, 30 July 1988, TI); loc. cit., 3510-4127 m (Minaki et al. 9080157, 5 Aug. 1990, TI); loc. cit., Milke Danda, Gidde - Khokling, 3420-3500 m (Ohba et al. 9130072, 20 July 1991, TI); loc. cit., Khokling - Jaljale, 3420-4030 m (Ohba et al. 9136074, 21 July 1991, TI); loc. cit., Jaljale Himal, Jaljale - Tin Pokhari, 4030-4170 m (Ohba et al. 9130083, 22 July 1991, TI); loc. cit., Jaljale Himal, around Tin Pokhari, 4130 m (Ohba et al. 9130093 & 9130095, 23 July 1991, TI); loc. cit., Tin Pokhari - Banduke, 4130-4150 m (Ohba et al. 9130105, 24 July 1991, TI); loc. cit., around Banduke, 4150 m (Ohba et al. 9130194, 1 Aug. 1991, TI); loc. cit., 4150 m (Ohba et al. 9130225 & 9130233, 2 Aug. 1991, TI); loc. cit., Jomle - Goja, 4100 m (Ohba et al. 9130239 & 9130240, 5 Aug. 1991, TI); loc. cit., Goja - Shuwan Kharka (near Panch Pokhari), 4080 m (Ohba et al. 9130284, 6 Aug. 1991, TI); loc. cit., Shuwan Kharka (near Panch Pokhari) - Topke Gola, 3570-4360 m (Ohba et al. 9130301, 9130303 & 9130306, 7 Aug. 1991, TI); Topke Gola, 3600 m (Kanai et al. 16 June 1972, TI); loc. cit., Topke Gola - Bomrang, 3570-4550 m (Ohba et al. 9130330, 9 Aug. 1991, TI); loc. cit., Bomrang - Singoa Kharka, 4140-4630 m (Ohba et al. 9130317, 10 Aug. 1991, TI); loc. cit., Singoa Kharka - Pahakhola, 3900 m (Ohba et al. 9130345 & 9130346, 11 Aug. 1991, TI); Ghopte (Tal Pokhari) - Gosa (near Kobche), 3500-4100 m (Kanai et al. s.n., 13 June 1972, TI); Gosa (near Kobche), 4100 m (Kanai et al. 720391, 14 June 1972, TI); Chairam, 27°33'N 87°58'E, 12500 ft. (Williams 885, 23 June 1969, TI).

SIKKIM. Without precise locality, 12000 ft. (Cutting & Vernay 24A, 3 Aug. 1935, GH); (Thomson s.n. in 1857, L, DR); (Gammie s.n. in 1892, P); Singalila Ridge, Phedup, c. 4200 m (Rai 361, 24 Sept. 1981, B); Migotang, 3900 m (Hara et al. 2623, 31 May 1960, TI); Megu, 13000 ft. (Ghose & Co. s.n., Aug. 1938, GH); Gamotang - Migotang, 3800-3900 m (Hara et al. 2619, 30 May 1960, TI); Jongri - Gamotang, 4200-3600 m (Hara et al. 499, 26 May 1960, TI); Jongri, 4200 m (Hara et al. 447, 22 May 1960, TI, GH); along the Choktsering Chu, N of Jongri, 4000-4500 m (Hara et al. 479, 25 May 1960, TI, GH); loc. cit. (Hara et al. 486, 25 May 1960, TI); Jongri - Olotang, 3900 m (Hara et al. 2621, 23 May 23, 1960, TI); Lingtu, 12000 ft. (Cave s.n., 24 Sept. 1923, E, GH); Zemu and Lhonakh valleys, Yeumthang, 13000 ft. (Cave s.n., 13 Sept. 1947, E); Lachen, 12000 ft. (Hooker f. s.n., 10 June 1849, K, L, P, GH); Yakla, 14000 ft. (Clarke 9787, 17 Oct. 1869, K); Changu, 13000 ft. (Cooper 54, 28 June 1913, E); loc. cit., 12000 ft. (Cooper 958, 27 Sept. 1913, E); loc. cit., 12000 ft. (Cave s.n., 24 Oct. 1916, E, GH); Sherabthang, 13000 ft. (Cooper 572, 22 Aug. 1913, E); Kupup, 13000 ft. (Burt 246, 2 Sept. 1935, E); Nijan (King's collector s.n. in 1888, L); Pheonp, 13500 ft. (Ribu & Rhomoo 6386 in 1913, E); Gampung, 14000 ft. (Ribu & Rhomoo 848, 12 Aug. 1913, E); Chumbi, Bue-tung (Dungboo s.n., 8 July 1878, K); Gampoong, 14000 ft. (Herb. Watt 5458, 30 May 1881, E, B).

BHUTAN. Parshong, Timpu, 13000 ft. (Cooper 3010, 28 Sept. 1914); Phajudin (Cooper 4772, E); Timpu, 13000 ft. (Cooper 3525, 4 Oct. 1914, E); Loona, Pho Chu, 12500 ft. (Ludlow, Sherriff & Hicks 16624, 25 June 1949, E); Pangotang, Tsampa, 12000-14500 ft. (Ludlow, Sherriff & Hicks 19739, 13 Sept. 1949, E, BM); Kantanang, Tsampa, 12500 ft. (Ludlow, Sherriff & Hicks 19061, 5 June 1949, E); Rodu La, 10000-12000 ft. (Ludlow & Sherriff 281, 19 July 1933, BM, E); Shingbe (Me La), 12000-14500 ft. (Ludlow, Sherriff & Hicks 20316, 5 June 1949, E); Tashigang, Kurted, 12000 ft. (Cooper 4548, 23 Aug. 1915, E); Sakden, 12500 ft. (Ludlow & Sherriff 626, 7 July 1934, BM); Setifree, c. 13000 ft. (Gould 430, 10 June 1938, K); Choidi Ponkay - Saka La, 9000-12000 ft. (Gould 1034, 13 July 1938, K).

TIBET. Chang Tang Tibet (Nepal border) (Nand s.n., 9 June 1937, E); Rel de Tibet (Nepal frontier) (Nand s.n., 25 June 1937); Balugang (Nand s.n., 17 July 1937, E); Yadong, 3600 m (Cheng 2448, 22 May 1964, PE).

