

References

- Alard, D., Poudevigne, I., 1999. Factors controlling plant diversity in a rural landscape: a functional approach. *Landscape & Urban Planning*, 46, 29-39.
- Albrecht, H., Mattheis, A., 1998. The effects of organic and integrated farming on rare arable weeds on the Forschungsverbund Agrarökosysteme München (FAM) research station in southern Bararia. *Biological Conservation*, 86, 347-356.
- Altieri, M.A., 1999. The ecological role of biodiversity in agroecosystems. *Agriculture Ecosystems & Environment*, 74, 19-31.
- Anderson, R.C., Schwegman, J.E., Anderson, M.R., 2000. Micro-scale restoration: a 25-year history of a southern Illinois barrens. *Restoration Ecology*, 8, 296–306.
- Andreasen, C., Stryhn, H., Streibig, C., 1996. Decline of the flora in Danish arable fields. *Journal of Applied Ecology*, 33, 619-626.
- Anzai, T., 1992. Dojo-taipubetsu-kyukoden-niokeru Fukugenji-no Suitou-ni-taisuru Chisso-hibai-kanri (Management of nitrogen input after the break of rice cultivation in different soil conditions). *Bulletin of Chiba Agriculture Experiment Station*, 33, 9-25. (In Japanese)
- Arai, M., Miyahara, M., 1955. Studies on weed control by submergence in rice cultivation. *Japanese Journal of Crop Science*, 24, 63-65. (in Japanese).
- Arita, Y., Kobayashi, T., 2000. The land use changes of "yatsuda" and the peculiarity of the paddy field vegetation. *Journal of Japanese Institute of Landscape Architecture*, 63, 485-490. (in Japanese with English summary)
- Asami, Y., Akamatsu, H., Tamura, K., 2001. A case study of vegetation management of abandoned rice fields for the conservation of water and wetland wildlife. *Journal of Japanese Institute of Landscape Architecture*, 64, 571–576 (in Japanese with English summary).
- Aude, E., Tybirk, K., Pedersen, M.B., 2003. Vegetation diversity of conventional and organic hedgerows in Denmark. *Agriculture Ecosystems and environment*, 99, 135-147.
- Azuma, A., Takeuchi, K., Tsunekawa, A., 1998. Behavior of gray-faced buzzard eagles and their habitat use in Yatsu-environment. *Papers of Environmental Information Science*, 12, 239-244. (In Japanese with English summary)
- Baba, T., Itoh, S., Tanaka, M., 1991. A study on the actual conditions of wild grass preservation on bank slopes in mountainous paddy fields. *Japanese Institute of Landscape Architects*, 54, 167-172. (in Japanese with English summary).
- Bakker, J.P., Berendse, F. 1999. Constraints in the restoration of ecological diversity in grassland and heathland communities. *Trends in Ecology and Evolution*, 14, 63-68.

- Bambaradeniya, C.N.B., Deirisinghe, D.N., De Silva, D.N., Gunatilleke, C.V.S., Ranawana, K.B., Wijekoon, S., 2004. Biodiversity associated with an irrigated rice agro-ecosystem in Sri Lanka. *Biodiversity & Conservation*, 13, 1715-1753.
- Baudry, J., Burel, F., Thenail, C., Le Coeur, D., 2000. A holistic landscape ecological study of the interactions between farming activities and ecological patterns in Brittany, France. *Landscape and Urban Planning*, 50, 119-128.
- Bengtsson, J.B., Ahnström, J., Weibull, A.C., 2005. The effects of organic agriculture on biodiversity and abundance: a meta-analysis. *Journal of Applied Ecology*, 42, 261-269.
- Benton, T.G., Vickery, J.A., Wilson, J.D., 2003. Farmland biodiversity: is habitat heterogeneity the key? *Trends in Ecology and Evolution*, 18, 182-188.
- Bischoff, A., 2005. Analysis of weed dispersal to predict chances of re-colonization. *Agriculture Ecosystems & Environment*, 106, 377-387.
- Bischoff, A., 2002. Dispersal and establishment of floodplain grassland species as limiting factors in restoration. *Biological Conservation*, 104, 25-33.
- Blomqvist, M.M., Vos, P., Klinkhamer, P.G.L., ter Keurs, W.J., 2003. Declining plant species richness of grassland ditch banks - a problem of colonisation or extinction? *Biological Conservation*, 109, 391-406.
- Boutin, C., Jobin, B., 1998. Intensity of agricultural practices and effects on adjacent habitats. *Ecological Applications*, 8, 544-557.
- Bruehlheide, H., Flintrop, T., 2000. Evaluating the transplantation of a meadow in the Harz Mountains, Germany. *Biological Conservation*, 92, 109-120.
- Büchs, W., 2003. Biotic indicators for biodiversity and sustainable agriculture - introduction and background. *Agriculture Ecosystems & Environment*, 98, 1-16.
- Bullock, J.M., Pakeman, R.J., 1997. Grazing of lowland heath in England: management methods and their effects on heathland vegetation. *Biological Conservation*, 79, 1-13.
- Burel, F., Baudry, J., 1990. Structural dynamic of a hedgerow network landscape in Brittany France. *Landscape Ecology*, 4, 197-210.
- Burel, F., Baudry, J., 2003. *Landscape Ecology. Concepts, methods and applications*. Science Publishers, Inc. Enfield, New Hampshire, USA. pp. 362.
- Carey, P.D., Barnett, C.L., Greenslade, P.D., Hulmes, S., Garbutt, R.A., Warman, E.A., Myhill, D., Scott, R.J., Smart, S.M., Manchester, S.J., Robinson, J., Walker, K.J., Howard, D.C., Firbank, L.G., 2002. A comparison of the ecological quality of land between an English agri-environment scheme and the countryside as a whole. *Biological Conservation*, 108, 183-197.
- Chiba city, 1983. Detailed land classification survey. Chiba city, 117 pp. (in Japanese).

- Chiba Prefecture (Ed.), 1979. Land classification survey (in National land survey), 1: 50,000 geographical map Chiba. 35 pp. (In Japanese)
- Chibaken-shiryō-kenkyūzaidan, 2003. Chibaken-no-shizenshi (4) Chibaken-shokubutsushi (Natural Source Book of Chiba Prefecture (4) Flora of Chiba Prefecture) Chiba-nippousha, Chiba, Japan, pp. 1181.
- Comín, F.A., Romero, J.A., Hernández, O., Menéndez, M., 2001. Restoration of wetlands from abandoned rice fields for nutrient removal, and biological community and landscape diversity. *Restoration Ecology*, 9, 201-208.
- Croxton, P.J., Franssen, W., Myhill, D.G., Sparks, T.H., 2004. The restoration of neglected hedges: a comparison of management treatments. *Biological Conservation*, 117, 19-23.
- de Blois, S., Domon, G., Bouchard, A., 2002. Factor affecting plant species distribution in hedgerows of southern Quebec. *Biological Conservation*, 105, 355-367.
- Degn, H.J., 2001. Succession from farmland to heathland: a case study for conservation of nature and historic farming methods. *Biological Conservation*, 97, 319-330.
- Delcourt, P.A., Delcourt, H.R., 1992. Ecotone dynamics in space and time. In: Hansen, A.J., di Castri, F. (Eds.), *Landscape boundaries. Consequences for biotic diversity and ecological flows*. Springer-Verlag, New York, pp. 19-54.
- Dobson, A.P., Bradshaw, A.D., Baker, A.J.M., 1997. Hopes for the future: restoration ecology and conservation biology. *Science*, 277, 515-522.
- Duelli, P., 1997. Biodiversity evaluation in agricultural landscapes: An approach at two different scales. *Agriculture Ecosystems & Environment*, 62, 81-91.
- Duelli, P., Obrist, M.K., 2003. Regional biodiversity in an agricultural landscape: the contribution of seminatural habitat islands. *Basic & Applied Ecology*, 4, 129-138.
- Dufrêne M., Legendre, P., 1997. Species assemblages and indicator species: the need for a flexible asymmetrical approach. *Ecological Monographs*, 67, 345-366.
- Dutoit, T., Gerbaud, E., Buisson, E., Roche, P., 2003. Dynamics of a weed community in a cereal field created after ploughing a seminatural meadow: role of permanent seed bank. *Ecoscience*, 10, 225-235. (in French with English summary)
- Environment Agency of Japan (Ed.), 2000. *Threatened Wildlife of Japan. Red Data Book*, 2nd ed., vol. 8: Vascular Plants. Japan Wildlife Research Center, Tokyo, pp. 660. (in Japanese with English summary).
- Eriksson, O., Cousins, S.A.O., Bruun, H.H., 2002. Land-use history and fragmentation of traditionally managed grasslands in Scandinavia. *Journal of Vegetation Science*, 13, 743-748.
- Forman, R.T.T., 1995. *Land mosaics: the ecology of landscape and regions*. Cambridge

- University Press, New York, USA. pp. 632.
- Forman, R.T.T., Moore, P.N., 1992. Theoretical foundations for understanding boundaries in landscape mosaics. In: Hansen, A.J., di Castri, F. (eds.), *Landscape Boundaries: consequences for biotic diversity and ecological flows*. Springer-Verlag, New York, USA. pp. 236-258.
- Frazer, G.W., Canham, C.D., Lertzman, K.P., 1999. Gap Light Analyzer (GLA), Version 2.0: Imaging software to extract canopy structure and gap light transmission indices from true-colour fisheye photographs, users manual and program documentation. <http://rem.sfu.ca/foresty/index.htm>
- Freemark, K.E., Boutin, C., Keddy, C.J., 2002. Importance of farmland habitats for conservation of plant species. *Conservation Biology*, 16, 399-412.
- Froud-Williams, R.J., Drennan, S.D.H., Chancellor, R.J., 1983. Influence of cultivation regime on weed floras of arable cropping systems. *Journal of Applied Ecology*, 20, 187-197.
- Fukamachi, K., Oku, H., Nakashizuka, T., 2001. The change of a satoyama landscape and its causality in Kamiseya, Kyoto Prefecture, Japan between 1970 and 1995. *Landscape Ecology*, 16, 703-717.
- Fuller, R.M., 1987. The changing extent and conservation interest of lowland grasslands in England grasslands in England and Wales: a review of grassland surveys 1930-84. *Biological Conservation*, 40, 281-300.
- Grootjans, A.P., Bakker, J.P., Jansen, A.J.M., Kemmers, R.H., 2002. Restoration of brook valley meadows in the Netherlands. *Hydrobiologia*, 478, 149-170.
- Hakoyama, S., Tanaka, H., Agata, W., Takeda, T., 1977. Studies on weed vegetation in non-cultivated paddy fields I. The vegetation of non-cultivated paddy fields in the north-western parts of Fukuoka Prefecture. *Japanese Journal of Crop Science*, 46, 219-227. (in Japanese with English summary)
- Hansson, M., Fogelfors, H., 1998. Management of permanent set-aside on arable land in Sweden. *Journal of Applied Ecology*, 35, 758-771.
- Hasegawa, S., Tabuchi, T., 1995. Well facilitated paddy fields in Japan. In: Tabuchi, T. and Hasegawa, S. (eds), *Paddy Fields in the World*. Japanese Society of Irrigation, Drainage and Reclamation Engineering, Tokyo, 103-124.
- Hayakawa, Y., Takahata, S., 1975. Studies on the landscape management of pastureland using the plat succession theory. IV. The comparison of plant succession and soil fertility in abandoned pastures and paddy fields. *Res. Bull. Hokkaido Nat. Agric. Exp. Stn.* 112, 139-156 (in Japanese with English summary).

