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RADIOCESIUM IN PLANTS OF FOREST ECOSYSTEMS

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Keywords: Forests, Radiocesium, Radioecology, Vegetation.

Abstract: This paper presents a review of the behaviour of radiocesium in plants of forest ecosystems, based on a screening of 375 articles. Particular stress is given to those factors which affect data variability in plants, such as vertical and horizontal patterns of radioactivity in soils due to interception, resuspension, wash-off, litter fall etc. The behaviour of radiocesium in different horizons of forest soils is discussed. The paper summarizes the main uptake mechanisms in fungi, lichens, bryophytes and higher plants, and the possible use of these organisms as bioaccumulators of radioactive deposition. For higher plants, the effects of several factors on root uptake are considered, such as pH, organic matter and clay content of different soil horizons, the concentrations of other ions in the soil solution, rooting depths, mycorrhiza, etc. Finally, the paper includes a discussion of translocation phenomena inside plants, of seasonal variation of radionuclide concentrations, and of the expression of radiocarbon contamination of plant material. The expression of radiocesium concentrations on a water basis is suggested as being more appropriate than the usual expression on a dry weight basis for the solution of several radioecological problems.
ANALISI FITOSOCIOLOGICA E VALUTAZIONE AGRONOMICA DI PASCOLI SUBALPINI (MALGA PADEON, CORTINA D’AMPEZZO, NE ITALIA)

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Keywords: Abandonment, Agronomic value, Calcareous pastures, Subalpine vegetation, Recolonization.

Abstract: PHYTOSOCIOLOGICAL ANALYSIS AND AGRONOMIC EVALUATION OF SUBALPINE PASTURES (MALGA PADEON, CORTINA D’AMPEZZO, NE ITALY). In this study the vegetation and the agronomic evaluation of subalpine pastures are described. These pastures are developed from 1800 to 2100 m on calcareous soils and have not been used for grazing since the early ’80s. The following vegetation types have been identified: Poa alpina pasture (Poion alpinae), Carex davalliana fen (Caricetum davallianae), Carex ferruginea pasture (Caricetum ferrugineae trifolietosum), Sesleria albicans pasture (Carici ornithopodae-Seslerietum albicantis), calcareous scree community (Thlaspietea rotundifolii), Pinus mugo scrub (Erico-Rhododendretum hirsuti) and Pinus cembra wood (Vaccinio-Pinetum cembrae rhododendretosum hirsuti). The ecological evaluation of the vegetation types was based on an indirect analysis by means of the Landolt indices. Some dynamic trends have been hypothesized on the basis of the ecological characterization. The indirect agronomic evaluation of the pasture types was based on the goodness values (Gütenzahl) of each species.

BIODIVERSITY OF EPiphytic LICHENS AND AIR QUALITY IN THE PROVINCE OF GORIZIA (NE ITALY)

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Keywords: Biodiversity, Italy, Lichens, Pollution.

Abstract: In the last six years the north-east Italian plains were intensively studied for air pollution monitoring with lichen biodiversity measures. To date, more than 3.500 relevés of epiphytic lichen vegetation, based on a standard methodology, were carried out in this area. The present study fills a gap in the exploration of the area, presenting the results relative to the province of Gorizia. The study is based on 335 relevés in 104 stations. The relevés are frequency counts of all lichen species in a
sampling grid subdivided into ten rectangles. The sum of the frequencies of all species is the Biodiversity Index of each relevé. The average values of Biodiversity Indices of all relevés taken in the same station is the Index of Atmospheric Purity (IAP) of the station, following a slightly modified approach proposed by Swiss authors. The matrices of the 60 lichen species found in the survey area, and of the relevés/stations were submitted to multivariate analysis (classification and ordination): the results show a predominance of nitrophytic Xanthorion-species and a transition from Parmelion (prevalent in less anthropized areas) to Xanthorion vegetation (favoured by agriculture and more resistant to air pollution). Distribution maps showing presence and abundance of eight selected species (Candelaria concolor, Hyperphyscia adglutinata, Parmelia caperata, P. sulcata, P. subrudecta, Physcia adscendens, Phaeophyscia orbicularis, Xanthoria parietina) are presented and discussed. Automatic mapping programs were also used to map the distribution of the weighed averages of ecological indices associated to each species in each station of the survey area: a map of eutrophication and one of air humidity are presented and discussed. The IAP map of the province is discussed in terms of air quality levels: no extensive lichen desert does occur and IAP values are generally high, but a few restricted areas show some symptoms of air quality worsening, and would be worthy being monitored by instrumental recording.


MONITORING OF AIRBORNE METAL POLLUTION BY MOSS BAGS: A METHODOLOGICAL STUDY

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Keywords: metals, monitoring, moss bags, air pollution.

Abstract: The use of moss transplants for monitoring heavy metals deposition is briefly reviewed. The methodological study concerns the effects of different types of pre-treatment on data variability. Epiphytic samples of Hypnum cupressiforme were collected from an unpolluted area, treated in different ways, and the resulting bags were exposed in two sites in the province of Trieste (NE Italy) with widely different pollution: a natural woodland far from urban and industrial centers, and a site near an iron smelting industry in the industrial area of Trieste. The content of eight heavy metals (Al, Cd, Cr, Cu, Fe, Mn, Ni, Pb) was measured in 80 moss samples by atomic absorption spectrophotometry. The results, which represent a contribution to the standardization of the moss bags technique, concern: a) variability of metal content in mosses from natural areas: this is influenced by soil contamination; it is advisable to collect epiphytic samples, avoiding those growing near the base of the trunks; b) effects of different washing treatments on metal contents: compared to distilled water, washing with an acid solution is particularly efficient in removing metal ions associated with the cell wall, but produces more variable data; c) uptake capacity of exposed moss bags: this is not influenced by the type of washing, and even short periods of exposure were sufficient to reveal differences in metal depositions between the two sites.