CHINA. SICHUAN: Tatsienlu (Mussot s.n., P).

PLACE UNKNOWN. (collector unknown s.n., DR).

10. Potentilla cardotiana Hand.-Mazz.

10a. var. cardotiana

CHINA. YUNNAN: without precise locality (Wang 993, July 1941, PE); (Montagne s.n., P); (Forrest 30356, E); (Delavay s.n., 26 June 1886, P); (Delavay s.n., E); upper Kiukiang Valley (Clulung Chialahuto), 3600 m (Yü 19731, 7 Aug. 1938, GH, E); Salwin-Kiukiang Divide, Tshuwang, 3100 m (Yü 20351, 17 Sept. 1938, GH, E); loc. cit., Parolaka, 3300-3600 m (Yü 20634, 11 Oct. 1938, GH, E); loc. cit., 3500 m (Yü 20675, 13 Oct. 1938, GH, E); Mekong-Salwin Divide, Londjrela, 3700 m (Yü 23255, 5

Oct. 1938, GH, E); loc. cit., 3900 m (Yü 23199, 2 Oct. 1938, GH, E); loc. cit., Suwalonba, 3400 m (Yü 22549, 27 Aug. 1938, GH, E); loc. cit., Sila, 3900 m (Yü 22139, 4 Aug. 1938, GH, E); loc. cit., behind Tzekou Mission (Forrest 158, 181, E); loc. cit., 28 18'N, 11000-12000 ft. (Forrest 13251, Sept. 1914, E); Tsekou (Soulié 1068 in 1895, P, E, K); loc. cit., 4200 m (Monberg 64, June 1912, P, E, GH); Atuntze, Dokeria, 3700-3900 m (Yü 7876, 5 Nov. 1937, GH, E); Dokeria - A-tun-tze, 3500 m (Wang 64919, 3-5, Aug. 1935, GH); Yundshi Mountains, 12500 ft. (Rock 23656, Aug.-Oct. 1932, GH, E, US); Mountains west of the Kaakerpo, Dokeria and Yundshi, 12500 ft. (Rock 23226, May-June 1932, GH, E, US); Degen Xian, Ci-zhong, 3800 m (Fey 5127, 5 July 1940, PE); Lu-kong Shan, Mekong Yangtze divide, 28 12'N, 14000 ft. (Forrest 14828, Sept. 1917, E); Wei-si Hsien, Yah-chih, 3600 m (Wang 68598, Aug. 1935, GH); Kang-pu, Wei-si Hsien, 3500 m (Wang 64609, July 1935, GH); Wei Hsi (MacLaren 162, E); Pi-lo-shan, Che-tse-lo, 4000 m (Tsai 58625, 15 Sept. 1934, GH); Che-tse-lo, 4000 m (Tsai 58290, 28 Aug. 1934, GH); Lan-ping Hsien, 3600 m (Tsai 53773, 17 Aug. 1933, PE, GH); Hia-lo-pin (Delavay 105, P); Lo-pin chan, 3200 m (Delavay s.n., 1 Sept. 1888, P, K); Tsang-Chan (Delavay s.n., 19 Aug. 1887, P); loc. cit. (Delavay s.n., GH); loc. cit., 4000 m (Delavay s.n., E, GH); loc. cit., 4000 m (Delavay 747, 4 Aug. 1884, P); Tali (Delavay s.n., GH); loc. cit. (MacLaren 89B, 20 March 1933, E); Tali Range, 25 40'N, 10000-12000 ft. (Forrest 4413, Aug. 1906, E, K, P); Lung-pan-la Champu-tung, 3500 m (Wang 67067, Oct. 1935, GH).

BURMA. Imau Bum, 12000 ft. (Kingdon-Ward 3378, 19 July 1925, E); Hpimew Ridge, 12200 ft. (Farres 1050, 24 June 1919, E); NE upper Burma, 26 23'N 98 48'E (Forrest 25013, Sept. 1924, E); Meku-ji Pass, 12200 ft. (Farres 1804, 4 Aug. 1920, E).

10b. var. *nepalensis* H. Ikeda et H. Ohba
NEPAL. E **NEPAL:** Koshi Zone, Sankhuwa Sabha Distr., Cha Ding Kharka - Siptong Pass (Keke La) - Khongma, 3800 m (Suzuki et al. 8880805, 30 July 1988, TI); loc. cit., 3510-4127 m (Minaki et al. 9080108 & 9080357, 5 & 12 Aug. 1990, TI).

11. *Potentilla tristis* Soják
INDIA. NW **INDIA:** Chychna Bhuaiik, 9500 ft. (Madden's collector 119, E); above Bhensui, a. 13000 ft. (Herb. Reid s.n., 16 Sept. 1885, E); Kumaon, Sumto Rahlam Pass, 15000 ft. (Chand 749, 17 June 1948, L).

NEPAL. C **NEPAL:** Tukucha, Kali Gandaki, 12500 ft. (Stainton, Sykes & Williams 7767, 11 Sept. 1954, E); Dhaulagiri Zone, Mustang Distr., Tukuche - Yak Kharka, 2590-3850 m (Suzuki et al. 8881646, 30 Aug. 1988, TI); loc. cit., 3650 m (Suzuki et al. 8881684, 1 Sept. 1988, TI); Chairogaon, N of Tukucha, 11500 ft. (Stainton, Sykes & Williams 835, 31 May 1954, E, GH); near Hinko cave, upper Kali Gandaki valley, 10000 ft. (Barclay & Synge 2282, 27 May 1971, K); above Sauwala Khola, 14000 ft. (Stainton, Sykes & Williams 3013, 5 June 1954, E, GH); Ganesh Himal, Shiar Khola, 13000 ft. (Gardner 495, 14 May 1953); Gosainkund, 4100 m (Kanai et al. 720391, 24 Aug. 1972, TI); Langtang, Surdsha Kunda, 4720 m (Miehe & Miehe 8986, 14

Aug. 1986, BM); loc. cit., Tangsep, 4730 m (Miehe & Miehe 10681, 4 Sept. 1986, BM); loc. cit., Ganja-La - Sudseite, 4920 m (Miehe & Miehe 6464, 24 July 1986, BM). **E NEPAL:** Koshi Zone, Sankhuwa Sabha Distr., Jaljale Himal, Goja - Shuwan Kharka (near Pansh Pokhari), 4150 m (Ohba et al. 9130260, 6 Aug. 1991, TI).

