

Julkaisut vuonna 1996 - Publications in 1996

Väitöskirjat/Doctoral dissertations

Kaitaniemi, P. 1996: Insect-plant interactions during a natural *Epirrita autumnata* outbreak. – Doc. thesis, *Annales Universitatis Turkuensis A II* 92. 21 pp. + 5 articles.

Turunen, M. 1996: Responses of Scots pine needle surfaces to air pollutants. – Doc. thesis, *Acta Universitatis Ouluensis, Scientiae Rerum Naturalium A* 277. 43 pp. + 6 articles.

Väre, H. 1996: Relationships between spatial heterogeneity in vegetation communities and in belowground ecosystems. – Doc. thesis, *Acta Universitatis Ouluensis, Scientiae Rerum Naturalium A* 275. 37 pp. + 5 articles.

Pro gradu -tutkielmat/Master's theses

Kause, A. 1996: Tunturimittaritoukkien (*Epirrita autumnata*) ruokailukäyttäytymisen evoluutiivinen ja ekologinen merkitys. – M. Sc. thesis, Department of Biology, University of Turku. 52 pp.

Müterthies, A. & Stevens, E. 1996: Kiefer (*Pinus sylvestris* L.) und Fichte (*Picea abies* L.) an ihrer polaren Verbreitungsgrenze in Finnisch-Lappland. Bestandesstruktur, Regeneration, Dendroökologie. – Diploma thesis, Institute of Geography, Westfälische Wilhelms-Universität Münster. 112 pp.

Ossenbrink, R. 1996: Standortuntersuchungen in einer Fjellheide im nördlichen Finnisch-Lappland unter besonderer Berücksichtigung des Einflusses der Rentiere auf die Vegetation. – Diploma thesis, Institute of Geography, Westfälische Wilhelms-Universität Münster. 114 pp. + 6 app.

Muut julkaisut/Other publications

Heikkinen, R.K. 1996: Predicting patterns of vascular plant species richness with composite variables: a meso-scale study in Finnish Lapland. – *Vegetatio* 126(2): 151-165. Stable URL: <http://www.jstor.org/stable/20048746>

Heikkinen, R.K. & Birks, H.J.B. 1996: Spatial and environmental components of variation in the distribution patterns of subarctic plant species at Kevo, N Finland - a case study at the meso-scale level. – *Ecography* 19(3): 341-351.

Helander, M.L., Neuvonen, S. & Ranta, H. 1996: Natural variation and effects of anthropogenic environmental changes on endophytic fungi in trees. – In: Redlin, S.C. & Carris, L.M. (eds.): *Endophytic Fungi in Grasses and Woody Plants. Systematics, Ecology, and Evolution*. APS Press, The American Phytopathological Society, St. Paul, Minnesota. pp. 197-207.

Holtmeier, F.-K., Mütterthies, A. & Stevens, E. 1996: Effektive Verjüngung und Zuwachs der Kiefer (*Pinus sylvestris*) und Fichte (*Picea abies*) an ihrer Höhengrenze in Finnisch-Lapland während der letzten 100 Jahre. – Arbeiten aus dem Institut für Landschaftsökologie, Münster 1: 85-99.

Koponen, S. 1996: Diversity and similarity of northern spider faunas. – *Acta Zoologica Fennica* 201: 3-5.

Lyytikäinen, P., Kainulainen, P., Nerg, A., Neuvonen, S., Virtanen, T. & Holopainen, J.K. 1996: Performance of pine sawflies under elevated tropospheric ozone. – *Silva Fennica* 30(2-3): 179-184.

Neuvonen, S., Virtanen, T., Nikula, A. & Varama, M. 1996: Climate change and the risks of forest insect outbreaks. The Finnish Research Programme on Climate Change. Final Report. – Publications of the Academy of Finland 4/96: 275-280.

Nurmi, K., Ossipov, V., Haukioja, E. & Pihlaja, K. 1996: Variation of total phenolic content and low-molecular-weight phenolics in foliage of the mountain birch trees (*Betula pubescens* ssp. *tortuosa*). – *Journal of Chemical Ecology* 22: 2023-2040. doi: 10.1007/BF02040093

Ohenoja, E. 1996: A check-list of the larger fungi in Inari Lapland (NE Finland) and in Finnmark (NE Norway). – *Kevo Notes* 11: 1-44.