- Helenius, J., 1994. Adoption of conservation headlands to Finnish farming. Field margins: Integrating agriculture and conservation. Monograph No. 58. British Crop Protection Council, pp. 191-196.
- Hill, M.O., 1979a. DECORANA: A FORTRAN program for Detrended Correspondence Analysis and Reciprocal Averaging. Cornell University Press, Ithaca, New York, pp. 52.
- Hill, M.O., 1979a. TWINSpan: A FORTRAN program for arranging multivariate data in an ordered two-way table by classification of individuals and attributes. Cornell University Press, Ithaca, New York, pp. 90.
- Hill, M.O., Gauch, H.G. Jr., 1980. Detrended correspondence analysis: an improved ordination technique. *Vegetatio*, 42, 47–58.
- Hobbs, R.J., Harris, J.A., 2001. Restoration ecology: repairing the earth's ecosystems in the new millennium. *Restoration Ecology*, 9, 239-246.
- Hooper, M.D., 1970. The botanical importance of our hedgerows. In: Perring, F.H. (Ed.), *The flora of a changing Britain*. Botanical Society of the British Isles, Classy, Middlesex, pp. 58-62.
- Hopkins, A., Pywell, R.F., Peel, S., Johnson, R.H., Bowling, P.J., 1999. Enhancement of botanical diversity of permanent grassland and impact on hay production in environmentally sensitive areas in the UK. *Grassland & Forage Science*, 54, 163-173.
- Hoshi, H., Takahashi, M., 1996. Stratigraphy and geologic structure of the Lower Miocene in the Motegi area: the relationship between N-S trending fault activity and tectonics in Miocene northwest Japan. *Journal of Geological Society of Japan*, 102, 25-39. (in Japanese with English summary).
- Hodgson, J.G., Montserrat-Martí, G., Cerabolini, B., Ceriani, R.M., Maestro-Martínez, M., Peco, B., Wilson, P.J., Thompson, K., Grime, J.P., Band, S.R., Bogard, A., Castro-Diez, P., Charles, M., Jones, G., Pérez-Rontomé, M.C., Caccianiga, M., Alard, D., Bakker, J.P., Cornelissen, J.H.C., Dutoit, T., Grootjans, A.P., Guerrero-Campo, J., Gupta, P.L., Hynd, A., Kahmen, S., Poschlod, P., Romo-Diez, A., Rorison, I.H., Rosén, E., Schreiber, K.-F., Tallowin, J., de Torres Espuny, L., Villar-Salvador, P., 2005. A functional method for classifying European grasslands for use in joint ecological and economic studies. *Basic & Applied Ecology*, 6, 119-131.
- Hulme, P.D., Merrell, B.G., Torvell, L., Fisher, J.M., Small, J.L., Pakeman, R.J., 2002. Rehabilitation of degraded *Calluna vulgaris* (L.) Hull-dominated wet heath by controlled sheep grazing. *Biological Conservation*, 107, 351-363.
- Hutchings, M.J., Booth, K.D., 1996a. Studies on the feasibility of re-creating chalk grassland vegetation on ex-arable land. I. The potential roles of the seed bank and the seed rain.

- Journal of Applied Ecology, 33, 1171-1181.
- Hutchings, M.J., Booth, K.D., 1996b. Studies on the feasibility of re-creating chalk grassland vegetation on ex-arable land. II. Germination and early survivorship of seedlings under different management regimes. *Journal of Applied Ecology*, 33, 1182-1190.
- Hyvönen, T., Ketoja, E., Salonen, J., Jalli, H., Tiainen, J., 2003. Weed species diversity and community composition in organic and conventional cropping of spring cereals. *Agriculture Ecosystems & Environment*, 97, 131-149.
- Hyvönen, T., Salonen, J., 2002. Weed species diversity and community composition in cropping practices at two intensity levels - a six-year experiment. *Plant Ecology*, 154, 73-81.
- Iiyama, N., Kamada, M., Nakagawa, E., Nakagashi, N., 2002. The effect of boundary ridge structure and grass-cutting on plant communities around terraced paddy field. *Journal of Japanese Institute of Landscape Architecture*, 65, 579-584. (in Japanese with English summary).
- Ishizaka, T., Takeuchi, K., Okazaki, M., Yoshinaga, S., 1986. Vegetation distribution influenced by the landform and soil arrangements in the Hik-kita Hills, Saitama Prefecture, central Japan. *Journal of Applied Plant Science*, 15, 1-16. (in Japanese with English summary)
- Ito, T., Nakayama, Y., Yamaguchi, H., 1999. Floral composition and successional process of vegetation on the levees of traditional and reconstructed paddy fields in Sakai, Japan. *Journal of Weed Science and Technology*, 44, 329-340. (in Japanese with English summary).
- Itoh, M., 1993. *Zassougaku-souron (General weed science)*. Youkendo, Tokyo, pp. 362 (in Japanese).
- Jackson, M.B., Drew, M.C., 1984. Effects of flooding on growth and metabolism of herbaceous plants. Kozloski, T.T. (Ed.). *Physiological Ecology: A series of monographs, texts and treatments: Flooding and plant growth*. Academic Press, Fla., USA, 47-128.
- Jansen, A.J.M., Fresco, L.F.M., Grootjans, A.P., Jalink, M.H., 2004. Effects of restoration measures on plant communities of wet Heathland ecosystems. *Applied Vegetation Science*, 7, 243-252.
- Janssens, F., Peeters, A., Tallowin, J.R.B., Bakker, J.P., Bekker, R.M., Fillat, F., Oomes, M.J.M., 1998. Relationship between soil chemical factors and grassland diversity. *Plant & Soil*, 202, 69-78.
- Jobin, B, Boutin, C., DesGranges, J.-L., 1997. Effects of agricultural practices on the flora of hedgerows and woodland edges in southern Quebec. *Canadian Journal of Plant Science*,

77, 293-299.

- Jones, A.T., Hayes, M.J., 1999. Increasing floristic diversity in grassland: the effects of management regime and provenance on species introduction. *Biological Conservation*, 87, 381-390.
- Joyce, C.B., Wade, P.W., 1998. *European wet grasslands. Biodiversity, management and restoration*. Wiley, New York, 340 pp.
- Kang, H.K., Okuro, T., Nikkuni, S., Aoda, T., Arita, H., 2004. Factors affecting plant succession in abandoned paddy fields in mountainous regions: case study in Ena city, Gifu prefecture, central Japan. *Journal of Rural Planning Association*, 23, 63–70 (in Japanese with English summary).
- Karube, J., Hasegawa, S., Toyomitsu, Y., Adachi, K. and Tada, A., 1995. Basic aspects of paddy fields. In: Tabuchi, T. and Hasegawa, S. (eds.). *Paddy Fields in the World*. The Japanese Society of Irrigation, Drainage and Reclamation Engineering. Tokyo. 247-268pp
- Kasahara, Y., 1951. Honpouzassou-no-shurui-oyobi-chiritekibunpu-no-kenkyu dai-yon-hou (Studies on the number of arable weeds and their distribution in Japan, part IV). *Nougaku-kenkyu*, 39(4), 145–154 (in Japanese).
- Kasahara, Y., 1960a. Experimental studies on the weed communities on cultivated land (1). *Nogakukenkyu*, 48, 1-33. (In Japanese)
- Kasahara, Y., 1960b. Experimental studies on the weed communities on cultivated land (2). *Nogakukenkyu*, 48, 129-173. (In Japanese)
- Kataoka, T., Kojima, K., Furuya, S., 1979. Growth and seed production of *Monochoria vaginalis* Presl. in paddy fields. *Journal of Weed Science and Technology*, 24, 86-91.
- Kauffman, J.B., Beschta, R.L., Otting, B.N., Lytjen, D., 1997. An ecological perspective of riparian and stream restoration in the western United States. *Fisheries*, 22, 12-24.
- Kennedy, R.A., Barrett, S.C.H., Zee, D.V., Rumpho, M.E., 1980. Germination and seedling growth under anaerobic conditions in *Echinochloa crus-galli* (barnyard grass). *Plant, Cell and Environment*, 3, 243-248.
- Kitagawa, Y., 2003. Regeneration of satoyama landscape. In: Takeuchi, K., Brown, R., Washitani, I., Tsunekawa, A. and Yokohari, M. (eds), *Satoyama: the Rural Landscape of Japan*. Springer-Verlag, Tokyo, pp. 129–142.
- Kitagawa, Y., Okubo, S., Yamada, S. and Takeuchi, K., 2004. Species composition and species richness of herbaceous vegetation on lowermost hillside-slope in hilly Yatsuda landscape. *Journal of Japanese Institute of Landscape Architecture*, 67, 551-554 (In Japanese with English summary).
- Kitazawa, T. Ohsawa, M., 2002. Patterns of species diversity in rural herbaceous

- communities under different management regimes, Chiba, central Japan. *Biological Conservation*, 104, 239-249.
- Kleijn, D., 2003. Can Establishment characteristics explain the poor colonization success of late successional grassland species on ex-arable land? *Restoration Ecology*, 11, 131-138.
- Kleijn, D., Snoeiijing, G.I.J., 1997. Field boundary vegetation and the effects of agrochemical drift: botanical change caused by low levels of herbicide and fertilizer. *Journal of Applied Ecology*, 34, 1413-1425.
- Kleijn, D., van der Voort, L.A.C., 1997. Conservation headlands for rare arable weeds: the effects of fertilizer application and light penetration on plant growth. *Biological Conservation*, 81, 57-67.
- Kleijn, D., Berendse, F., Smit, R., Gillssen, N., 2001. Agri-environment schemes do not effectively protect biodiversity in Dutch agricultural landscapes. *Nature*, 413, 723-725.
- Klötzli, F., Grootjans, A.P., 2001. Restoration of natural and semi-natural wetland systems in central Europe: progress and predictability of developments. *Restoration Ecology*, 9, 209-219.
- Krebs, J.R., Wilson, J.D., Baudry, R.B., Siriwardena, G.M., 1999. The second silent spring? *Nature*, 400, 611-612.
- Lawson, C.S., Ford, M.A., Mitchley, J., 2004. The influence of seed addition and cutting regime on the success of grassland restoration on former arable land. *Applied Vegetation Science*, 7, 259-266.
- Le Coeur, D., Baudry, J., Burel, F., Thenail, C., 2002. Why and how we should study field boundary biodiversity in an agrarian landscape context. *Agriculture Ecosystems & Environment*, 89, 23-40.
- Lee, C.S., You, Y.H., Robinson, G.R., 2002. Secondary succession and natural habitat restoration in abandoned rice fields of central Korea. *Restoration Ecology*, 10, 306-314.
- Lososová, Z., Chytrý, M., Kropáč, Z., Otýpková, Z., Pyšek, P., Tichý, L. 2004. Weed vegetation of arable land in central Europe: gradients of diversity and species composition. *Journal of Vegetation Science*, 15, 415-422.
- Luoto, M., 2000. Modelling of rare plant species richness by landscape variables in an agricultural area in Finland. *Plant Ecology*, 149, 157-168.
- MAFF (ed.), 2003. *Kouchi-oyobi-sakutsukemenseki-toukei* (Statistics on the area under cultivation in Japan). Ministry of Agriculture, Forestry and Fisheries of Japan. Nourintoukeikyokai, Tokyo, pp. 113 (in Japanese).
- MAFF, 2001. Annual report on food, agriculture and rural areas in Japan. Ministry of Agriculture, Forestry and Fisheries of Japan.

<http://www.maff.go.jp/hakusyo/kaigai/ehakusyo2001.pdf>.