12. Potentilla commutata Lehm.

12a. var. commutata

INDIA. NW INDIA: Kashmir, Sangam Valley, 13000 ft. (Duthie 13550, 12 Aug. 1893, E); loc. cit., Badzulkad nala, 12000-13000 ft. (Duthie 13412, 1 Aug. 1893, F); Punjab, Kulu-Lahaul, Rotang (Drummond 22905, 12 July 1888, K); Lahaul, Rotang Pass, 13000 ft. (Bor 9904, 11 July 1941, E); loc. cit., Khokhsar, 13000 ft. (Koelz 767, 29 July 1930, NY); Mula Girdh, 12000-13000 ft. (Duthie s.n., 5 Aug. 1986, E). **NEPAL:** Without precise locality (Dhwoj 73 in 1928, E). **E NEPAL:** Iswa Khola, c. 15000 ft. (Beer 10028, 14 Aug. 1971, BM); Koshi Zone, Sankhuwa Sabha Distr., around Cha Ding Kharka, 3970 m (Minaki et al. 9080213, 9030214 & 9030221, 6-7 Aug. 1990, TI); loc. cit., Khongma - Siptong Pass (Keke La) - Cha Ding Kharka, 3510-4127 m (Minaki et al. 9080161, 5 Aug. 1990, TI); loc. cit., Khongma (Kauma) - Numbuk (Mumbuk), 3500-4070 m (Suzuki et al. 8880608, 17 July 1988, TI); loc. cit., Jaljale Himal, Jaljale - Tin Pokhari, 4030-4170 m (Ohba et al. 9130086, 22 July 1991, TI); loc. cit., Tin Pokhari - Banduke, 4130-4150 m (Ohba et al. 9130100 & 9130101, 24 July 1991, TI); loc. cit., around Banduke, 4150 m (Ohba et al. 9130118, 9130119, 9130181, 9130182 & 9130185, 26-30 July 1991, TI). **SIKKIM.** 15000 ft. (Hooker f. s.n., K, E, P); Yakla, 15000 ft. (Cooper 583, 23 Aug. 1913, E); Dobinda Pass, 15000 ft. (Cooper 338, 24 July 1913, E); Yampung, 13000 ft. (Cave s.n., 1 Sept. 1919, GH); Zeum Valley, 14000 ft. (Smith & Cave 1348, 13 July 1909, B).

12b. var. major H. Ikeda et H. Ohba

INDIA. NW INDIA: Kumaon, Barji Kangpah, 14700 ft. (Strachey & Winterbottom 18, K, P, GH). **NEPAL. E NEPAL:** Khimti Khola, 27°38'N 86°17'E, 13500 ft. (Stainton 4782, 10 July 1964, TI); Janakpur Zone, Ramechhap Distr., around Jata Pokhari, 4220 m (Ohba et al. 8580281, 13 July 1985, TI); Koshi Zone, Sankhuwa Sabha Distr., around Cha Ding Kharka, 3970 m (Minaki et al. 9080222, 8 Aug. 1990, TI); loc. cit., Jaljale Himal, Jaljale - Tin Pokhari, 4030-4170 m (Ohba et al. 9130085, 22 July 1991, TI); loc. cit., around Banduke, 4300 m (Ohba et al. 9130154 & 9130155, 29 July 1991, TI); loc. cit., 4150 m (Ohba et al. 9130183, 30 July 1991, TI); loc. cit., Shuwan Kharka (near Panch Pokhari) - Topke Gola, 4330 m (Ohba et al. 9130307, 7 Aug. 1991, TI); loc. cit., Topke Gola - Bomrang, 3570-4550 m (Ohba et al. 9130312 & 9130313, 9 Aug. 1991, TI). **SIKKIM.** Thanka La, 15000 ft. (Cooper 375, 30 July 1913, E); Tosa, 14500 ft. (Smith 4049, 2 Aug. 1910, E). **CHINA. SICHUAN:** Wen-chuan, Tsao-puh (Hu 2631A, Aug. 1942, GH); Kangting (Tachienlu) Distr., Tapaoshan, c. 4500 m (Smith

11479, 22 Aug. 1934, NY).

13. *Potentilla leuconota* D. Don

13a. var. *leuconota*

INDIA. NW INDIA: Doodootolee, 10000 ft. (Madden's collector 113, E, K); Garhwal, 11000-12000 ft. (Duthie s.n., Sept. 1885, DR); near Bhoniani, 11000-12000 ft. (Duthie 3980, 15 Sept. 1885, BM); above Bhawani, c. 12500 ft. (collector unknown s.n., 15 Sept. 1885, E).