Ossipov, V., Nurmi, K., Loponen, J., Haukioja, E. & Pihlaja, K. 1996: High-performance liquid chromatographic separation and identification of phenolic compounds from leaves of *Betula pubescens* and *Betula pendula*. – *Journal of Chromatography A*, 721(1): 59-68. doi.org/10.1016/0021-9673(95)00765-2

Ruohomäki, K., Chapin, F.S. III, Haukioja, E., Neuvonen, S. & Suomela, J. 1996: Delayed inducible resistance in mountain birch in response to fertilization and shade. – *Ecology* 77(8): 2302-2311. doi: 10.2307/2265732

Ruohomäki, K., Kaitaniemi, P., Kozlov, M., Tammaru, T. & Haukioja, E. 1996: Density and performance of *Epirrita autumnata* (Lep., Geometridae) along three air pollution gradients in northern Europe. – *Journal of Applied Ecology* 33(4): 773-785. doi: 10.2307/2404947

Saikkonen, K., Helander, M., Ranta, H., Neuvonen, S., Virtanen, T., Suomela, J. & Vuorinen, P. 1996: Endophyte-mediated interactions between woody plants and insect herbivores? – *Entomologia experimentalis et applicata* 80: 269-271.

Shumejko, P., Ossipov, V. & Neuvonen, S. 1996: The effect of simulated acid rain on the biochemical composition of Scots pine (*Pinus sylvestris* L.) needles. – *Environmental Pollution* 92(3): 315-321.

Suomela, J. 1996: Within-tree variability of mountain birch leaves causes variation in performance for *Epirrita autumnata* larvae. – *Vegetatio* 127(1): 77-83. Stable URL: <http://www.jstor.org/stable/20048764>

Tammaru, T., Kaitaniemi, P. & Ruohomäki, K. 1996: Realized fecundity in *Epirrita autumnata* (Lepidoptera, Geometridae): relation to body size and consequences to population dynamics. – *Oikos* 77(3): 407-416. doi: 10.2307/3545931

Tammaru T., Ruohomäki K. & Saikkonen K. 1996: Components of male fitness in relation to body size in *Epirrita autumnata* (Lepidoptera, Geometridae). – *Ecological Entomology* 21: 185-192.

Tammaru, T., Virtanen, T & Ruohomäki, K. 1996: *Eupithecia veratraria* (Geometridae) Pohjois-Norjassa. – *Baptria* 21(3): 123-126.

Tammaru, T., Virtanen, T, Ruohomäki, K. & Kaila, L. 1996: *Eupithecia veratraria* Herrich-Schäffer, 1850 new to Scandinavia, with the redescription of *E. veratraria* ssp. *arctica* Viidalepp, 1974 (Lepidoptera, Geometridae). – *Nota lepidopterologica* 18(3/4): 297-303.

Vanhala, P., Fritze, H. & Neuvonen, S. 1996: Prolonged simulated acid rain treatment in the subarctic: Effect on the soil respiration rate and microbial biomass. – *Biology and Fertility of Soils* 23(1): 7-14. doi: 10.1007/BF00335811

Veistola, S., Lehikoinen, E., Eeva, T. & Iso-Iivari, L. 1996: The breeding biology of the Redstart *Phoenicurus phoenicurus* in a marginal area of Finland. – *Bird Study* 43(3): 351-355. doi: 10.1080/00063659609461028

Virtanen, T., Neuvonen, S., Nikula, A., Varama M. & Niemelä P. 1996: Climate change and the risks of Neodiprion sertifer outbreaks on Scots pine. – *Silva Fennica* 30(2-3): 169-177.

Väre, H. & Ohtonen, R. 1996: Ectomycorrhizal fungal population structures in northern *Pinus sylvestris* forests. – In: Azcon-Aguilar, C. & Barea, J.M. (eds.): *Mycorrhizas in integrated systems from genes to plant development*. Proceedings of the fourth European Symposium on Mycorrhizas. European Commission, Directorate-General XII. Science, Research and Development. B-1049 Brussels.