- Marrs, R.H., Snow, C.S.R., Owen, K.M., Evans, C.E., 1998. Heathland and acid grassland creation on arable soils at Minsmere: identification of potential problems and a test of cropping to impoverish soils. *Biological Conservation*, 85, 69-82.
- Marshall, E.J.P., 1989. Distribution patterns of plants associated with arable field edges. *Journal of Applied Ecology*, 26, 247-257.
- Marshall, E.J.P., Arnold, G.M., 1995. Factors affecting field weed and field margin flora on a farm in Essex, UK. *Landscape & Urban Planning*, 31, 205-216.
- Marshall, E.J.P., Moonen, A.C., 2002. Field margins in northern Europe: their functions and interactions with agriculture. *Agriculture, Ecosystems & Environments*, 89, 5-21.
- Marshall, E.J.P., Brown, V.K., Boatman, N.D., Lutmans, P.J.W., Square, G.R., Ward, L.K., 2003. The role of weeds in supporting biological diversity within crop fields. *Weed Research*, 43, 77-89.
- Matson, P.A., Parton, W.J., Power, A.G., Swift, M.J., 1997. Agriculture intensification and ecosystem properties. *Science*, 277, 504-509.
- Matsubayashi, T., 1997. A relationship between "Vegetation Patch" and landform in a small drainage basin in the Takadake Hills, northeastern Japan. *Quarterly Journal of Geography*, 49, 247-261. (in Japanese with English summary)
- Matsumura, M., Nishimura, N., Saijoh, Y., 1988. Plant succession in paddy fields lying fallow in Hida mountainous regions, Gifu Prefecture. *Japanese Journal of Ecology*, 38, 121-133 (in Japanese with English summary)
- McAdam, J.H., Bell, A.C., Henry, T., 1994. Field margin flora and fauna changes in response to grassland management practices. *Field margins: Integrating agriculture and conservation*. Monograph No. 58. British Crop Protection Council, pp. 153-158.
- McCune, B., Mefford, M.J., 1999. *PC-ORD: Multivariate Analysis of Ecological Data*, Version 4. MjM Software Design, Cleneden, Gleneden Beach, Oregon.
- McDonald, A.W., Bakker, J.P., Vegelin, K., 1996. Seed bank classification and its importance for the restoration of species-rich flood-meadows. *Journal of Vegetation Science*, 7, 157-164.
- McIntyre, S., Mitchell, D.S., Ladiges, P.Y., 1989. Seedling mortality and submergence in *Diplachne fusca*: A semi-aquatic weed of rice fields. *Journal of Applied Ecology*, 26, 537-549.
- McIver, J., Starr, L., 2001. Restoration of degraded lands in the interior Columbia River basin: passive vs. active approaches. *Forest Ecology and Management*, 153, 15-28.
- Mesléard, F., Lepart, J., Grillas, P., Mauchamp, A., 1999. Effects of seasonal flooding and

- grazing on the vegetation of former ricefields in the Rhône delta (Southern France). *Plant Ecology*, 145, 101-114.
- Middleton, B.A., 2003. Soil seed banks and the potential restoration of forested wetlands after farming. *Journal of Applied Ecology*, 40, 1025-1034.
- Mitsutaka, N., Fujisaki, K., Katsuno, T., 1999. Germination characteristics of the reproduced wetland vegetation in urban 'Yato' space. *Transactions of Rural Planning*, 1, 271-276 (in Japanese with English summary).
- Miyahara, M., 1961. Auto-ecology of Barnyardgrass (*Echinochloa crus-galli* Beauv.). *Journal of Weed Science and Technology*, 4, 11-19. (in Japanese).
- Miyahara, M., 1968. Effects of cultural practices on the weed community in paddy fields. *Journal of Weed Science and Technology*, 7, 22-28. (in Japanese).
- Miyawaki, A. (Ed.), 1986. *Vegetation of Japan. Volume 7 Kanto*. Shibundo Co., LTD. Publishers, Tokyo, 641 pp. (in Japanese).
- Miyawaki, A., Okuda, S., Fujiwara, R. (eds), 1994. *Handbook of Japanese Flora*. Shibundo, Tokyo, pp. 910. (in Japanese).
- Morimoto J., Inamoto A., Katsuno T., 2005. Ecological studies for conservation of *Saururus chinensis* (Lur.) Bali. In abandoned paddy fields in valley bottoms. *Journal of the Japanese Institute of Landscape Architecture*, 68, 697-700. (In Japanese with English summary)
- Morita, H., Kabaki, N., 2002. Effects of soil moisture condition on the emergence of weeds and rice plants from rainfed paddy soils in north-east Thailand. *Weed Biology and Management*, 2, 209-212.
- Motegi-choshi-hensan-iinkai (Ed.), 1995. *Motegi-Choshi, Dai 1 Kan, Shizen-minzoku-bunka-hen* (Natural history of Motegi Town, Volume 1 Nature, folklore and culture. Motegi Town, Tochigi Prefecture, Japan. 1000 pp. (in Japanese).
- Mountford, J.O., Lakhan, K.H., Hollnad, R.J., 1996. Reversion of grassland vegetation following the cessation of fertilizer application. *Journal of Vegetation Science*, 7, 219-228.
- Nagamatsu, D. and Miura, O., 1997. Soil disturbance regime in relation to micro-scale landforms and its effects on vegetation structure in a hilly area in Japan. *Plant Ecology*, 133, 191-200.
- Nakagawa, K., 1965. Auto-ecology of perennial weeds. *Journal of Weed Science and Technology*, 4, 42-48. (in Japanese).
- Nakamoto M., Sekioka H., Shimoda M., Morimoto Y., 2002. The vegetation management of fallow rice fields through periodical cultivation. *Journal of the Japanese Institute of Landscape Architecture* 65: 585-590. (In Japanese with English summary)

- National Institute of Agro-Environmental Science, MAFF (Eds.), 1998. Suidenseitaikei-niokeru-seibutsutayousei (Biodiversity in the agro-ecosystems of paddy fields). Yokendo, Tokyo. 183 pp. (In Japanese)
- Nishida, F., Kasahara, Y., 1978. Experimental studies on the effects of soil moisture content on the structure of weed communities in cultivated lands. *Nogakukenkyu*, 57, 55-72. (In Japanese)
- Nogami, M., 1994. Thermal condition of the forest vegetation zones and their potential distribution under different climates in Japan. *Journal of Geography*, 103, 886-897. (In Japanese with English summary)
- Numata, M., Nakamura, T., Hasegawa, M., Fujihara, M. (Eds.), 1997. Conservation of regional biodiversity –surveys of species, communities and ecosystems in Chiba city-. Shinzansha, Tokyo. 1059 pp. (in Japanese).
- Numata, M., Yoshizawa, N. (eds), 1979. Weed flora of Japan. Nippon-shokubutsu-chouseizai-kenkyukyokai, Tokyo, pp. 334 (in Japanese).
- Ohkuro, T., Shirato, Y., Itoh, K., 2003. Environmental characteristics of abandoned paddy fields contributing to the persistence of the population of a threatened plant species *Penthorum chinense*. *Journal of the Japanese Institute of Landscape Architecture*, 66, 599–602. (in Japanese with English summary)
- Ohkuro, T., Matsuo, K., Nemoto, M., 1996. Vegetation dynamics of abandoned paddy fields and their levee slopes in mountainous regions of central Japan. *Japanese Journal of Ecology*, 46, 245-256. (in Japanese with English summary)
- Ohta, T., Taniyama, I., Kusaba, T., Mori, A., Araya, H., 1996. Changes in the soil properties of terrace paddy fields with the years after abandoned. *Soil Phys. Cond. Plant Growth*, Jpn., 73, 3-10.
- Ohtsuka, H., Kobayashi, S., Masuda, S., Nemoto, M., 2004. Influence of rice cultivation and its cessation on the vegetation in valleys in hill land in Chiba Prefecture. *J. Weed Sci. Tech.* 49, 21-35 (In Japanese with English summary).
- Okubo, S., Kamiyama, A., Kitagawa, Y., Yamada, S., Palijon, A., Takeuchi, K., 2005. Management and micro-scale ground flora of secondary woodlands and their verges in the Tama Hills of Tokyo, Japan. *Biodiv. Conserv.* 14, 2137–2157.
- Okubo, S., Kamiyama, A., Kitagawa, Y. and Takeuchi, K., 2003. Plant species composition of the herbaceous layer of secondary woodlands and their verges in relation to micro-scale landform in the Tama Hills, central Japan. *Journal of Japanese Institute of Landscape Architecture*, 66(5), 537-542. (in Japanese with English abstract)
- Okubo S., Katoh Y. and Yamamoto S. 1999. Distribution patterns and classification of paddy

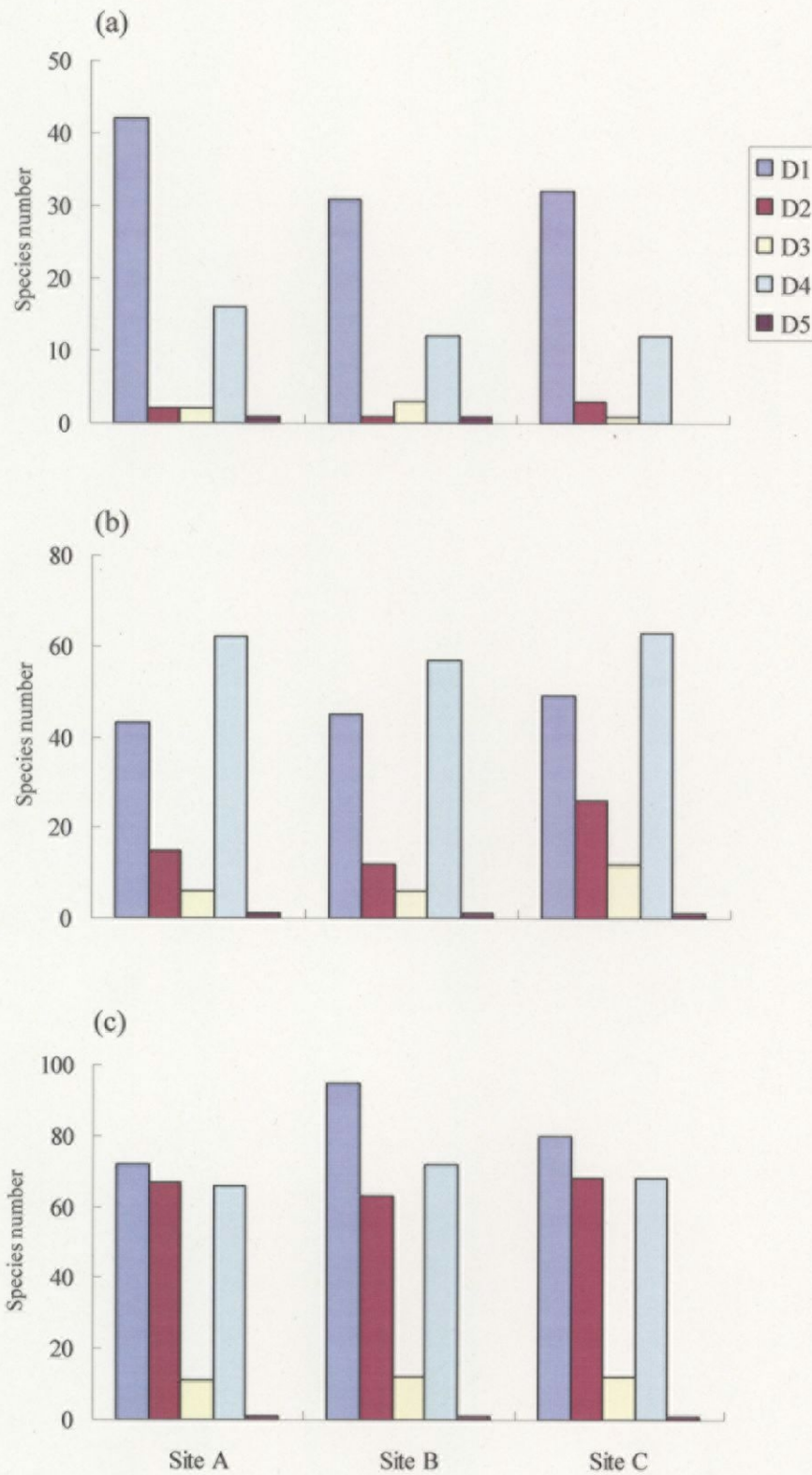
- fields on slope for evaluating ecological functions. *Transactions of Rural Planning* 1: 289-294. (In Japanese with English summary).
- Okubo, K., 2002. The present state of biological diversity on semi-natural grassland in Japan. *Grassland Science*, 48, 268-276.
- Okubo, S., Kamiyama, A., Kitagawa, Y., Yamada, S., Palijon, A., Takeuchi, K., 2005. Management and micro-scale ground flora of secondary woodlands and their verges in the Tama Hills of Tokyo, Japan. *Biodiv. Conserv.* 14, 2137–2157.
- Ormerod, S.J., Marshall, E.J.P., Kerby, G., Rushton, S.P., 2003. Meeting the ecological challenges of agricultural change: editor's introduction. *Journal of Applied Ecology*, 40, 939-946.
- Osawa S. and Katsuno T., 2003. Studies on the germination characteristics of *Alisma rariflorum* Samuelsson and the management for conservation in Yato wetland. *Japanese Journal of Environmental Information Science*, 17, 341-346. (In Japanese with English summary)
- Ovenden, G.N., Swash, A.R.H., Smallshire, D., 1998. Agri-environment schemes and their contribution to the conservation of biodiversity in England. *Journal of Applied Ecology*, 35, 955-960.
- Paoletti, M.G., Pimentel, D., Stinner, B.R., Stinner, D., 1992. Agroecosystem biodiversity: matching production and conservation biology. *Agriculture Ecosystems & Environment*, 40, 3-23.
- Pfadenhauer, J., Klötzli, F., 1996. Restoration experiments in middle European wet terrestrial ecosystems: an overview. *Vegetatio*, 126, 101-115.
- Pointereau, P., Bazile, D., 1995. Arbres des champs: haies, alignements, prés, vergers, ou l'art du bocage pour protéger restaurer et gérer les arbres hors la forêt, Solagro, 139 pp.
- Pykälä, J., Luoto, M., Heikkinen, R.K., Kontula, T., 2005. Plant species richness and persistence of rare plants in abandoned semi-natural grasslands in northern Europe. *Basic & Applied Ecology*, 6, 25-33.
- Pywell, R.F., Webb, N.R., Putwain, P.D., 1995. A comparison of techniques for restoring heathland on abandoned farmland. *Journal of Applied Ecology*, 32, 400-411.
- Robinson, R.A., Sutherland, W.J., 2002. Post-war changes in arable farming and biodiversity in Great Britain. *Journal of Applied Ecology*, 39, 157-176.
- Rosenthal, G., 2003. Selecting target species to evaluate the success of wet grassland restoration. *Agriculture Ecosystems & Environment*, 98, 227-246.
- Sakamoto, S., 1989. Ecology and control of main weeds into paddy fields of early-season rice in southern Kyushu. *Journal of Weed Science and Technology*, 34, 188-195. (in Japanese)