NEPAL. (Brinkworth s.n., BM); (Wallich 33, BM). **W NEPAL:** Churchi Lekh, Lunsá - Murma, 12000 ft. (Polunin, Sykes & Williams 5140, 11 Aug. 1952, BM, E, GH). **C NEPAL:** above Banmagaon, 11000 ft. (Stainton, Sykes & Williams 3332, 1 July 1954, BM, E, GH, P); Mangan - Khodang Danda, 3200 m (Kanai et al. 722016, 28 Aug. 1972, TI); c. 5 km NW of Dobato, direction Gosainkund, 28°03'N 85°28'E, 3500-3800 m (de Haas 2182, 10 Aug. 1974, BM); near Bhuanjeng Garka, 28°01'N 85°30'E, 3300 m (de Haas 2168, 10 Aug. 1974, BM); Lukthang - Mogarcheko Danda, 3200-3400 m (Kanai et al. s.n., 27 Sept. 1970, TI) Tale Bisauna - Tingoang, 2750-3100 m (Kanai et al. s.n., 11 Sept. 1970, TI); Tingoang - Khosori Khahre, 1500-3100 m (Kanai et al. 674779, 12 Sept. 1970, TI); Chilime Kharka, c. 15000 ft. (Polunin 1161, July 1949, BM); Langtang, Schiabru, 3050 m (Miehe & Miehe 950, 19 Apr. 1986, BM); loc. cit., SE Schabru, 3860 m (Miehe & Miehe 14960, 27 Oct. 1986, BM); loc. cit., Tschadang, 3880 m (Miehe & Miehe 14623, 22 Oct. 1986, BM); loc. cit., Pangsang Lekh, 4000 m (Miehe & Miehe 10096a, 29 Aug. 1986, BM); loc. cit., Naukunda Lekh, 3250 m (Miehe & Miehe 9478, 9492, 18 Aug. 1986, BM); loc. cit., 3980 m (Miehe & Miehe 9321, 17 Aug. 1986, BM); Gosain Than (Wallich s.n., BM, K); Langtang, Dupku Danda, 3860 m (Miehe & Miehe 7468, 1 Aug. 1986, BM). **E NEPAL:** Janakpur Zone, Ramechhap Distr., Deorali - Serdingma, 2700-3400 m (Ohba et al. 8530108, 6 July 1985, TI); loc. cit., Koshing Kharka - Thare Og, 4000-4150 m (Ohba et al. 8530414, 22 July 1985, TI); Lamjura, c. 10000 ft. (Banerji 1847, 20 July 1966, GH); loc. cit. (Banerji & Shakya 5520, 21 July 1966, US); Sagarmata Zone, Solukhumbu Distr., Thosa Kharka - Beni Kharka (Dambuk), 3670-4350 m (Ohba et al. 8581085A, 22 Aug. 1985, TI); Everest region, near Dole, 4150 m (Miehe 974, 11 Sept. 1982, BM); Koshi Zone, Sankhuwa Sabha Distr., around Merek (Mera), 4450 m (Suzuki et al. 8880685, 25 July 1988, TI); loc. cit., Ta Dasa - Muzek (Mera), 3900-4450 m (Suzuki et al. 8880666, 21 July 1988, TI); loc. cit., Yangri Kharka - Ta Dasa, 3700 m (Suzuki et al. 8880650, 20 July 1988, TI); loc. cit., 3850 m (Suzuki et al. 8880659, 20 July 1988, TI); loc. cit., around Yangri Kharka, 3500 m (Suzuki et al. 8860274, 19 July 1988, TI); loc. cit., Ta Dasa - Pheathing Kharka (Tematan Kharka), 3700 m (Suzuki et al. 8880762, 28 July 1988, TI); loc. cit., Cha Ding Kharka - Siptong Pass (Keke La) - Khongma (Kauma), 3500-4120 m (Suzuki et al. 8880810, 30 July 1988, TI); loc. cit., 3510-4127 m (Minaki et al. 9080156 & 9080162, 5 Aug. 1990, TI); loc. cit., Bhainsi Kharka - Khongma, 3510 m (Minaki et al. 9080108, 4 Aug. 1990, TI); loc. cit., around Khongma (Kauma), 3500 m (Suzuki et al. 8880569, 16 July 1988, TI); loc. cit., Jaljale Himal, Goja - Shuwan Kharka (near Panch Pokhari), 4130-4300 m (Ohba et al.

9130261, 6 Aug. 1991, TI); loc. cit., Shuwan Kharka (near Panch Pokhari) - Topke Gola, 3900-4000 m (Ohba et al. 9130279, 7 Aug. 1991, TI); Topke Gola, 3700 m (Kanai et al. 720592, 18 June, 1972, TI); Topke Gola - Shewaden, 2600-3600 m (Kanai et al. s.n., 28 June 1972, TI); Thudam, 3400 m (Kanai et al. 1736, 25 June 1972, TI); Chairam, 27°33'N 87°58'E, 12500 ft. (Polunin & Williams 865, 23 June, 1969, BM, TI).

SIKKIM. Without precise locality, 10000-16000 ft. (Hooker f. s.n., BM, E, P, L, GH, NY); (King's collector s.n. in 1888, BM, E); Singalila, Tonglu, 2800-3100 m (Hara et al. 15357, 12 July 1969, TI); Singalila Ridge, Sandakphu, c. 4000 m (Pradhan & Rai 113, 16 July 1980, B); loc. cit., 12000 ft. (Lepcha 780, 21 July 1913, E); loc. cit., Sandakphu, 3800-3970 m (Hara et al. 15354, 20 July 1969, TI); loc. cit., 12000 ft. (Cave s.n., 25 July 1919, E, GH); loc. cit., 3600 m (Kanai et al. s.n., 1 Aug. 1972, TI); loc. cit. (Hara s.n., 16 Sept. 1964, TI); Darjeering, Sandakphu - Phalut, 3200-3600 m (Kanai et al. 721378, 2 Aug. 1972, TI); loc. cit., 3500 m (Hara et al. 675, 6 June 1960, TI); Chiyabanjan - Phalut, 3100-3500 m (Hara et al. 2632, 2 June 1960, TI); Megutang - Nayatang, 3300-3900 m (Hara et al. 2635, 1 June 1960, TI); Darjeeling, Senchal, 2400 m (cultivated at Koishikawa Bot. Gard. and collected in July 1963) (Hara s.n., Apr. 1963, TI); Gamotang, 3750 m (Hara et al. 571, 29 May 1960, TI); loc. cit., 3800 m (Hara et al. 2631, 29 May 1960, TI, BM, GH); Jongri - Gamothang, 3600-4200 m (Hara et al. 2634, 26 May 1960, TI); Jongri, 14000 ft. (Lepcha 939, 12 Aug. 1913, E); loc. cit., 13000 ft. (Clarke 26096A, 26241, 15 Oct. 1875, K); along the Choktsering Chu, N of Jongri, 4000-4500 m (Hara et al. 2633, 25 May 1960, TI); Changu, 12000 ft. (Cooper 515, 526, 18 Aug. 1913, E); Kapup & Changu, 12500 ft. (Cooper 538, 19 Aug. 1913, E); Zeum Valley, 14500 ft. (Smith & Cave 1360, 13 July 1909, L); Kangling, 14000 ft. (Ribu & Rhomoo 6530 in 1913, E); Chamnago, 12000 ft. (Cave s.n., 20 Sept. 1916, E, GH); Llovok, 12000 ft. (Smith & Cave 1770, 26 July 1909, E); Dharahli Pass - Bilbari Valley, c. 4300 m (Agses 219, 30 June 1983, K); Singnapyakot, 13000 ft. (Ribu & Rhomoo 5298, 6 Sept. 1911, E); Ghaloot, 12000-13000 ft. (Kurz s.n., 16 Oct. 1868, K); Chunghat, 13000 ft. (King's collector s.n., July 1888, BM).