Väre, H., Ohenoja, E. & Ohtonen, R. 1996: Macrofungi of oligotrophic Scots pine forests in northern Finland. – *Karstenia* 36: 1-18.

Julkaisut vuonna 1997 - Publications in 1997

Väitöskirjat/Doctoral dissertations

Heikkinen, R.K. 1997: Patterns of species richness and distributions of vascular plant species at the mesoscale in the Kevo Nature Reserve, Northern Finland. – Doc. thesis, *Annales Universitatis Turkuensis A II* 96. 28 pp. + 5 articles.

Tammaru, T. 1997: Size and time for a geometrid moth: evolutionary forces and consequences to population dynamics. – Doc. thesis, *Annales Universitatis Turkuensis A II* 97. 21 pp. + 6 articles.

Pro gradu -tutkielmat/Master's theses

Henriksson, J. 1997: Lehtivaurioituksen ja hedenorkon tuoton vaikutus tunturikoivun (*Betula pubescens* ssp. *czerepanovii*) versojen kasvuun. – M. Sc. thesis, Department of Biology, University of Turku. 29 pp.

Montola, M. 1997: Tiheydestä riippuva fenotyyppinen plastisuus tunturimittarin (*Epirrita autumnata* Bkh.) kehitysfysiologiassa. – M. Sc. thesis, Department of Biology, University of Turku. 35 pp.

Pehkonen, T. 1997: Puolukan tuhosienen, *Exobasidium splendidum* (Nannf.) esiintyminen häiriintyneellä ja vakaalla kasvupaikalla pohjoisella metsänraja-alueella. – M. Sc. thesis, Department of Biology, University of Joensuu. 62 pp. + 8 app.

Pirhonen, A.-L. 1997: Säätekijöiden vaikutus männyn (*Pinus sylvestris* L.) paksuuskasvuun Utsjoen Kevolla vuosina 1962-1996. – M. Sc. thesis, Department of Geography, University of Helsinki. 84 + 7 pp.

Tanhuanpää, M. 1997: Tunturikoivun (*Betula pubescens* ssp. *czerepanovii*) resistenssin vaihtelu. – M. Sc. thesis, Department of Biology, University of Turku. 38 pp.

Tuomivuo, J. 1997: Keinotekoisien raskasmetallilaskeuman ja happaman laskeuman vaikutus *Phratora polaris*-lehtikuoriaisen kasvuun ja puolustautumiskykyyn. – M. Sc. thesis, Department of Biology, University of Turku. 27 pp.

Veistola, S. 1997: The effects of food and weather conditions on the breeding of hole-nesting passerines in the north. – Doc. thesis, *Annales Universitatis Turkuensis A II* 94. 9 pp. + 7 articles.

Muut julkaisut/Other publications

Danell, K., Haukioja, E. & Huss-Danell, K. 1997: Morphological and chemical responses of mountain birch leaves and shoots to winter browsing along a gradient of plant productivity. – *Ecoscience* 4: 296-303.

Gross, J. 1997: Speziation beim Blattkäfer *Chrysomela lapponica* L.: Vergleichende Studien zu Chemischer Ökologie, Verhalten und Morphologie verschiedener Ontogenesestadien aus zwei allopatrischen Populationen. – *Sitzungsberichte der Gesellschaft Naturforschender Freunde zu Berlin* 36: 125-142.

Heikkinen, R.K. & Neuvonen, S. 1997. Species richness of vascular plants in the subarctic landscape of northern Finland: modelling relationships to the environment. – *Biodiversity and Conservation* 6(9): 1181-1201. doi: 10.1023/A:1018356823171

Kaitaniemi, P., Ruohomäki, K. & Haukioja, E. 1997: Consumption of apical buds as a mechanism of alleviating host plant resistance for *Epirrita autumnata* larvae. – *Oikos* 78(2): 230-238. doi: 10.2307/3546289