- with English summary).
- Schmuckl, R., de Blois, S., Bouchard, A., Domon, G., 2002. Spatial and temporal dynamics of hedgerows in three agricultural landscape of southern Quebec, Canada. *Environmental Management*, 30, 651-664.
- Sekioka, H., Shimoda, M., Nakamoto, M., Mizusawa, T., Morimoto, H., 2000. Vegetation management of abandoned rice fields for the conservation of water plants and wetland plants. *Journal of Japanese Institute of Landscape Architecture*, 63, 491–494. (in Japanese with English summary).
- Shimoda M., Nakamoto M. 2003. Vegetation and threatened plant dynamics of wet abandoned rice fields in Nakaikemi, Fukui Prefecture, Japan. *Japanese Journal of Ecology* 53: 197-217. (In Japanese with English summary)
- Shimoda, M., 1996. Abandoned rice field vegetation and its evaluation -a case study of wet abandoned rice field vegetation in Hiroshima Prefecture. *Vegetation Science*, 13, 37-50. (in Japanese with English summary)
- Shoji, A., 2003. Landscape ecological studies for semi-natural grassland conservation. *Grassland Science*, 48, 557-563. (in Japanese with English summary).
- Small, C.J., McCarthy, B.C., 2003. Spatial and temporal variability of herbaceous vegetation in an eastern deciduous forest. *Plant Ecology*, 164, 37-48.
- Smart, S.M., Bunce, R.G.H., Firbank, L.G., Coward, P., 2002. Do field boundaries act as refugia for grassland plant species diversity in intensively managed agricultural landscapes in Britain? *Agriculture Ecosystems & Environment*, 91, 73-87.
- Smith, H., Firbank, L.G., Macdonald, D.W., 1999. Uncropped edges of arable fields managed for biodiversity do not increase weed occurrence in adjacent crops. *Biological Conservation*, 89, 107-111.
- Society for Ecological Restoration International Science & Policy Working Group. 2004. The SER international primer on ecological restoration. www.ser.org
- Suding, K.N., Gross, K.L., Houseman, G.R., 2004. Alternative states and positive feedbacks in restoration ecology. *Trends in Ecology and Evolution*, 19, 46-52.
- Sugihara, S., 1970. Geomorphological developments of the western Shimosa upland in Chiba Prefecture, Japan. *Geographical Review of Japan*, 43, 703-718.
- Sugihara, S., Arai, F., Machida, H., 1978. Tephrocronology of the Middle to Late Pleistocene sediments in the northern part of the Boso Peninsula, central Japan. *Journal of Geological Society of Japan*, 84, 583–600 (in Japanese with English summary).
- Sutherland, W.J., 2002. Openness in management. *Nature*, 418, 834-835.
- Suzuki, T., 2000. Introduction to map reading for civil engineers. Volume 3 Terrace, hills and

- mountains. Kokonshoin, Tokyo, 942 pp. (in Japanese)
- Svenning, J.C., 2002. A review of natural vegetation openness in north-western Europe. *Biological Conservation*, 104, 133-148.
- Swetnam, R.D., Mountford, J.O., Manchester, S.J., Broughton, R.K., 2004. Agri-environmental schemes: their role in reversing floral decline in the Brue floodplain, Somerset, UK. *Journal of Environmental Management*, 71, 79-93.
- Takano, S., 1994. Stratigraphy of the lower Pleistocene Kazusa Group in the Tama Hills Central Japan. *Journal of Geology Society, Japan*, 100, 675–691 (in Japanese with English summary).
- Takeuchi K., Brown R.D., Washitani I., Tsunekawa A. and Yokohari M. (Eds.), 2002. *SATOYAMA: The traditional rural landscape of Japan*. Springer, Tokyo, 229 pp.
- Tamura, T., 1981, Multiscale landform classification study in the Hills of Japan II application of the multiscale landform classification system to pure geomorphological studies of the Hills of Japan. *Science Reports of the Tohoku University 7th series (geography)*, 31, 85-153.
- Thompson, D.B.A., MacDonald, A.J., Marsden, J.H., Galbraith, C.A., 1995. Upland heather moorland in Great Britain: a review of international importance, vegetation change and some objectives for nature conservation. *Biological Conservation*, 71, 163-178.
- Tallowin, J.R.B., Smith, R.E.N., Goodyear, J., Vickery, J.A., 2005. Spatial and structural uniformity of lowland agricultural grassland in England: a context for low biodiversity. *Grassland & Forage Science*, 60, 225-236.
- Tochigi Prefecture (Ed.), 1988. Land classification survey (in National land survey), 1: 50,000 geographical map, Karasuyama and Hitachiomiya. 51 pp. (in Japanese)
- Tokyo Metropolitan Government (Ed.), 1995. Land classification survey (in National land survey), 1: 50,000 geographical map, Hachioji, Fujisawa and Uenohara. 82 pp. (in Japanese)
- Tsiouris, S., Marshall, E.J.P., 1998. Observations on patterns of granular fertiliser deposition beside hedges and its likely effects on the botanical composition of field margins. *Annals of Applied Biology*, 132, 115-127.
- Vermeer, J.G., Berendse, F., 1983. The relationship between nutrient availability, shoot biomass and species richness in grassland and wetland communities. *Vegetatio*, 53, 121-126.
- Vinther, E., Hald, A.B., 2000. Restoration of an abandoned species-rich fen-meadow in Denmark: changes in species richness and dynamics of plant groups during 12 years. *Nordic Journal of Botany*, 20, 573-584.

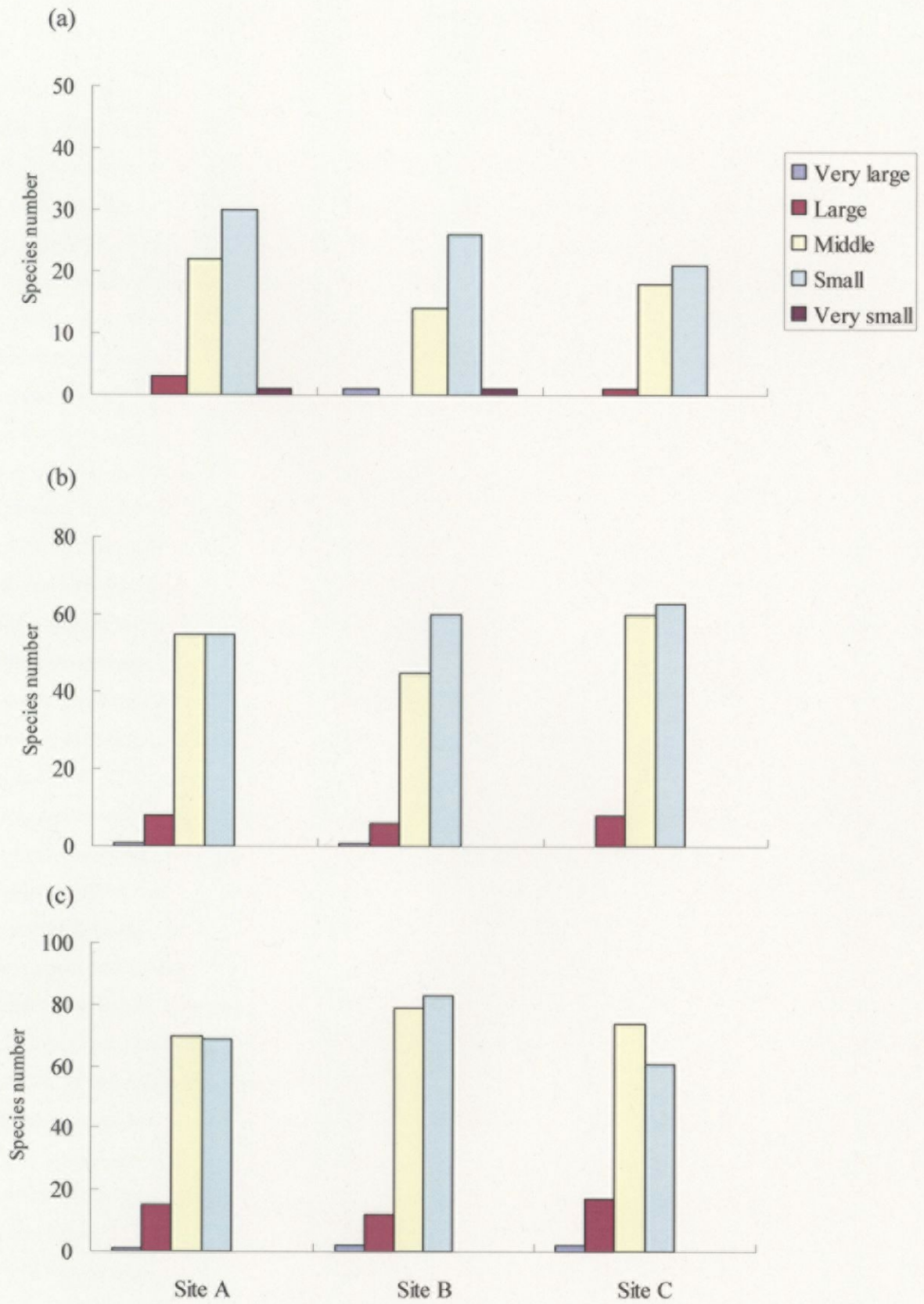
- Wagner, H.H., Wildi, O., Ewald, K.C., 2000. Additive partitioning of plant species diversity in an agricultural mosaic landscape. *Landscape Ecology*, 15, 219-227.
- Walker, K.J., Stevens, P.A., Stevens, D.P., Mountford, J.O., Manchester, S.J., Pywell, R.F., 2004. The restoration and re-creation of species-rich lowland grassland on land formerly managed for intensive agriculture in the UK. *Biological Conservation*, 119, 1-18.
- Webb, N.R., 1990. Changes on the heathlands of Dorset, England, between 1978 and 1987. *Biological Conservation*, 51, 273-286.
- Weibull, A.C., Östman, Ö., Granqvist, Å., 2003. Species richness in agroecosystems: the effect of landscape, habitat and farm management. *Biodiversity and Conservation*, 12, 1335-1355.
- Weibull, A.C., Bengtsson, J., Nohlgren, E., 2000. Diversity of butterflies in the agricultural landscape: the role of farming system and landscape heterogeneity. *Ecography*, 23, 743-750.
- Willems, J.H., 2001. Problems, approaches, and results in restoration of Dutch calcareous grassland during the last 30 years. *Restoration Ecology*, 9, 147-154.
- Yabu, S., 1988. Guiding principle on establishment and management of *Erythronium japonicum* DECNE. Population. *Journal of Japanese Institute of Landscape Architecture*, 51, 228-236. (in Japanese with English summary).
- Yagi, R., Yoshimura, M., 2000. Micro-landform units composing dissection valleys on Shimosa Upland, central Japan. *Natural History Museum and Institute, Chiba*, 6, 15-30. (in Japanese with English summary)
- Yamada, S., Kitagawa, Y., Takeuchi, K., 2002. Extensive cultivation management in wet-fallow paddy fields on the Tama Hills. *J. Jpn. Inst. Landsc. Architect.* 65, 290-293 (in Japanese with English summary).
- Yamada, S., Takeuchi, K., Kitagawa, Y., 2000. Influences on vegetation due to mowing, plowing and surface soil paddling in abandoned paddy fields. *Transactions of Rural Planning*, 2, 235-240 (in Japanese with English summary).
- Yamaguchi, H., Umemoto, S., 1996. Classification of paddy levees in terms of plant resource complex. *Japanese Journal of Weed Science and Technology*, 41, 286-294. (in Japanese with English summary)
- Yamane, I., Iimura, K., Yoshida, T., Iwata, S., Masujima, H., Kanazawa, S. (Eds.), 1982. *Suiden-dojo-gaku (Soils of paddy fields)*. Nonsanson-bunkakyokai, Tokyo, 347 pp. (in Japanese)
- Yamato, M., Hattori, T., Asami, K., 1999. Comparison of floristic composition of *Imperata cylindrica* var. *koenigii* communities growing on consolidated and on traditional levee