BHUTAN. above Motithang, Thimphu, 27°29'N 89°36'E, c. 3320 m (Grierson & Long 2736, 19 July 1979, E, K); upper Mo Chu, Ghasa - Koina, 89°45'E, c. 3000 m (Sargent 52, 28 July 1983, E); Chendebi, 8000-11000 ft. (Ludlow & Sherriff 3334, 30 June 1937, BM, E); Shingbe, Mela, 9500 ft. (Ludlow, Sherriff & Hicks 20653, 21 May 1949, E); loc. cit., 12000 ft. (Ludlow, Sherriff & Hicks 20699, 6 June 1949, BM, E).

TIBET. Chang Tang Tibet (Nepal border) (Nand s.n., 9 June 1937, E); Lusha Chu, 29°20'N 94°35'E, 11500 ft. (Ludlow, Sherriff & Taylor 4687, 8 June 1938, BM, E); Chianang, Langong, 28°48'N 93°42'E, 13500 ft. (Ludlow, Sherriff & Taylor 3950, 4 June 1938, E); Ka-gur-pur, 15000 ft. (Kingdon-Ward 846, 21 July 1913, E); without precise locality, 13000 ft. (Kingdon-Ward 618, 30 June 1913, E); Mi Ling, 4300-5000 m (collector unknown 4023, 17 July 1972, PE).

CHINA. YUNNAN: without precise locality (Soulié 1068, 28 June 1895, P); (Tsai 63138, GH); upper Kiukiang Valley, (Clulung)

Chialahmuto, 3450 m (Yü 19711, 6 Aug. 1938, GH, E); Salwin-Kiukiang Divide, Tshuwang, 3300 m (Yü 20367, 17 Sept. 1938, PE, GH, E); loc. cit., Newahlung, 3600 m (Yü 19304, 11 July 1938, GH, E); Shweli-Salwin Divide, 20°20'N, 10000 ft. (Forrest 9023, Aug. 1912, E); Mekong-Salwin Divide, Sewalongba, 3400 m (Yü 22548, 27 Aug. 1938, GH, E); Tse-Kou (Monberg 101, P); Tahching, (Atuntze) Wuyen, 3200 m (Yü 8421, 3 June 1937, PE, BM); A-tun-tze, 2050 m (Wang 64703, July-Aug. 1935, GH); loc. cit., 3000 m (Wang July-Aug. 1935, PE); Huann-fu-ping, A-tun-tze, 3700 m (Wang 68795, Aug. 1935, GH); Wei-si-hsien, 3500 m (Wang 63821, June 1935, PE, GH); loc. cit., 3000 m (Wang 67660, Aug.-Sept. 1935, PE); loc. cit., 3650 m (Tsai 59726, 8 Oct. 1934, PE, GH, mixed with *P. lineata* Trev.); loc. cit., 3650 m (Tsai 59607, 1 Oct. 1934, PE, GH); loc. cit., Kang-pu, 3000 m (Wang 64541, July 1935, PE); loc. cit., Yah-Chih, 3600 m (Wang 68604, 68438, 68458, Aug. 1935, GH); loc. cit., 3600 m (Wang 68436, Aug. 1935, PE); loc. cit., 3600 m (Wang 68438, Aug. 1935, PE, GH); loc. cit., Kang-pu, 3000 m (Wang 64537, July 1935, PE, GH); loc. cit., Tungchuling, Sungyenka, 3800 m (Yü 8875, 11 July 1937, PE); Kiulung, Metikonga, Tsangpi, 4000 m (Yü 6820, 5 July 1937, PE, GH); Che-tse-lo, 4000 m (Tsai 58220, 27 Aug. 1934, PE, GH); Chungtien, Tehgoh, 3300 m (Yü 13829, 22 Oct. 1937, GH, E, BM); loc. cit., 3400 m (Yü 12376, 23 July 1937, PE); loc. cit., Kungsinshu, 3420 m (Yü 11741, 24 June 1937, PE); loc. cit., 3400 m (Yü 11753, 24 June 1937, PE); Tancheng Hsien, Mowu, 3900 m (Yü 12876, PE, GH); Chungtien Plateau (Feng 1464, 5 July 1939, GH); Ta-li Hsien, 3300 m (Wang 63184A, May 1935, GH); loc. cit., 3500 m (Tsai 53949, 30 July 1933, GH); Tali, Mt. Yii Chii (MacLaren's collector 134B, June 1933, BM, E); Tali Range, 25°40'N, 10000-12000 ft. (Forrest 7093, July 1910, E); loc. cit., 8000-9000 ft. (Forrest 4414, May-June 1906, E, K); Gang chan, Tali (Delavay 474, 4 July 1882, P); loc. cit. (Delavay s.n., 16 July 1884, P); Mt. Gang chan (Delavay 107, 4 Aug. 1884, E); Koua la po, 3000 m (Delavay s.n., 5 Aug. 1885, P, BM, GH, NY); Yen-tze-koig, 2200 m (Delavay s.n., 19 July 1889, P); Li-kiang Hsien, 2800 m (Wang 71686, July 1935, PE, GH); Likiang Snow Range, Yangze watershed (Rock 8675 in 1923-1924, E, US, NY); loc. cit. (Rock 4921, May-Oct. 1922, GH, E); loc. cit. (Rock 4205, 30 May-6 June 1922, BM, E); Likiang Range, 11000 ft. (Forrest 5759, June 1910, E, BM, PE); loc. cit., 27°12'N, 10000-11000 ft. (Forrest 2462, June 1906, E); NW Likiang, Tamichung - Tuchi (Ching 22057, 10 Oct. 1939, GH); loc. cit., Ah-s-chi (Ching 20829, 27 June 1939, GH); Yangbi Xian, W side of Diancang Shan mountain range, Vicinity of Dajiapung, 25°50'N 99°59'E, c. 3300 m (Bartholomew et al. 632, 30 June 1984, GH, E, TI); NW Yunnan (Monberg s.n. in 1907, K, E). **SIKANG:** Nar-yung, Tsa-wa-rung, 3400 m (Wang 66484, Sept. 1935, PE, GH). **SICHUAN:** Muli, Kulu, 3500 m (Yü 7077, 7 July 1937, PE); loc. cit., 3500 m (Yü 14236, 11 Sept. 1937, E); Tschahungnyotscha, Ngaitshékou, Yalung, Yenyuen, c. 28°15'N, 3600-3900 m (Handel-Mazzetti 2635, 27 May 1914, E); Taining (Ngata) - Taofu (Dawo), Sunglingku, c. 3800 m (Smith 12113, 13 Sept. 1934, E); Kangting (Tachienlu), Distr., Yulingkong, Gomba La, c. 3700 m (Smith 10736, 22 July 1934, GH, BM, E, NY, PE); near Tachienlu, 9000-13500 ft. (Pratt 53, BM); loc. cit. (Potanin