- Kaitaniemi, P., Ruohomäki, K. & Haukioja, E. 1997: Consequences of defoliation on phenological interaction between *Epirrita autumnata* and its host plant, mountain birch. – *Functional Ecology* 11(2): 199-208. Stable URL: <http://www.jstor.org/stable/2390319>
- Lappalainen, J. & Helander, M. L. 1997: The role of foliar microfungi in mountain birch-insect herbivore relationships. – *Ecography* 20(2): 116-122. doi: 10.1111/j.1600-0587.1997.tb00353.x
- Ossipov, V., Lojonen, J., Ossipova, S., Haukioja, E. & Pihlaja, K. 1997. Gallotannins of birch *Betula pubescens* leaves: HPLC separation and quantification. – *Biochemical Systematics and Ecology* 25(6): 493-504. doi.org/10.1016/S0305-1978(97)00032-X
- Ruohomäki, K., Haukioja, E., Repka, S. & Lehtilä, K. 1997. Leaf value: effects of damage to individual leaves on growth and reproduction of mountain birch shoots. – *Ecology* 78(7): 2105-2117. doi.org/10.1890/0012-9658(1997)078[2105:LVEODT]2.0.CO;2
- Ruohomäki, K., Virtanen, T., Kaitaniemi, P. & Tammaru, T. 1997: Old mountain birches at high altitudes are prone to outbreaks of *Epirrita autumnata* (Lepidoptera: Geometridae). – *Environmental Entomology* 26(5): 1096-1104.
- Saloniemi, I. 1997: Mathematical models of plant/fungus interactions. – In: Carroll, G.C. & Tudzynski, P. (eds.): *The Mycota V, Part B, Plant Relationships*. Springer-Verlag, Berlin-Heidelberg.
- Sewón, P., Mikola, H., Lehtinen, T. & Kallio, P. 1997: Polar lipids and net photosynthesis potential of subarctic *Diapensia lapponica*. – *Phytochemistry* 46(8): 1339-1347. doi.org/10.1016/S0031-9422(97)00482-2
- Shevtsova, A. & Neuvonen, S. 1997. Responses of ground vegetation to prolonged simulated acid rain in sub-arctic pine-birch forest. – *New Phytologist* 136: 613-625. Stable URL: <http://www.jstor.org/stable/2559154>
- Shevtsova, A., Haukioja, E. & Ojala, A. 1997: Growth response of subarctic dwarf shrubs, *Empetrum nigrum* and *Vaccinium vitis-idaea*, to manipulated environmental conditions and species removal. – *Oikos* 78(3): 440-458. doi: 10.2307/3545606
- Suomela, J. & Neuvonen, S. 1997. Effects of long-term simulated acid rain on suitability of mountain birch for *Epirrita autumnata* (Geometridae). – *Canadian Journal of Forest Research* 27(2): 248-256.
- Suomela, J., Suominen, O. & Törvi, M. 1997. Variation in quality of mountain birch and tea-leaved willow for mammal and insect herbivores: differences among trees, among sites and between tree species. – *Ecography* 20(3): 224-232. doi: 10.1111/j.1600-0587.1997.tb00365.x
- Veistola, S., Lehikoinen, E. & Eeva, T. 1997: Foraging niches of two passerines at their subarctic limit of distribution: the Siberian Tit *Parus cinctus* and the Pied Flycatcher *Ficedula hypoleuca*. – *Ornis Fennica* 74(2): 79-87.

Veistola, S., Lehtikoinen, E. & Eeva, T. 1997: Weather and breeding success at high latitudes - the Pied Flycatcher *Ficedula hypoleuca* and the Siberian Tit *Parus cinctus*. – *Ornis Fennica* 74(2): 89-98.

Virtanen, T., Ranta, H. & Neuvonen, S. 1997: Shoot-feeding aphids promote development of *Gremmeniella abietina*, the fungal pathogen causing Scleroderris canker disease in conifers. – *Journal of Phytopathology* 145(5-6): 245-151. doi: 10.1111/j.1439-0434.1997.tb00394.x

Zobel, K., Moora, M., Brown, V., Niemelä, P. & Zobel, M. 1997: Secondary succession and summer herbivory in a subarctic grassland: community structure and diversity. – *Ecography* 20(6): 595-604. doi: 10.1111/j.1600-0587.1997.tb00428.x

Julkaisut vuonna 1998 - Publications in 1998

Väitöskirjat/Doctoral dissertations

Karhu, K.J. 1998: Green islands. Top-down and bottom-up effects of wood ants in forests under folivore attack. – Doc. thesis, *Annales Universitatis Turkuensis A II* 107. 41 pp. + 5 articles.