- slopes in Sanda, Hyogo Pref. Western Japan. *Japanese Journal of Weed Science and Technology*, 44, 170-179. (in Japanese with English summary)
- Yonekura, N., Kaizuka, S., Nogami, M., Chinzei, K. (Eds.), 2001. *Regional geomorphology of the Japanese Islands. Volume 1 Introduction to Japanese Geomorphology*. University of Tokyo Press, Tokyo, 349 pp. (In Japanese)
- Yoshinaga, S., Takeuchi, K., 1986. Slope morphology controlled by hydro-geological conditions in the western part of the Tama Hills, west of Tokyo. *Annals of the Tohoku Geographical Association*, 38, 1-15. (In Japanese with English summary)



Appendix 1 Disseminule forms of occurred species.

((a) Paddy field; (b) Levee; (c) Verge meadow, D1; anemochorous, D2; zoochorous, D3; autoshorous, D4; bolochorous, D5; not producing seed.)



Appendix 2 Plat height of occurred species.

((a) Paddy field; (b) Levee; (c) Verge meadow.)

Appendix 3. Taxa recorded in the present study.

| Occurred species | a* | Site A | | | Site B | | | Site C | | |
|---|----|--------|-----|----|--------|---|-----|--------|----|-----|
| | | P | L | VM | P | L | VM | P | L | VM |
| <i>Selaginella nipponica</i> | W | | | I | | | | | | |
| <i>Isoetes japonica</i> | W | I | | | | | | | | |
| <i>Equisetum arvense</i> | UR | I | III | II | I | V | III | I | IV | II |
| <i>Sceptridium ternatum</i> | G | | | | | I | I | | | |
| <i>Ophioglossum petiolatum</i> | G | | | | | | I | | | |
| <i>Osmunda japonica</i> | G | | | II | | I | IV | | | I |
| <i>Lygodium japonicum</i> | FM | | | I | | I | I | | | I |
| <i>Adiantum pedatum</i> | FM | | | | | | | | | I |
| <i>Dennstaedtia hirsuta</i> | W | | | I | | | | | | I |
| <i>Dennstaedtia wilfordii</i> | FF | | | | | | | | | I |
| <i>Pteridium aquilinum</i> var. <i>latiusculum</i> | G | | | I | | | I | | | I |
| <i>Sphenomeris chinensis</i> | FM | | | I | | | I | | | I |
| <i>Ceratopteris thalictroides</i> | W | I | | | | | | | | |
| <i>Athyrium niponicum</i> | UR | | | II | | I | II | | II | II |
| <i>Athyrium yokoscense</i> | FF | | | | | | | | | II |
| <i>Cyclosorus acuminatus</i> | FM | | | | | | I | | | |
| <i>Cyrtomium fortunei</i> | FF | | | | | | I | | | |
| <i>Deparia conilii</i> | W | | | I | | | II | | I | I |
| <i>Deparia japonica</i> | W | | | II | | I | III | | I | I |
| <i>Dryopteris bissetiana</i> | FF | | | | | | I | | | |
| <i>Dryopteris erythrosora</i> | FF | | | | | | I | | | |
| <i>Dryopteris uniformis</i> | FF | | | I | | | I | | | I |
| <i>Leptogramma mollissima</i> | W | | | I | | | I | | | |
| <i>Onoclea sensibilis</i> var. <i>interrupta</i> | W | | | | | | | | I | I |
| <i>Phegopteris decursivipinnata</i> | W | | | II | | | I | | I | III |
| <i>Thelypteris glanduligera</i> var. <i>elatior</i> | FF | | | | | | I | | | |
| <i>Thelypteris japonica</i> | FF | | | | | | I | | | |
| <i>Thelypteris palustris</i> | W | | | I | | | I | | II | II |
| <i>Thelypteris viridifrons</i> | FF | | | I | | | I | | | |
| <i>Pinus densiflora</i> | FF | | | | | | | | | I |
| <i>Cryptomeria japonica</i> | FF | | | | | | I | | | |
| <i>Chamaecyparis pisifera</i> | FF | | | | | | I | | | |
| <i>Typha orientalis</i> | W | I | | | | | | | | |
| <i>Alisma canaliculatum</i> | W | I | | | | | | | | |
| <i>Sagittaria trifolia</i> | W | III | | | I | | | V | | |

| Occurred species | a* | Site A | | | Site B | | | Site C | | |
|---|----|--------|-----|-----|--------|----|----|--------|-----|-----|
| | | P | L | VM | P | L | VM | P | L | VM |
| <i>Agrostis clavata</i> | G | | | | | | | II | I | |
| <i>Agrostis clavata ssp. matsumurae</i> | UR | | II | II | | IV | II | | III | I |
| <i>Agrostis gigantea</i> | UR | | III | | | | | | | |
| <i>Alopecurus aequalis var. amulensis</i> | W | IV | II | | V | II | | I | I | |
| <i>Andropogon virginicus</i> | UR | | | I | | | | | | |
| <i>Arthraxon hispidus</i> | W | I | II | I | | | I | I | II | I |
| <i>Arundinella hirta</i> | G | | | | | | | | I | |
| <i>Beckmannia syzigachne</i> | W | | | | I | | | | | |
| <i>Brachypodium sylvaticum</i> | FF | | | | | | II | | | |
| <i>Bromus unioloides</i> | UR | | | I | | | | | | |
| <i>Calamagrostis brachytricha</i> | FM | | | | | | I | | | I |
| <i>Cymbopogon tortilis var. goeringii</i> | G | | | I | | | I | | | I |
| <i>Digitaria ciliaris</i> | UR | I | IV | II | | I | I | I | III | I |
| <i>Digitaria radicata</i> | UR | | I | | | | | | | |
| <i>Dimeria ornithopoda var. tenera</i> | W | | | | | | I | | | I |
| <i>Echinochloa crus-galli</i> | UR | I | I | | | I | | | | |
| <i>Echinochloa oryzoides</i> | W | I | II | | | | | I | | |
| <i>Eleusine indica</i> | UR | | I | | | | | | | |
| <i>Elymus racemifera</i> | UR | | | I | | | I | | II | I |
| <i>Elymus tsukushiensis var. transiens</i> | UR | | III | I | | II | | | II | |
| <i>Eragrostis ferruginea</i> | UR | | I | | | | | | | |
| <i>Eragrostis multicaulis</i> | UR | | I | | | | | | | |
| <i>Eragrostis pilosa</i> | UR | | I | | | | | | | |
| <i>Festuca parvigluma</i> | G | | | II | | II | IV | | I | III |
| <i>Glyceria acutiflora</i> | W | | | | | I | | | | |
| <i>Imperata cylindrica</i> | G | | I | III | | II | I | | III | II |
| <i>Isachne globosa</i> | W | | | | I | | | | | |
| <i>Leersia sayanuka</i> | W | I | II | | | | | I | | |
| <i>Microstegium japonicum</i> | UR | | | I | | | I | | I | II |
| <i>Microstegium vimineum var. polystachyum</i> | W | | I | II | | | II | | I | I |
| <i>Miscanthus sinensis</i> | G | | | III | | I | II | | III | III |
| <i>Muhlenbergia japonica</i> | FM | | | I | | | | | | |
| <i>Oplismenus undulatifolius</i> | FF | | | I | | | II | | | I |
| <i>Oplismenus undulatifolius var. japonicus</i> | FM | | | II | | | IV | | | IV |
| <i>Panicum bisulcatum</i> | W | | I | I | | I | I | | | I |

| Occurred species | a* | Site A | | | Site B | | | Site C | | |
|---|----|--------|----|----|--------|-----|----|--------|-----|----|
| | | P | L | VM | P | L | VM | P | L | VM |
| <i>Paspalum dilatatum</i> | UR | | I | | | | | | | |
| <i>Paspalum thunbergii</i> | UR | | II | I | | I | I | | I | I |
| <i>Pennisetum alopecuroides</i> | UR | | | | | | | | I | |
| <i>Phragmites australis</i> | W | | | | I | | I | | | |
| <i>Poa acroleuca</i> | UR | | | | | | | | I | |
| <i>Poa annua</i> | UR | I | I | | I | I | | | | |
| <i>Sacciolepis indica</i> | W | | | I | | | II | | I | |
| <i>Sacciolepis indica</i> var. <i>oryztorum</i> | W | I | | | | I | | | | |
| <i>Setaria faberi</i> | UR | | | | | | | | | I |
| <i>Setaria glauca</i> | UR | | I | I | | | I | | I | |
| <i>Spodiopogon cotulifer</i> | G | | | I | | | | | | |
| <i>Spodiopogon sibiricus</i> | G | | | | | | | | | II |
| <i>Themeda triandra</i> var. <i>japonica</i> | G | | | | | | I | | | |
| <i>Trisetum bifidum</i> | UR | | I | I | | I | I | | III | I |
| <i>Zoysia japonica</i> | G | | I | I | | III | I | | III | I |
| <i>Phyllostachys pubescens</i> | FF | | | I | | | | | | |
| <i>Pleioblastus chino</i> | G | | | IV | | I | V | | I | IV |
| <i>Carex biwensis</i> | W | | | | | I | I | | | |
| <i>Carex conica</i> | FF | | | I | | | V | | | II |
| <i>Carex duvaliana</i> | FF | | | | | | I | | | |
| <i>Carex gibba</i> | UR | | I | | | I | I | | | |
| <i>Carex humilis</i> | FF | | | I | | | I | | | |
| <i>Carex lanceolata</i> | FF | | | I | | I | II | | | II |
| <i>Carex lenta</i> | FF | | | II | | | I | | | |
| <i>Carex leucochlora</i> | UR | | I | I | | I | I | | I | |
| <i>Carex leucochlora</i> var. <i>aphanandra</i> | UR | | | II | | I | I | | II | II |
| <i>Carex leucochlora</i> var. <i>filiculmis</i> | FM | | | | | | | | | I |
| <i>Carex maximowiczii</i> | W | | | I | | | I | | | |
| <i>Carex multifolia</i> | W | | | | | | II | | I | I |
| <i>Carex nervata</i> | G | | | | | II | I | | I | I |
| <i>Carex parciflora</i> var. <i>macroglossa</i> | W | | | | | II | I | | II | |
| <i>Carex rugata</i> | FM | | | I | | | | | I | I |
| <i>Carex sachalinensis</i> var. <i>iwakiana</i> | FM | | | I | | | | | | |
| <i>Carex thunbergii</i> | W | | | | | | I | | | |
| <i>Carex tristachya</i> | FM | | | | | | I | I | | |