s.n., July 1893, DR); loc. cit. (Mussot 111, P); Moupin (David s.n. in 1870, P); Pao-hsi-hsien, Mupin (Soong 38512, 38572 & 39100 in 1954, PE); Mao-Hsien, 2800 m (Wang 22045, 2 Aug. 1930, PE); Tchen-keou-tin (Farges 331, P); W of Kuan Hsien, 3100 m (Wang 20897, 16 May 1930, GH); Pingwu Hsien, Lungan fu (Fang 4221, 16 Aug. 1928, GH, E, P, US, NY); Tien-chuan-hsien, 3500 m (Chu 2787, 14 June 1936, BM); Lien ho kou, 12000 ft. (Wang & Wen 0613, Aug. 1938, GH). HUPEI: (Wilson 2072, June 1907, NY, E); Shennogjia Forrest Distr., 31°30'N 110°30'E, vicinity of Dalongtan and Xiaolongtan, 2300-2600 m (Bartholomew et al. 937, 9 Sept. 1980, GH, E, NY); Shin Shan Hsien (Chun & Chien 8399, 4 Sept. 1922, E).
BURMA. N BURMA: Laktang, 9000 ft. (Kingdon-Ward 3325, 30 June 1919, E); Imaw Bum, 12000 ft. (Kingdon-Ward 3379, 25 July 1919, E); western flank of the N'Maikha-Salwin divide, 26°24'N 98°48'E, 12000 ft. (Forrest 26883, June 1925, E, K, US, NY); Burma-Tibet, 11000-13000 ft. (Kingdon-Ward 9670, 2 June 1931, BM).

13b. var. omeiensis H. Ikeda et H. Ohba
CHINA. SICHUAN: Chien-fu-tien, Mt. Omei, 3150 m (Tai 320, 15 Aug. 1940, GH); loc. cit. (Fang 20415, 2 Aug. 1951, PE); Omei Hsien (Tu 616 in 1934, GH); loc. cit., Mt. Omei (Lee 2869, 18 July 1940, US); loc. cit. (Fang 16524, 10 May 1942, GH); loc. cit. (Fang 12980 5 Aug. 1938, GH); loc. cit., 2100 m (Fang 18761, 16 May 1942, GH); Mt. Omei (Wilson 4853, June 1904, BM, P); loc. cit., 3300 m (Wang 23417, 25 July 1931, PE, GH); loc. cit. (Sun & Chang 130, 10 June 1939, GH); loc. cit. (Pratt 53, K); loc. cit., 3100 m (Chow 9798, 17 May 1939, GH); loc. cit., 3035 m (Chow 7668, 29 June 1938, GH); loc. cit., 3000 m (Chiao & Fan 832, 23 Aug. 1938, GH, E); loc. cit., 8500-9000 ft. (Fang 2872, 13 Aug. 1928, GH, E, US); Omei Summit (Faber 557, K); loc. cit., Chin-ting (Feng 30554, 14 May 1952, PE).

13c. var. brachyphyllaria Card.
ASSAM. Camp Glacier View, 13000 ft. (Kingdon-Ward 4241, 21 June 1921, E).
TIBET. Kajilatho (Soulié 2447, 20 July 1894, P, BM).
CHINA. YUNNAN: Lu-chuan, Wu-meng-Shan, 4200 m (Chang 0662, 1 Nov. 1940, PE, KUN). **SICHUAN:** Muli, Wachin, Jin-chang, 4000 m (Yü 14595, 21 Oct. 1937, GH, E, BM); Taofu (Dawa) Distr., Lhamo Mondeh La, c. 3800 m (Smith 12311, 21 Sept. 1934, NY, BM, E); Ta-tsien-lou (Soulié 690, 13 July 1893, P); loc. cit. (Soulié s.n. in 1893, P); Kangting (Tachienlu) Distr., Cheto La, c. 3600 m (Smith 11062, 4 Aug. 1934, GH, NY).

14. Potentilla montisvictoriae H. Ikeda et H. Ohba
BURMA. C BURMA: Mt. Victoria (Cooper 6002 in 1924, E); loc. cit., 8500 ft. (Unrin 3045, 16 Apr. 1926, E); loc. cit., 9000-10000 ft. (Kingdon-Ward 21981, 9 Apr. 1956, E); loc. cit., Chin Hills, 10000 ft. (Dickason 8524, Apr. 1939, GH, L); Mindat, Hilawng ridge, 8500 ft. (Gale 9130, 11 Aug. 1962, E).

15. Potentilla wenchuensis H. Ikeda et H. Ohba

China. **SICHUAN**: Win-chuan, Tsao-puh, 12000-13000 ft. (S. Y. Hu 2666, Aug. 1944, GH); Hong Xi Xian, 2000-3000 m (collector unknown 1593, 5 Aug. 1959, PE); Mao Xian Li Xian (He & Zhou 12805 in 1952, PE). **Guizhou**: Fanjing Shan, Pin Xin Lin Chang (North Guizhou Exped. 0947, 20 May 1959, PE).

16. *Potentilla anserina* L.

