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CO-OCCURRENCE OF TWO SPECIES *MOLINIA CAERULEA* L. AND "RED-LIST" SPECIES *CAREX PULICARIS* L. IN WESTERN POMERANIA (POLAND)

ABSTRACT: Wide patches of fruiting *Carex pulicaris* L. (subatlantic element in Polish flora) were found in the *Myrico-Salicetum sphagnetosum* Pass. 1961 var. *Molinia caerulea* association, within the wetland area in Western Pomerania (Poland). Field observations included measurements of ground-waters, reaction of soil and seasonally stagnant waters, the height of *Molinia caerulea* tufts and also floral and phytosociological observations. Microhabitats of *Carex pulicaris* were tufts formed both by dead and living parts of *Molinia caerulea*. Artificially regulated level of inundation waters of local rivers had influence on site conditions suitable for *Carex pulicaris*. Distribution of *Carex pulicaris* within the area of investigations was connected with *Molinia caerulea* occurrence.

During population survey of wax myrtle *Myrica gale* L. in summer 2001 within the area of Rozwarowo Marshes, wide patches of fruiting *Carex pulicaris* L. were found. The area of Rozwarowo Marshes was situated in the mouth of local rivers near Szczecin Lagoon and there is one of the biggest bogmoores complexes in Western Pomerania, Poland (Fig. 1). Unusual biodiversity of this area is presented by the mosaic of halophilous and cyperaceous vegetation, reed-bed, rushes, al-

der forests and osier-bed (Ciaciura and Stępień 1998).

In Western Pomerania *Carex pulicaris* is recognized as a dying out species (Żukowski and Jackowiak 1996) whereas in Poland as endangered species (Kaźmierczakowa and Zarzycki 2001). This subatlantic species presents Cantabrian-Atlantic-Central-European element in Polish flora (Meusel *et al.* 1965). It occurs in north, west and central Europe (Chater 1980) with eastern border of its range in Poland (Stuchlikowa 1964). Confirmed sites of *Carex pulicaris* occur in Western Pomerania, Lower Silesia and the Polish Western Carpathians (Mirek 1989, Bartoszek 1999, Koczur 2000, Zając and Zając 2001).

Data about distribution of *Carex pulicaris* in Pomerania were presented by Czubński (1950), Jasnowski (1962), Piotrowska (1966), Jasnowska and Jasnowski (1973), Kaźmierczakowa and Zarzycki (2001). The only one confirmed site in Western Pomerania comes from the biggest Polish island on western part of Polish Baltic Coast (Piotrowska 1966, Kaźmierczakowa and Zarzycki 2001).