| Occurred species | a* | Site A | | | Site B | | | Site C | | |
|--|----|--------|-----|----|--------|----|----|--------|----|----|
| | | P | L | VM | P | L | VM | P | L | VM |
| <i>Cyperus brevifolius</i> var. <i>leiolepis</i> | W | | IV | I | | I | I | | I | |
| <i>Cyperus difformis</i> | W | II | II | | I | I | | | | |
| <i>Cyperus flaccidus</i> | W | I | | | | | | | | |
| <i>Cyperus globosus</i> | W | | | | | | I | | | |
| <i>Cyperus halpan</i> ssp. <i>juncooides</i> | W | | I | | | | I | | | |
| <i>Cyperus iria</i> | W | | I | I | | I | | | | |
| <i>Cyperus orthostachyus</i> | W | I | | | | | | I | | |
| <i>Eleocharis acicularis</i> var. <i>longiseta</i> | W | I | I | | | | | | | |
| <i>Eleocharis congesta</i> var. <i>japonica</i> | W | II | I | | | | I | I | | |
| <i>Eleocharis kuroguwai</i> | W | | | | | | | I | | |
| <i>Fimbristylis autumnalis</i> | W | | I | | | | I | I | I | |
| <i>Fimbristylis dichotoma</i> var. <i>tentsuki</i> | W | | | | | I | | | | |
| <i>Fimbristylis milliacea</i> | W | I | I | | | I | | I | | |
| <i>Fimbristylis squarrosa</i> var. <i>esquarrosa</i> | W | I | | | | | | | | |
| <i>Lipocarpa microcephala</i> | W | | | | | | | | I | |
| <i>Scirpus juncoides</i> var. <i>ohwianus</i> | W | | | | I | | | I | | |
| <i>Trachycarpus fortunei</i> | FF | | | I | | | | | | |
| <i>Arisaema urashima</i> | FM | | | | | | | | | I |
| <i>Pinellia ternata</i> | UR | | I | I | | | | | I | |
| <i>Lemna aoukikusa</i> | W | | | | III | | | III | | |
| <i>Spirodela polyrhiza</i> | W | | | | IV | | | IV | | |
| <i>Eriocaulon cinereum</i> var. <i>sieboldianum</i> | W | I | | | | | | | | |
| <i>Eriocaulon decemflorum</i> var. <i>Nipponicum</i> | W | | | | | | I | | | |
| <i>Eriocaulon robustius</i> | W | | | | | | | I | | |
| <i>Commelina communis</i> | UR | | II | I | | I | I | | I | II |
| <i>Murdannia keisak</i> | W | II | III | | III | I | | I | I | |
| <i>Monochoria vaginalis</i> var. <i>plantaginea</i> | W | IV | | | IV | | | III | | |
| <i>Juncus effusus</i> var. <i>decipiens</i> | W | | | I | | I | I | | | |
| <i>Juncus leschenaultii</i> | W | I | | | | | I | | | |
| <i>Juncus tenuis</i> | W | | I | | | | | | | |
| <i>Luzula capitata</i> | G | | | II | | IV | I | | I | II |
| <i>Luzula multiflora</i> | G | | | | | | | | | I |
| <i>Allium macrostemon</i> | UR | | I | I | | I | I | | | I |
| <i>Allium thunbergii</i> | G | | | | | | | | I | I |
| <i>Disporum sessile</i> | FF | | | | | | I | | | |
| <i>Hemerocallis fulva</i> var. <i>kwanso</i> | G | | I | | | | | | II | |

| Occurred species | a* | Site A | | | Site B | | | Site C | | |
|---|----|--------|---|-----|--------|-----|-----|--------|----|-----|
| | | P | L | VM | P | L | VM | P | L | VM |
| <i>Hemerocallis fulva</i> var. <i>longituba</i> | G | | I | III | | | | | | |
| <i>Hosta albomarginata</i> f. <i>lancifolia</i> | W | | | I | | | I | | I | II |
| <i>Hosta montana</i> | W | | | | | | III | | | III |
| <i>Lilium auratum</i> | G | | | | | | II | | | I |
| <i>Liriope minor</i> | G | | I | I | | I | I | | I | II |
| <i>Liriope platyphylla</i> | FF | | | | | | I | | | I |
| <i>Ophiopogon japonicus</i> | FF | | | II | | | III | | | I |
| <i>Ophiopogon ohwii</i> | FF | | | | | | I | | | |
| <i>Polygonatum falcatum</i> | FF | | | I | | | I | | | |
| <i>Polygonatum lasianthum</i> | FF | | | | | | I | | | |
| <i>Scilla scilloides</i> | G | | | II | | I | I | | | |
| <i>Smilax china</i> | FM | | | I | | | II | | | I |
| <i>Smilax riparia</i> var. <i>ussuriensis</i> | FF | | | | | | I | | | |
| <i>Tricyrtis macropoda</i> | FF | | | I | | | I | | | |
| <i>Dioscorea gracillima</i> | FM | | | I | | | I | | | I |
| <i>Dioscorea japonica</i> | FM | | | II | | | III | | I | III |
| <i>Dioscorea tokoro</i> | FM | | | I | | | II | | I | II |
| <i>Sisyrinchium atlanticum</i> | UR | | I | I | | I | I | | | |
| <i>Houttuynia cordata</i> | UR | | I | IV | | III | V | | II | III |
| <i>Chloranthus japonicus</i> | FF | | | | | | | | | I |
| <i>Chloranthus serratus</i> | FF | | | | | | I | | | |
| <i>Salix bakko</i> | W | | | | | | | | | I |
| <i>Salix japonica</i> | FM | | | I | | | I | | | |
| <i>Carpinus tschonoskii</i> | FF | | | I | | | I | | | I |
| <i>Castanea crenata</i> | FF | | | | | | | | | I |
| <i>Cyclobalanopsis myrsinaefolia</i> | FF | | | I | | | I | | | |
| <i>Quercus acutissima</i> | FF | | | | | | | | | I |
| <i>Quercus serrata</i> | FF | | | I | | | III | | | I |
| <i>Aphananthe aspera</i> | FF | | | I | | | | | | |
| <i>Celtis sinensis</i> var. <i>japonica</i> | FF | | | I | | | | | | |
| <i>Zelkova serrata</i> | FF | | | I | | | | | | |
| <i>Fatoua villosa</i> | UR | | | II | | | I | | I | I |
| <i>Morus australis</i> | FF | | | II | | | II | | I | I |
| <i>Boehmeria gracilis</i> | FM | | | | | | | | I | III |
| <i>Boehmeria nipononivea</i> | UR | | I | I | | | | | I | I |
| <i>Boehmeria platanifolia</i> | FM | | I | I | | | | | I | II |

| Occurred species | a* | Site A | | | Site B | | | Site C | | |
|--|----|--------|-----|----|--------|-----|----|--------|----|----|
| | | P | L | VM | P | L | VM | P | L | VM |
| <i>Pilea hamaoi</i> | W | | | | | | I | | I | I |
| <i>Thesium chinense</i> | G | | | I | | | I | | | I |
| <i>Heterotropa muramatsui</i> var. <i>tamaensis</i> | FF | | | | | | I | | | |
| <i>Antenoron filiforme</i> | FF | | | I | | | | | | I |
| <i>Persicaria hydropiper</i> | W | II | I | | | | | | | |
| <i>Persicaria lapathifolia</i> | UR | | I | | | | | | | |
| <i>Persicaria longiseta</i> | UR | I | III | I | | I | | | II | |
| <i>Persicaria nipponensis</i> | W | I | I | | I | I | I | I | I | |
| <i>Persicaria pubescens</i> | W | | I | | | | | | | |
| <i>Persicaria senticosa</i> | FM | | | | | | | | | I |
| <i>Persicaria sieboldii</i> | W | | | | | | | I | | |
| <i>Persicaria thunbergii</i> | W | I | I | | I | | I | I | I | I |
| <i>Reynoutria japonica</i> | UR | | | | | | | | | I |
| <i>Rumex acetosa</i> | UR | | I | I | | II | I | | II | I |
| <i>Rumex conglomeratus</i> | UR | | I | I | | | | | | |
| <i>Rumex japonicus</i> | UR | | II | | | I | | | | |
| <i>Achyranthes fauriei</i> | UR | | I | I | | I | | | I | I |
| <i>Achyranthes japonica</i> | FM | | | I | | | I | | | |
| <i>Cerastium glomeratum</i> | UR | | III | I | | III | I | | | |
| <i>Cerastium holosteoides</i> ssp. <i>triviale</i> var. <i>angustifolium</i> | UR | | I | I | | I | I | | IV | I |
| <i>Dianthus superbus</i> var. <i>longicalycinus</i> | G | | | | | | | | I | II |
| <i>Lychnis senno</i> | G | | | | | | | | | I |
| <i>Sagina japonica</i> | UR | I | II | I | I | I | | | II | |
| <i>Stellaria alsine</i> var. <i>undulata</i> | UR | I | IV | | IV | III | I | I | IV | |
| <i>Stellaria aquatica</i> | UR | | I | | | | | | I | |
| <i>Stellaria media</i> var. <i>procera</i> | UR | | I | I | | | | | | |
| <i>Stellaria sessiliflora</i> | W | | | | | | | | | I |
| <i>Cimicifuga japonica</i> | FM | | | | | | | | | I |
| <i>Clematis apiifolia</i> | FM | | | | | | | | | I |
| <i>Clematis japonica</i> | FM | | | | | | I | | | |
| <i>Clematis terniflora</i> | FM | | | I | | | I | | I | I |
| <i>Ranunculus cantoniensis</i> | W | I | III | I | I | III | I | | I | |
| <i>Ranunculus japonicus</i> | G | | | | | I | | | I | II |
| <i>Ranunculus sceleratus</i> | W | I | I | | I | | | | | |
| <i>Ranunculus silerifolius</i> | W | | | | | | I | | | |