Loponen, J. 1998: Isolation and identification of plant phenolic compounds in birch leaves. Air pollution stress and leaf phenolics. – Doc. thesis, Department of Chemistry, University of Turku. 65 pp. + 5 articles.

Pennanen, T. 1998: Structure of the microbial communities in boreal coniferous forest humus exposed to heavy metals and changes in soil pH. – Doc. thesis, Department of Biosciences, Division of General Microbiology, University of Helsinki. 49 pp + 6 articles.

Shevtsova, A. 1998: Responses of subarctic dwarf shrubs to climate change and air pollution. – Doc. thesis, *Annales Universitatis Turkuensis A II* 113. 22 pp. + 5 articles.

Wagner, F. 1998: The influence of environment on the stomatal frequency in *Betula*. – Doc. thesis, LPP Contributions Series No. 9, Laboratory of Paleobotany and Palynology, University of Utrecht. 102 pp.

Pro gradu -tutkielmat/Master's theses

Kokkonen, K. 1998: Äkämien esiintyminen ja menestyminen Inari Lapin pajuilla ja pajuristeyksillä. – M. Sc. thesis, Department of Biology, University of Turku. 100 + 9 pp.

Lehtiniemi, T. 1998: Kirjosiepon *Ficedula hypoleuca* dispersaalin voimakkuus - koiraan väri immigraation ilmentäjänä. – M. Sc. thesis, Department of Biology, University of Turku. 57 pp.

Muut julkaisut/Other publications

Ahlholm, J.U., Helander, M.L. & Savolainen, J. 1998: Genetic and environmental factors affecting the allergenicity of birch (*Betula pubescens* ssp. *czerepanovii* [Orl.] Hämet-Ahti) pollen. – *Clinical and Experimental Allergy* 28(11): 1384-1388. doi: 10.1046/j.1365-2222.1998.00404.x

Bogacheva, I. 1998: Ecological and ontogenic heterogeneity of leaves and its role in insect-plant relationships. – *Reports from the Kevo subarctic research station* 22: 11-17.

Elamo, P., Saloniemi, I., Helander, M. & Neuvonen, S. 1998: Genetic and environmental variation in susceptibility of mature mountain birch trees to leaf rust. Proc. First IUFRO Rusts of Forest Trees WP Conf., 2-7 Aug. 1998, Saariselkä, Finland. – Finnish Forest Research Institute, Research Papers 712: 137.

Heikkinen, R.K. 1998: Can richness patterns of rarities be predicted from mesoscale atlas data? A case study of vascular plants in the Kevo Reserve. – *Biological Conservation* 83(2): 133-143. doi.org/10.1016/S0006-3207(97)00069-4

Heikkinen, R.K., Birks, H.J.B. & Kalliola, R.J. 1998: A numerical analysis of the mesoscale distribution patterns of vascular plants in the subarctic Kevo Nature Reserve, northern Finland. – *Journal of Biogeography* 25(1): 123-146. doi: 10.1046/j.1365-2699.1998.251133.x

Helander, M.L., Vuorinen, P., Saikkonen, K. & Lappalainen, J. 1998: Evidence for resistance of mountain birch (*Betula pubescens* subsp. *czerepanovii*) to birch rust (*Melampsorium betulinum*). – *Mycological Research* 102(1): 63-66. doi.org/10.1017/S0953756297004437

Helmberger, D.V., Wen, L. & Ding, X. 1998: Seismic evidence that the source of the Iceland hotspot lies at the core-mantle boundary. – *Nature* 396(6708): 251-255. doi: 10.1038/24357

Kaitaniemi, P., Ruohomäki, K., Ossipov, V., Haukioja, E. & Pihlaja, K. 1998: Delayed induced changes in the biochemical composition of host plant leaves during an insect outbreak. – *Oecologia* 116(1-2): 182-190. doi: 10.1007/s00440050578

Karhu, K.J. 1998: Effects of ant exclusion during outbreaks of a defoliator and a sap-sucker on birch. – *Ecological Entomology* 23(2): 185-194. doi: 10.1046/j.1365-2311.1998.00116.x