AFGHANISTAN. Bamian Province, Band-i-Amir, c. 9500 ft. (Grey-Wilson & Hewer 953, 27 May 1971, K, E); Near Bamian, 9000 ft. (Beach 5157, 29 July 1952, US); Ghazni, Okak, Dasht-e Nawar (Naour), 33 50'N, 67 55'E, 3000 m (Rechinger 17774, 4 July 1962, E); Logar (Johnston 1879-1880, E); Pamir, Taldik (Trans Altai) (Edm. in 1893, P); loc. cit., Pangong (Dutreuil, 24 Sept. 1892, P); Kabur, NW of Unai Pass, c. 3000 m (Hedge & Wendelbo 4575, 25 June 1962, E).

PAKISTAN. KARAKORAM: Chitral, Baroghil Pass, 13000 ft. (Stainton 2995, 24 July 1968, BM, GH, TI); loc. cit., Yarkhun, between 36 30'N 72 40'E and 36 48'N 73 05'E, 12500 ft. (Lyon 1000, 24 June 1958, BM, TI); loc. cit., Yarkhun, 4000 m (Schmid 2360, 22-27 Aug. 1954, BM); Nagar Village area, 7800 ft. (Polunin 6405, 28 Aug. 1960, BM); Karakoram Glacier, between Nagyr and Hapcar, 7700-9350 ft. (Conway s.n. in 1892, K); Baltistan, Shigar, 7700 ft. (Clarke 30483C, 15 Aug. 1876, BM); Baltistan, Skardu, 8000 ft. (Stewart 20445, 6 Aug. 1940, GH, NY); loc. cit. (Takatsuki et al. 9370002, 30 June 1993, TI); Ladak, Upschi - Leh (Schlagintweit s.n., 1-31 Aug. 1856, BM); loc. cit., Timti La Pass - Kandzi - Yuru Kiom (Schlagintweit 5252, 2 July 1856, E); loc. cit., Leh (Schlagintweit 1395, 1-15 July 1856, GH, P); Tsanskar, Sulle - Padum (Schlagintweit s.n., 22-24 June 1856, BM, GH); Gnari Khorsum, 14800-15500 ft. (Schlagintweit s.n., 17-26 July 1856, BM); Nubra, Tsarasa - Aranu (risght side of the Nubra valley) (Schlagintweit 2096, 3-4 Aug. 1856, GH); Nubra, left side of the Shayok (Schlagintweit 2204, 1-12 Aug. 1856, L); Balti, Skardo - Satpar valley (south of Skardo) (Schlagintweit 5554, 2 Sept. 1856, GH).

INDIA. NW INDIA: Ladak, 10000-16000 ft. (Stewart 110, K); Kashmir, Shagarthang Valley, 10000-11000 ft. (Duthie 12108, 18 July 1892, K, BM); Kashmir, Ladak, Shushal, 14200 ft. (Koelz 2443g, 26 July 1931, NY, US); Jammu and Kashmir, Zaskar, Padam, 11000 ft. (Southampton Univ. Bot. Exped. 55, 16 July 1981, BM); Ladak, Seb, 11500 ft. (Ludlow & Sherriff 8398, 16 June 1941, BM); loc. cit., Dras, 10500 ft. (Ludlow & Sherriff 8324, 31 May 1941, BM); loc. cit., 10000 ft. (Stewart 9987A, Aug. 1928, NY); Kashmir, between Doghani and Shyor River, 8000 ft. (Ludlow 342, 13 June 1928, BM); Punjab, Kulu-Lahaul (Drummond 22908, 6 July 1888, K); Spiti, Thunrla, 4200 m (Bhattacharyya 49230, 1 Aug. 1972, L).

NEPAL. W NEPAL: Dolpo, Sya Gompa, 29 15'N 82 58'E, 14500 ft. (Stainton 5531, 14 July 1966, BM, TI); Barbung Khola, Pemrunggaon, 15000 ft. (Polunin, Sykes & Williams 1102, 7 June 1952, BM, GH); Tarapgaon, 11000 ft. (Jest 128, 19 June 1961, P); Yara (S of Mustang), 12000 ft. (Stainton, Sykes & Williams 2135, 2 Aug. 1954, BM, GH, L). **C NEPAL**: Muktinath, 12500 ft. (Stainton, Sykes & Williams 5643, 8 June 1954, BM, GH); loc.