| Occurred species | a* | Site A | | | Site B | | | Site C | | |
|---|----|--------|----|-----|--------|-----|----|--------|-----|-----|
| | | P | L | VM | P | L | VM | P | L | VM |
| <i>Thalictrum minus</i> var. <i>hypoleucum</i> | G | | | II | | | I | | | V |
| <i>Akebia x pentaphylla</i> | FM | | | I | | | | | | I |
| <i>Akebia quinata</i> | FM | | | I | | | I | | I | I |
| <i>Akebia trifoliata</i> | FM | | | II | | | II | | I | II |
| <i>Berberis thunbergii</i> | W | | | | | | | | | I |
| <i>Epimedium grandiflorum</i> var. <i>thunbergianum</i> | G | | | I | | | | | | |
| <i>Cocculus trilobus</i> | FM | | | I | | | II | | | II |
| <i>Magnolia praecocissima</i> | FF | | | I | | | | | | |
| <i>Lindera glauca</i> | FF | | | | | | | | | I |
| <i>Lindera praecox</i> | FF | | | | | | | | | I |
| <i>Macleaya cordata</i> | FM | | | | | | | | | I |
| <i>Arabis hirsuta</i> | G | | | | | | | | I | I |
| <i>Cardamine flexuosa</i> | W | III | I | | V | II | I | I | II | I |
| <i>Cardamine flexuosa</i> var. <i>latifolia</i> | W | II | I | | I | | | | I | |
| <i>Cardamine regeliana</i> | W | | | | | | I | | I | |
| <i>Rorippa indica</i> | UR | II | II | | | I | | I | II | |
| <i>Rorippa islandica</i> | W | I | I | | | | | | | |
| <i>Sedum bulbiferum</i> | UR | I | V | III | I | IV | I | | V | I |
| <i>Astilbe microphylla</i> | G | | | I | | I | II | | I | III |
| <i>Deutzia crenata</i> | FM | | | I | | | I | | I | III |
| <i>Deutzia scabra</i> | FM | | | | | | II | | | |
| <i>Hydrangea involucrata</i> | W | | | | | | | | | I |
| <i>Parnassia palustris</i> var. <i>mulutiseta</i> | W | | | | | | I | | | |
| <i>Agrimonia pilosa</i> var. <i>japonica</i> | FM | | | | | | I | | | |
| <i>Chaenomeles japonica</i> | G | | | II | | | | | | I |
| <i>Duchesnea chrysantha</i> | UR | | IV | I | I | III | I | I | III | I |
| <i>Kerria japonica</i> | FM | | | | | | | | | I |
| <i>Potentilla centigrana</i> f. <i>patens</i> | UR | | | | | | | | I | |
| <i>Potentilla fragarioides</i> var. | G | | | I | | | | | | I |
| <i>Potentilla freyniana</i> | G | | | I | | I | IV | | I | IV |
| <i>Potentilla sundaica</i> var. <i>robusta</i> | W | | | | I | II | | I | I | |
| <i>Prunus jamasakura</i> | FF | | I | | | | I | | | I |
| <i>Rosa multiflora</i> | FM | | | I | | | I | | | I |
| <i>Rosa wichuraiana</i> | FM | | | I | | | I | | | I |
| <i>Rubus microphyllus</i> | FM | | | | | | | | | II |

| Occurred species | a* | Site A | | | Site B | | | Site C | | |
|--|----|--------|----|-----|--------|-----|-----|--------|----|-----|
| | | P | L | VM | P | L | VM | P | L | VM |
| <i>Rubus palmatus</i> var. <i>coptophyllus</i> | FM | | | I | | | II | | | I |
| <i>Rubus parvifolius</i> | FM | | | II | | | | | | I |
| <i>Sanguisorba officinalis</i> | G | | | II | | I | II | | I | II |
| <i>Spiraea japonica</i> | G | | | | | | I | | | I |
| <i>Albizia julibrissin</i> | FM | | | I | | | | | | I |
| <i>Amphicarpaea edgeworthii</i> var. <i>japonica</i> | FM | | | | | | I | | | I |
| <i>Astragalus sinicus</i> | W | | | | II | I | | | I | |
| <i>Desmodium oxyphyllum</i> | FM | | | | | | | | | I |
| <i>Dumasia truncata</i> | FM | | | I | | | II | | | I |
| <i>Indigofera pseudo-tinctoria</i> | G | | | II | | | I | | I | II |
| <i>Kummerowia striata</i> | UR | | | | | | I | | | |
| <i>Lespedeza bicolor</i> | G | | | I | | | | | | |
| <i>Lespedeza cuneata</i> | G | | | | | | I | | | |
| <i>Lespedeza pilosa</i> | G | | | I | | I | II | | I | III |
| <i>Pueraria lobata</i> | FM | | | I | | | I | | | I |
| <i>Trifolium repens</i> | UR | | IV | I | | III | | | I | |
| <i>Vicia angustifolia</i> var. <i>segetalis</i> | UR | | | I | | | | | | |
| <i>Vicia pseudo-orobus</i> | FM | | | I | | | | | | |
| <i>Wisteria floribunda</i> | FM | | | II | | | I | | | I |
| <i>Geranium nepalense</i> var. <i>thunbergii</i> | UR | | I | | | I | I | | I | II |
| <i>Oxalis corniculata</i> | UR | | I | III | | III | III | | II | II |
| <i>Zanthoxylum piperitum</i> | FF | | | I | | | | | | I |
| <i>Polygala japonica</i> | G | | | I | | | I | | I | I |
| <i>Acalypha australis</i> | UR | | I | I | | | | | I | I |
| <i>Euphorbia pekinensis</i> var. <i>onoei</i> | G | | | I | | | II | | | II |
| <i>Mallotus japonicus</i> | FF | | | | | | | | | I |
| <i>Phyllanthus matsumurae</i> | UR | | | I | | | I | | I | I |
| <i>Callitriche verna</i> | W | | | | I | | | I | | |
| <i>Rhus javanica</i> var. <i>roxburghii</i> | FM | | | | | | I | | | II |
| <i>Rhus trichocarpa</i> | FF | | | | | | | | | I |
| <i>Ilex crenata</i> | FF | | | I | | | II | | | |
| <i>Ilex serrata</i> | FF | | | | | | | | | I |
| <i>Celastrus orbiculatus</i> | FM | | | I | | | | | I | I |
| <i>Euonymus alatus</i> | FF | | | | | | | | | I |
| <i>Euonymus alatus</i> f. <i>ciliato-dentatus</i> | FF | | | I | | | I | | | |
| <i>Euonymus sieboldianus</i> | FF | | | | | | I | | | I |

| Occurred species | a* | Site A | | | Site B | | | Site C | | |
|--|----|--------|-----|----|--------|----|-----|--------|----|----|
| | | P | L | VM | P | L | VM | P | L | VM |
| <i>Acer crataegifolium</i> | FF | | | | | | | | | I |
| <i>Berchemia racemosa</i> | FM | | | I | | | I | | | I |
| <i>Ampelopsis brevipedunculata</i> var. <i>heterophylla</i> | FM | | | I | | | I | | | I |
| <i>Cayratia japonica</i> | UR | | | I | | | | | | |
| <i>Parthenocissus tricuspidata</i> | FF | | | I | | | II | | | I |
| <i>Vitis thunbergii</i> | FM | | | I | | | I | | | I |
| <i>Corchoropsis tomentosa</i> | UR | | | | | | I | | | |
| <i>Eurya japonica</i> | FF | | | | | | III | | | |
| <i>Hypericum erectum</i> | G | | | I | | | I | | I | I |
| <i>Sarothra laxa</i> | W | I | I | | I | I | I | I | I | |
| <i>Elatine triandra</i> var. <i>podicellata</i> | W | I | | | II | | | | | |
| <i>Viola grypceras</i> | G | | | II | | I | IV | | I | II |
| <i>Viola keiskei</i> | FM | | | I | | | | | | I |
| <i>Viola phalacrocarpa</i> | G | | | | | | | | I | I |
| <i>Viola phalacrocarpa</i> f. <i>glaberrima</i> | G | | | | | | I | | | |
| <i>Viola verecunda</i> | W | | I | I | | I | II | | II | I |
| <i>Stachyurus praecox</i> | FM | | | | | | | | | I |
| <i>Wikstroemia ganpi</i> | G | | | | | | I | | | |
| <i>Rotala indica</i> var. <i>uliginosa</i> | W | I | | | I | | | I | | |
| <i>Epilobium pyrricholophum</i> | W | | | | | | I | | I | |
| <i>Ludwigia epilobioides</i> | W | II | I | | III | I | | II | | |
| <i>Haloragis micrantha</i> | G | | | | | I | I | | | |
| <i>Aralia elata</i> | FM | | | | | | | | | I |
| <i>Hedera rhombea</i> | FF | | | I | | | I | | | |
| <i>Angelica decursiva</i> | G | | | I | | | II | | | I |
| <i>Cryptotaenia japonica</i> | FF | | | | | | | | | I |
| <i>Hydrocotyle maritima</i> | W | | III | I | | I | I | | I | |
| <i>Hydrocotyle ramiflora</i> | G | | I | I | | I | I | | II | I |
| <i>Hydrocotyle sibthorpioides</i> | UR | | I | I | I | I | I | | I | I |
| <i>Oenanthe javanica</i> | W | III | IV | I | II | II | I | III | II | |
| <i>Seseli libanotis</i> ssp. <i>Japonica</i> | G | | | | | | | | | I |
| <i>Torilis japonica</i> | FM | | | I | | | | | | |
| <i>Torilis scabra</i> | FM | | | I | | | | | | |
| <i>Helwingia japonica</i> | FF | | | I | | | | | | I |
| <i>Clethra barvinervis</i> | FF | | | | | | II | | | I |

| Occurred species | a* | Site A | | | Site B | | | Site C | | |
|--|----|--------|----|-----|--------|-----|-----|--------|----|-----|
| | | P | L | VM | P | L | VM | P | L | VM |
| <i>Rhododendron kaempferi</i> | FF | | | | | | III | | | II |
| <i>Ardisia crenata</i> | FF | | | I | | | | | | |
| <i>Ardisia japonica</i> | FF | | | | | | I | | | |
| <i>Lysimachia clethroides</i> | G | | | | | | I | | | I |
| <i>Lysimachia fortunei</i> | W | | | | | | | | I | |
| <i>Lysimachia japonica</i> var. <i>subsessilis</i> | UR | | I | III | | III | IV | | II | II |
| <i>Styrax japonicus</i> | FF | | | | | | I | | | I |
| <i>Fraxinus sieboldiana</i> | FF | | | | | | I | | | I |
| <i>Ligustrum lucidum</i> | FF | | | | | | I | | | |
| <i>Gentiana scabra</i> var. <i>buergeri</i> | G | | | I | | I | II | | | I |
| <i>Swertia japonica</i> | G | | | | | | I | | | |
| <i>Trachelospermum asiaticum</i> var. <i>intermedium</i> | FF | | | | | | I | | | I |
| <i>Cynanchum sublaceolatum</i> | FM | | | | | | I | | | I |
| <i>Calystegia hederacea</i> | UR | | I | I | | | | | | |
| <i>Bothriospermum tenellum</i> | UR | | I | I | | II | I | | | |
| <i>Lithospermum zollingeri</i> | FM | | | | | | | | | I |
| <i>Trigonotis peduncularis</i> | UR | | I | I | | | | | II | I |
| <i>Callicarpa japonica</i> | FF | | | I | | | I | | | I |
| <i>Callicarpa mollis</i> | FF | | | | | | I | | | |
| <i>Ajuga decumbens</i> | UR | | | | | II | II | | II | I |
| <i>Ajuga nipponensis</i> | FM | | | I | | | | | | |
| <i>Clinopodium gracile</i> | UR | | | | | II | I | | | |
| <i>Clinopodium micranthum</i> | FM | | | | | | | | | I |
| <i>Glechoma hederacea</i> var. <i>grandis</i> | UR | | I | I | | I | I | | V | II |
| <i>Isodon inflexus</i> | FM | | | I | | | I | | | III |
| <i>Lamium purpureum</i> | UR | | I | I | | | | | | |
| <i>Lycopus ramosissimus</i> var. <i>japonicus</i> | W | | I | | | I | | | | |
| <i>Mentha arvensis</i> var. <i>piperascens</i> | W | | | | | | | | I | I |
| <i>Mosla dianthera</i> | W | | II | | | | I | | I | |
| <i>Prunella vulgaris</i> ssp. <i>asiatica</i> | G | | | I | | | II | | | II |
| <i>Salvia japonica</i> | FM | | | I | | I | II | | I | II |
| <i>Salvia nipponica</i> | G | | | | | | II | | | II |
| <i>Scutellaria brachyspica</i> | FM | | | I | | | I | | | |
| <i>Scutellaria indica</i> | G | | | | | I | I | | | |
| <i>Dopatrium junceum</i> | W | I | | | | | | | | |