Karhu, K.J. & Neuvonen, S. 1998: Wood ants and a geometrid defoliator of birch: predation outweighs beneficial effects through the host plant. – *Oecologia* 113(4): 509-516. doi: 10.1007/s004420050403

Kukkonen, E. & Huttunen, S. 1998: Structural observations on needles exposed to elevated levels of copper and nickel. – *Chemosphere* 36(4-5): 727-732. doi: 10.1016/S0045-6535(97)10115-1

Liira, T. & Hietaranta, J. 1998: On the postglacial development of the bedrock precipices and talus formations in the Keävvi river valley, northern Finnish Lapland. – *Reports from the Kevo Subarctic Research Station* 22: 1-10.

Lundvall, P., Neuvonen, S. & Halonen, M. 1998: Interspecific differences in susceptibility of adult leaf beetles (Col., Chrysomelidae) to predation by willow warblers (*Phylloscopus trochilus*). – Reports from the Kevo Subarctic Research Station 22: 19-24.

Mäkinen, Y., Kallio, P., Laine, U. & Nurmi, J. 1998: Vascular flora of Inari Lapland. 6. Nymphaeaceae - Papaveraceae. – Reports from the Kevo Subarctic Research Station 22: 25-86.

Neuvonen, S., Virtanen, T. & Nikula, A. 1998: Timberline, insect pests, and minimum winter temperatures; applications of GIS. – Finnish Forest Research Institute, Research Papers 677: 17-21.

Pennanen, T., Fritze, H., Vanhala, P., Kiikkilä, O., Neuvonen, S. & Bååth, E. 1998: Structure of a microbial community in soil after prolonged addition of low levels of simulated acid rain. – Applied and Environmental Microbiology 64(6): 2173-2180.

Pennanen, T., Perkiömäki, J., Kiikkilä, O., Vanhala, P., Neuvonen, S. & Fritze, H. 1998: Prolonged, low-level simulated acid rain and heavy metal deposition: separated and combined effects on forest soil microbial community structure. – FEMS Microbiology Ecology 27(3): 291-300. doi: 10.1111/j.1574-6941.1998.tb00545

Rask, M., Holopainen, A.-L., Karusalmi, A., Niinioja, R., Tammi, J., Arvola, L., Keskitalo, J., Blomqvist, I., Heinimaa, S., Karppinen, C., Salonen, K. & Sarvala, J. 1998: An introduction to the limnology of the Finnish Integrated Monitoring lakes. – Boreal Environment Research 3(3): 263-274.

Ruoho-Airola, T., Syri, S. & Nordlund, G. 1998: Acid deposition trends at the Finnish Integrated Monitoring catchments in relation to emission reductions. – Boreal Environment Research 3(3): 205-219.

Starr, M., Hartman, M. & Kinnunen, T. 1998: Biomass functions for mountain birch in the Vuoskojärvi Integrated Monitoring area. – Boreal Environment Research 3(3): 297-303.

Suomela, J., Neuvonen, S., Ossipova, S., Ossipov, V. & Pihlaja, K. 1998: A long-term study of the effects of simulated acid rain on the phenolics of birch foliage. – Chemosphere 36(4-5): 639-644. doi.org/10.1016/S0045-6535(97)10100-X

Suominen, O., Kojola, I. & Niemelä, P. 1998: Poron vaikutus metsänpohjan selkärangattomiin. – Teoksessa: Hyppönen, M., Penttilä, T. & Poikajärvi, H. (toim.). Poron vaikutus metsä- ja tunturiluontoon. Tutkimusseminaari Hetassa 1997. – Metsäntutkimuslaitoksen tiedonantoja 678: 9-19.