cit., 12500 ft. (Stainton, Sykes & Williams 1402, 25 June 1954, BM, L, US); loc. cit., 3500 m, 28 49'N 83 55'E (Dobremez & Manandhar 3054, 19 May 1974, BM); Ghiling, 3800 m, 29 00'N 83 52'E (Dobremez & Manandhar 3000, 17 May 1974, BM); Shyagompha, 14300 ft. (Shrestha 5391, 15 July 1966, BM); Changyon Khola, 14500 ft. (Gardner 732, 14 June 1953, BM, TI).
E NEPAL: Ghunsa, 3600 m (Nakao 504, 15 June 1962, TI); Koshi Zone, Sankhuwa Sabha Distr., Jaljale Himal, Topke Gola - Bomrang, 3740 m (Ohba et al. 9130314, 9 Aug. 1991, TI).
BHUTAN. Seanchu Passa - Gokhu La - Chabecha, 3600-4200 m (Hara et al. 7505, 21 May 1967, TI); Shodu - Barshong, 3700 m (Hara et al. 6666, 24 May 1967); Laya, upper Mo Chu, 14000 ft. (Ludlow, Sherriff & Hicks 299, 7 June 1949, BM).
TIBET. Without precise locality, 13000 ft. (Ladygin 95 in 1900, DR); (Hooker f. & Thomson s.n. in 1855); (collector unknown s.n., 24 Nov. 1938, P); Tibet Occ., 6000-16000 ft. (Thomson s.n., BM, GH, L, P); Valley of Tibet, 15300 ft. (Strachey & Winterbottom 24, BM, GH); upper Manga Chu, 28 50'N 87 35'E, 5000 m (Miehe 1299, 29 Aug. 1984, BM); Gyanke, 13000 ft. (Ludlow 23, 21 June 1924, BM); Lhasa, 12000 ft. (Ludlow & Sherriff 9495, 16 May 1943, BM); loc. cit., 11800 ft. (Ludlow & Sherriff 8602, 20 May 1942, BM); loc. cit., 11800 ft. (Ludlow & Sherriff 8605, 22 May 1942, BM); Reting, 60 miles N of Lhasa, 14500 ft. (Ludlow & Sherriff 8939, 30 July 1942, BM); near Lhasa (Kawaguchi s.n., March 1913, TI); loc. cit. (Kawaguchi s.n., May 1913, TI); vicinity of Lhasa (Richardson 40, May 1939, BM); Chagul Dzong, Chagul Chu, 11500 ft. (Ludlow & Sherriff 1550, 5 May 1934, BM); Loro Chu, Chayul Dzong, 11000 ft. (Kingdon-Ward 11748, 20 June 1935, BM); loc. cit., 11000 ft. (Kingdon-Ward 11765, 22 June 1935, BM); Tibet Plateau (Aoki s.n. in 1912-1915, TI); SE Tibet, Kongbo, Tamola, 10000 ft. (Ludlow, Sherriff & Elliot 13697, 16 May 1947, BM); E Tibet, between Labrang and Yellow River, Yobsha valley, 11600 ft. (Rock 14532, 30 July 1926, NY, GH, K); Radja and Yellow River gorges, near Radja, 10000 ft. (Rock 14022, 28 May 1926, NY, GH, US); Hlodzong Kham, 12600 ft. (Hanbury-Tracy 133, 27 May 1936, BM); Khampa, 14000 ft. (Humphreys 5047, 29 June 1936, BM).
E HIMALAYA. Chamgong, 15000 ft. (Rhomo Lepcha 266, 12 Sept. 1912, GH).
CHINA. YUNNAN: without precise locality (G. Forrest 2272, E); (Yü 5214, 5293, 13002, GH); Yehching (Atuntze) miyetzimu, 3250 m (Yü 8596, 17 June 1937, BM); Weihsi, Tse-jao, 3000 m (Yü 8214, 11 May 1937, PE); Pino E Chungting (Feng 906, 20 May 1939, GH); Ganhaide, Lidjiang ("Likiang"), 3150 m (Handel-Mazzetti 6602, 1 June 1915, NY); Likiang Snow Range (Ching 30316, 26 June 1939, GH); Yangtze watershed, Prefectural District of Likiang, western slopes of Likiang Snow Range, 10000 ft. (Rock 4151, 30 May-6 June 1922, NY, BM, E, K); loc. cit., Valley, 10000 ft. (Rock 4209, 30 May-6 June 1922, GH, E); loc. cit., eastern slopes of Likiang Snow Range, 11000 ft. (Rock 3491, NY 1922, GH, E, US, P); north end of Likiang valley, 27 05'N, 9000 ft. (G. Forrest 2092, May 1906, E, K, P); Mt. Hee-chan-men, Kan hay tze (Lankong), 2800 m (Delavay s.n., 27 June 1883, P); loc. cit., 2800 m (Delavay 51 & 1105, 2 June 1884, P). **SICHUAN:** Batang, Yargong, "Tchroon-ma" (Soulié 3153

in 1903, P); Tongolo (Soulié 83, July 1891, P); loc. cit. (Soulié s.n., 17 June 1894, P, E); loc. cit. (Soulié 408 in 1893, P, K); Sungpan Hsien (Fang 4274, 17 Aug. 1928, GH, US, NY, E, K, P); Sungpaw, c. 3000 m (H. Smith 2660, 8 July 1922, BM); Kangding County, 3280 m (Chen Ze-Ying 111758, 1 May 1980, E); near Tatsien-lu (Cunningham 68 in 1923, E). **HUPEI:** Patachou (Sheehan 56, 15 May 1932, NY); Peitaiho (Hsia 1812, 16 June 1930, NY). **KANSU:** Ho Lan Shan Mountains, 1750-2650 m (Rock 1120, 20 July 1923, US, E); loc. cit., Pi Ze Ku, 1375-2400 m (Rock 123, 10-25 May 1923, US, E); SW Kansu, T'ao River basin, W of Choni, 8800 ft. (Rock 12180, June 1925, GH, BM, P); Chiuchian (Ching 7, 2 July 1956, PE); Yu-chung, Ten-lung-shan, Hai-yang-zui, Ta-shui valley (Huan 03399, 31 Aug. 1956, PE).

17. Potentilla gombalana Hand.-Mazz.

CHINA. SICHUAN: without precise locality, 9000-13000 ft. (Pratt s.n., K); Kangting (Tatsienlu) distr., Yulingkong, Gomba La, c. 3700 m (Smith 10714, 22 July 1934, BM, PE).

18. Potentilla smithiana Hand.-Mazz.

CHINA. SICHUAN: Tatsienlu, c. 1400 m (Smith 10380, 24 June 1934, GH, BM, E, NY, PE); loc. cit. (Herb. d'Orleans, s.n. in 1890, P); Shih-mien-hsien (Hsieh 40511, 40611, 40815 & 42676 in 1955, PE); Le-po Hsien, 2900 m (Yü 3802, 16 Aug. 1934, PE); Leibo Xian, Shan-ling-gang-ku, 2100 m (collector unknown 0675, June 17, 1959, PE); Ma-pien Hsien (Wang 23077, 29 May 1931, PE, GH); Hanyuanhsien, Sianglingshan, 2400 m (Wang 8803, 17 Aug. 1938, PE); Juei-she-Hsien, 1700 m (Yü 906, 26 May 1932, PE); Lei Bo (Yü 3802 in 1934, PE); near Tian Qian Xin Go, 1500 m (Ching & Wang 3303, 7 Sept. 1963, PE); Jin Yan Xian, Dui Pin Zi, 1000 m (collector unknown 3327, 1 June 1959, PE); Ching-si-hsien, 1400 m (Liu 416, 24 June 1934, PE); Zhao Jue Xian, 2600 m (collector unknown 12809, 3 June 1976, PE).

19. Potentilla taronensis Wu ex Yü et C. Li

CHINA. YUNNAN: Taron-Taru Divide, Tarulaka, Gonshan, 3000-3200 m (Yü 20915, 1 Nov. 1938, PE).