| Occurred species | a* | Site A | | | Site B | | | Site C | | |
|--|----|--------|-----|-----|--------|-----|-----|--------|-----|-----|
| | | P | L | VM | P | L | VM | P | L | VM |
| <i>Limnophila aromatica</i> | W | I | | | | | | | | |
| <i>Limnophila sessiliflora</i> | W | II | | | I | | | | | |
| <i>Lindernia antipoda</i> | W | | | | I | | | | | |
| <i>Lindernia dubia</i> | W | I | | | I | | | I | | |
| <i>Lindernia procumbens</i> | W | III | | | II | | | II | | |
| <i>Lindernia dubia</i> var. <i>dubia</i> | W | | | | | | | I | | |
| <i>Mazus miquelii</i> | W | | I | | I | III | | I | II | |
| <i>Mazus miquelii</i> form. <i>albiflorus</i> | W | | | | | I | | | | |
| <i>Mazus pumilus</i> | UR | I | II | | I | I | | | I | |
| <i>Mimulus nepalensis</i> | W | | | | | | | I | | |
| <i>Phtheirospermum japonicum</i> | FM | | | I | | | | | | I |
| <i>Veronica arvensis</i> | UR | | II | I | | III | I | | II | I |
| <i>Veronica persica</i> | UR | | II | I | | II | I | | I | |
| <i>Justicia procumbens</i> | UR | | I | IV | | | III | | III | III |
| <i>Phryma leptostachya</i> var. <i>asiatica</i> | FF | | | I | | | | | | |
| <i>Plantago asiatica</i> | UR | | III | | | I | I | | | |
| <i>Galium gracilens</i> | G | | I | III | | I | I | | II | II |
| <i>Galium spurium</i> var. <i>echinospermum</i> | UR | | | I | | | I | | | |
| <i>Galium trachyspermum</i> | G | | | I | | | | | I | I |
| <i>Hedyotis diffusa</i> | W | I | I | | | | | | | |
| <i>Neonotis hirsuta</i> | FM | | I | I | | I | | I | I | I |
| <i>Paederia foetida</i> | FM | | | III | | | IV | | I | IV |
| <i>Rubia argyi</i> | FM | | | I | | | I | | | II |
| <i>Lonicera gracilipes</i> var. <i>glabra</i> | FM | | | | | | I | | | |
| <i>Lonicera japonica</i> | FM | | | I | | | III | | I | II |
| <i>Viburnum dilatatum</i> | FF | | | | | | I | | | II |
| <i>Patrinia scabiosifolia</i> | G | | | | | | | | | I |
| <i>Patrinia villosa</i> | G | | | | | | I | | | I |
| <i>Gynostemma pentaphylla</i> | FM | | | I | | | | | | |
| <i>Trichosanthes cucumeroides</i> | FM | | | I | | | I | | | I |
| <i>Adenophora triphylla</i> var. <i>japonica</i> | G | | | III | | | I | | I | IV |
| <i>Campanula punctata</i> | G | | | I | | | I | | I | II |
| <i>Codonopsis lanceolata</i> | FM | | | | | | | | | I |
| <i>Lobelia chinensis</i> | W | | II | | I | I | | I | I | |
| <i>Platycodon grandiflorum</i> | G | | | | | | | | | I |
| <i>Ainsuliaea apiculata</i> | FF | | | | | | I | | | |

| Occurred species | a* | Site A | | | Site B | | | Site C | | |
|--|----|--------|-----|-----|--------|-----|-----|--------|-----|-----|
| | | P | L | VM | P | L | VM | P | L | VM |
| <i>Artemisia indica</i> var. <i>maximoviczii</i> | UR | | I | II | | I | | | III | III |
| <i>Artemisia japonica</i> | G | | | | | | | | | I |
| <i>Aster iinumae</i> | W | | I | I | | | | | I | I |
| <i>Aster leiophyllus</i> | FM | | | | | | | | I | III |
| <i>Aster scaber</i> | G | | | I | | | II | | | II |
| <i>Aster yomena</i> var. <i>dentatus</i> | W | | II | I | | II | I | | I | I |
| <i>Bidens frondosa</i> | W | I | | | | | I | I | I | I |
| <i>Bidens tripartita</i> | W | II | I | | | | | I | | |
| <i>Carpesium abrotanoides</i> | FM | | | | | | I | | | |
| <i>Carpesium divaricatum</i> | FF | | | | | | | | | I |
| <i>Centipeda minima</i> | UR | II | I | | I | I | | I | I | |
| <i>Cirsium japonicum</i> | G | | | I | | I | I | | I | I |
| <i>Cirsium oligophyllum</i> | G | | | II | | I | IV | | III | IV |
| <i>Conyza sumatrensis</i> | UR | | I | I | | | | | | |
| <i>Dendranthema japonicum</i> | G | | | | | | II | | | I |
| <i>Eclipta alba</i> | W | | | | | | | | I | |
| <i>Eclipta prostrata</i> | W | I | III | | I | I | | I | I | |
| <i>Erigeron annuus</i> | UR | | I | II | | I | I | | I | I |
| <i>Erigeron canadensis</i> | UR | | | I | | | | | | I |
| <i>Erigeron philadelphicus</i> | UR | I | V | III | I | IV | III | | V | II |
| <i>Erigeron strigosus</i> | G | | | I | | | I | | | I |
| <i>Eupatorium lindleyanum</i> | W | | | | | | | | | I |
| <i>Eupatorium makinoi</i> var. <i>oppositifolium</i> | G | | | I | | | I | | I | I |
| <i>Gnaphalium affine</i> | UR | | I | I | | IV | I | | I | |
| <i>Gnaphalium japonicum</i> | G | | | | | II | | | | |
| <i>Gnaphalium spicatum</i> | UR | I | | I | I | I | I | | | |
| <i>Hypochaeris radicata</i> | UR | | | I | | | | | | |
| <i>Ixeris debilis</i> | UR | | IV | I | | III | II | | II | I |
| <i>Ixeris dentata</i> | G | | I | II | | II | III | | I | II |
| <i>Lactuca indica</i> | UR | | | | | | | | I | I |
| <i>Lapsana apogonoides</i> | W | | I | | I | | | | | |
| <i>Lapsana humilis</i> | UR | | II | I | | III | III | | II | |
| <i>Leibnitzia anandria</i> | G | | | I | | | I | | | I |
| <i>Paraixeris denticulata</i> | FM | | | I | | | I | | | III |
| <i>Petasites japonicus</i> | FM | | | I | | | | | | I |
| <i>Picris hieracioides</i> ssp. <i>japonica</i> | UR | | I | II | | | | | | |

| Occurred species | a* | Site A | | | Site B | | | Site C | | |
|--|----|--------|----|-----|--------|---|-----|--------|----|----|
| | | P | L | VM | P | L | VM | P | L | VM |
| <i>Solidago altissima</i> | UR | | II | III | | I | I | | | |
| <i>Solidago virga-aurea</i> var. <i>asiatica</i> | G | | | I | | | I | | | II |
| <i>Sonchus asper</i> | UR | | I | I | | | | | | |
| <i>Sonchus oleraceus</i> | UR | | | I | | | | | | |
| <i>Taraxacum officinale</i> | UR | | I | I | | | I | | | |
| <i>Taraxacum platycarpum</i> | UR | | I | I | | I | I | | | |
| <i>Youngia japonica</i> | UR | | I | III | | I | III | | II | I |

a*: Potential habitat type: UR: Upland fields or roadside species, W: specie favored in wet condition, G: grassland species, FM: forest margin species, FF: forest floor species. P: paddy field, L: levee, VM: verge meadow.

Appendix 4. Number of species of either 4 m² or 6 m² around in each group in verge meadow.

| Number of species of 4 m ² (corresponded to 4 quadrats) around | | | | | | |
|---|--------|------------|------------|------------|------------|------------|
| | | UR | W | G | FM | FF |
| Site A | | | | | | |
| Group A1 | N = 9 | 45.3 ± 3.1 | 7.2 ± 2.6 | 9.3 ± 2.3 | 7.7 ± 2.0 | 3.7 ± 2.0 |
| Group A2 | N = 13 | 23.2 ± 2.6 | 3.4 ± 1.1 | 27.9 ± 2.1 | 13.9 ± 2.8 | 6.9 ± 2.1 |
| Group A3 | N = 9 | 21.6 ± 1.2 | 9.1 ± 1.1 | 22.9 ± 2.1 | 21.3 ± 3.7 | 10.3 ± 1.4 |
| Group A4 | N = 4 | 12 | 4 | 8 | 20 | 16 |
| Site B | | | | | | |
| Group B1 | N = 8 | 10.8 ± 2.8 | 17.4 ± 5.7 | 15.8 ± 3.2 | 14.1 ± 1.7 | 18.5 ± 2.7 |
| Group B2 | N = 14 | 16.0 ± 2.4 | 10.2 ± 3.0 | 18.3 ± 2.8 | 20.2 ± 2.3 | 17.8 ± 2.5 |
| Group B3 | N = 6 | 23.3 ± 3.3 | 8.0 ± 1.1 | 11.5 ± 1.5 | 12.9 ± 1.2 | 10.7 ± 1.8 |
| Group B4 | N = 7 | 16.5 ± 3.7 | 6.1 ± 1.2 | 30.7 ± 3.1 | 17.7 ± 2.2 | 19.6 ± 2.8 |
| Group B5 | N = 4 | 27 | 3 | 36 | 15 | 12 |
| Group B6 | N = 2 | (17) | (20) | (13) | (8) | (6) |
| Site C | | | | | | |
| Group C1 | N = 6 | 24.1 ± 1.6 | 6.1 ± 0.6 | 30.8 ± 2.0 | 21.9 ± 2.2 | 2.9 ± 1.0 |
| Group C2 | N = 10 | 15.3 ± 2.6 | 4.5 ± 1.0 | 32.5 ± 2.6 | 20.4 ± 2.4 | 4.8 ± 1.0 |
| Group C3 | N = 18 | 11.6 ± 3.0 | 9.6 ± 1.9 | 27.0 ± 3.6 | 25.1 ± 2.6 | 10.9 ± 2.4 |
| Group C4 | N = 3 | (15) | (12) | (10) | (22) | (11) |

| Number of species of 6 m ² (corresponded to 6 quadrats) around | | | | | | |
|---|--------|------------|------------|------------|------------|------------|
| | | UR | W | G | FM | FF |
| Site A | | | | | | |
| Group A1 | N = 9 | 53.6 ± 2.3 | 10.2 ± 2.4 | 11.5 ± 1.9 | 10.8 ± 1.9 | 5.2 ± 1.9 |
| Group A2 | N = 13 | 26.7 ± 2.2 | 4.6 ± 1.1 | 31.2 ± 1.6 | 17.5 ± 2.6 | 8.6 ± 1.7 |
| Group A3 | N = 9 | 24.4 ± 1.1 | 10.8 ± 1.0 | 25.7 ± 1.4 | 25.4 ± 3.0 | 12.9 ± 1.1 |
| Group A4 | N = 4 | | | | | |
| Site B | | | | | | |
| Group B1 | N = 8 | 13.5 ± 2.5 | 21.6 ± 4.3 | 19.6 ± 2.6 | 17.0 ± 1.2 | 23.1 ± 1.9 |
| Group B2 | N = 14 | 19.9 ± 2.2 | 12.9 ± 2.6 | 22.0 ± 2.7 | 24.0 ± 1.7 | 21.5 ± 2.3 |
| Group B3 | N = 6 | 28 | 9 | 14 | 15 | 13 |
| Group B4 | N = 7 | 21.6 ± 2.7 | 8.1 ± 0.9 | 35.3 ± 2.1 | 21.6 ± 1.4 | 23.4 ± 1.8 |
| Group B5 | N = 4 | | | | | |
| Group B6 | N = 2 | | | | | |
| Site C | | | | | | |
| Group C1 | N = 6 | 28 | 7 | 36 | 27 | 4 |
| Group C2 | N = 10 | 19.8 ± 2.4 | 5.8 ± 0.9 | 37.0 ± 1.9 | 24.5 ± 2.3 | 5.7 ± 0.8 |
| Group C3 | N = 18 | 14.7 ± 2.6 | 11.9 ± 2.0 | 32.3 ± 3.4 | 29.9 ± 2.5 | 13.6 ± 2.7 |
| Group C4 | N = 3 | | | | | |