Tammaru, T. 1998: Determination of adult size in a folivorous moth: constraints at instar level? – Ecological Entomology 23(1): 80-89. doi: 10.1046/j.1365-2311.1998.00106.x

Tarhanen, S. 1998: Ultrastructural responses of the lichen *Bryoria fuscescens* to simulated acid rain and heavy metal deposition. – Annals of Botany 82(6): 735-746. doi: 10.1006/anbo.1998.0734

Ukonmaanaho, L., Starr, M. & Ruoho-Airola, T. 1998: Trends in sulfate, base cations and H⁺ concentrations in bulk precipitation and throughfall at integrated monitoring sites in Finland 1989-1995. – *Water, Air, and Soil Pollution* 105(1-2): 353-363. doi: 10.1023/A:1005087627364

Ukonmaanaho, L., Starr, M., Hirvi, J.-P., Kokko, A., Lahermo, P., Mannio, J., Paukola, T., Ruoho-Airola, T. & Tanskanen, H. 1998: Heavy metal concentrations in various aqueous and biotic media in Finnish Integrated Monitoring catchments. – *Boreal Environment Research* 3(3): 235-249.

Vanhala, P., Kapanen, A., Fritze, H. & Niemi, R. M. 1998: Microbial activity and biomass in four Finnish coniferous forest soils - spatial variability and effect of heavy metals. – *Boreal Environment Research* 3(3): 287-295.

Virtanen, T., Neuvonen, S. & Nikula, A. 1998: Modelling topoclimatic patterns of egg mortality of *Epirrita autumnata* (Lep., Geometridae) with a Geographical Information System: predictions for current climate and warmer climate scenarios. – *Journal of Applied Ecology* 35(2): 311-322. doi: 10.1046/j.1365-2664.1998.00299.x

Wilsey, B.J., Haukioja, E., Koricheva, J. & Sulkinoja, M. 1998: Leaf fluctuating asymmetry increases with hybridization and elevation in tree-line birches. – *Ecology* 79(6): 2092-2099. doi.org/10.1890/0012-9658(1998)079[2092:LFAIWH]2.0.CO;2

Yli-Halla, M. & Mokma, D.L. 1998: Soil temperature regimes in Finland. – *Agricultural and Food Science in Finland* 7: 507-512.

Julkaisut vuonna 1999 - Publications in 1999

Väitöskirjat/Doctoral dissertations

Kukkola, E. 1999: Effects of copper and nickel on subarctic Scots pine needles. – Doc. thesis, University of Oulu. ? pp.

Lappalainen, J. 1999: Leaf microfungi and insect herbivores on birch: relationships, environmental effects and tree properties. – Doc. thesis, *Annales Universitatis Turkuensis A II* 117. 15 pp. + 5 articles.

Suominen, O. 1999: Mammalian herbivores, vegetation and invertebrate assemblages in boreal forests: feeding selectivity, ecosystem engineering and trophic effects. – Doc. thesis, *Annales Universitatis Turkuensis A II* 122. 26 pp + 7 articles.

Vanhala, P. 1999: Microbiological indicators of soil pollution in boreal forest ecosystems with special reference to the soil respiration of the humus layer. – Doc. thesis, *Monographs of the Boreal Environment Research* 14: 1-31.

Virtanen, T. 1999: Patterns in the ecology of herbivorous insects in northern areas explained by regional or local climate. – Doc. thesis, *Annales Universitatis Turkuensis A II* 123. 28 pp + 5 articles.

Pro gradu -tutkielmat/Master's theses

Müller, S. 1999: Winterliche Wärmewellen und sommerliche Kaltlufteinbrüche im nördlichen Finnisch-Lappland. – Diploma thesis, Institute of Geography, Westfälische Wilhelms-Universität Münster. 81 pp.

Parantainen, A. 1999: Männyn (*Pinus sylvestris* L.) siitepölyn elävyys ja sopeutuminen etelä-pohjoisgradientilla. – M. Sc. thesis, Department of Biology, University of Turku. 58 pp.

Peippo, M. 1999: Inarin Lapin satelliittikuvien, maastohavaintojen, maankäyttö- ja puustotulkintaluokituksen sekä numeerisen korkeusmallin yhteiskäyttö ja vertailu paikkatietojärjestelmässä. – M. Sc. thesis, Department of Geography, University of Turku. 85 pp. + 25 app.

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Elamo, P., Helander, M. L., Saloniemi, I. & Neuvonen, S. 1999: Birch family and environment affect endophytic fungi in leaves. – *Oecologia* 118(2): 151-156. doi: 10.1007/s004420050713

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