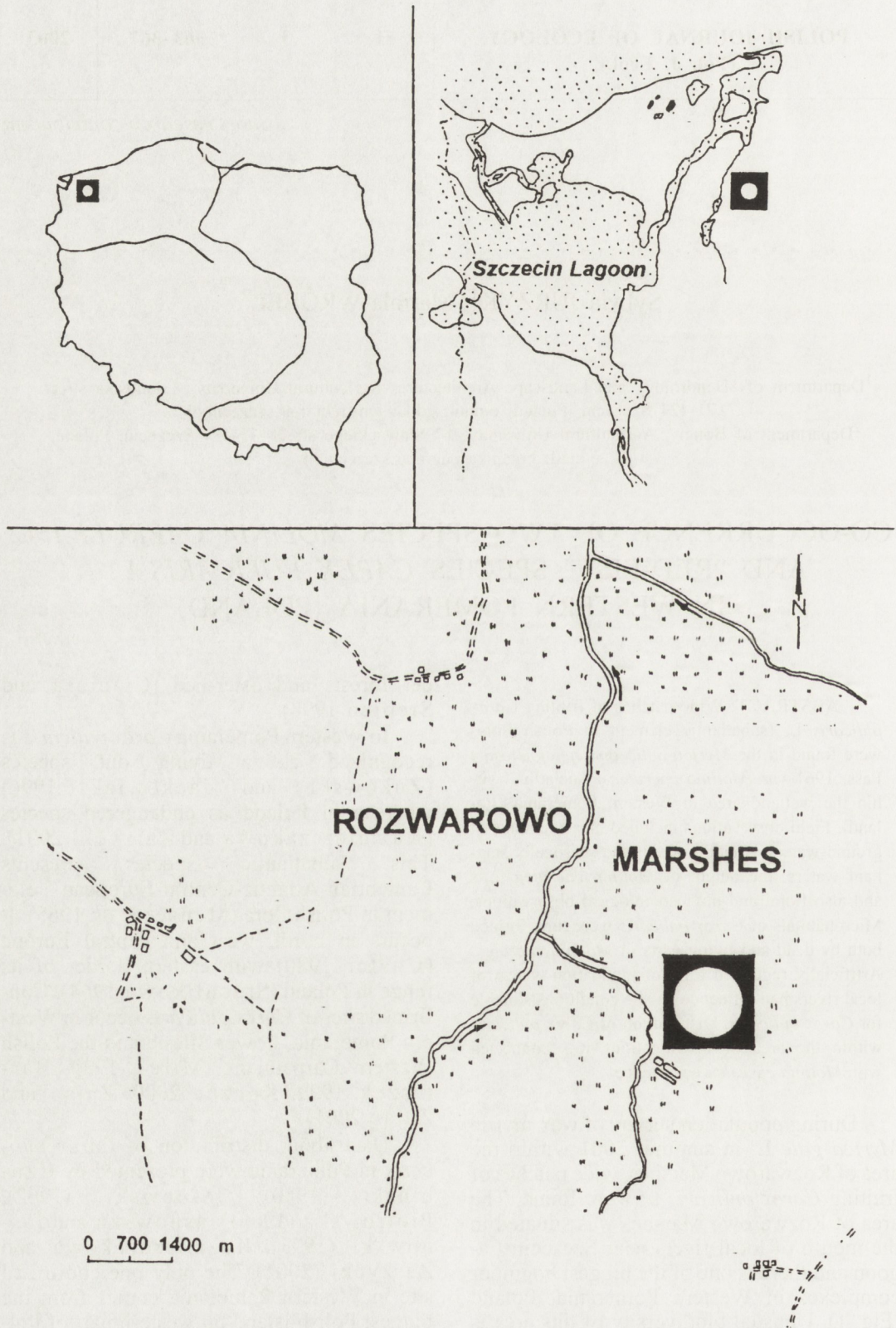


Fig. 1. Location of *Myrico-Salicetum sphagnetosum* var. *Molinia caerulea* association with *Carex pulicaris* in Western Pomerania (Poland). ■ – site of *Carex pulicaris*.

Carex pulicaris was found in the south-eastern part of Rozwarowo Marshes (Fig. 1). Within the area of investigations floral and phytosociological observations were carried out (using Braun-Blanquet method) also the limits of *Carex pulicaris* patches were described. Measurements of ground-waters level were examined twice a month during the whole 2001 year. The highest values were observed in time of spring and autumn backwater (Fig. 2). After the outflow of spring backwater in May reaction both at the top of *Molinia caerulea* tufts and seasonally stagnant waters was measured (Fig. 3).

Microhabitats of *Carex pulicaris* were tufts of 28–42 cm height formed both by dead and living parts of blue moor grass *Molinia caerulea* (Fig. 3). They made specific reservoir of water. Observed tufts kept inside high humidity for the greater part of the year. Such conditions were conducive to flowering (A–M) and fruiting (J–Jul.) of *Carex pulicaris*. Tufts overdrying and maximal ground waters decrease was observed at the end of July and in August (Fig. 2). Surface layers of seasonally stagnant water had acid reaction (pH 5.5–5.8), but the tops of blue moor grass tufts, where *Carex pulicaris* occurred, dem-

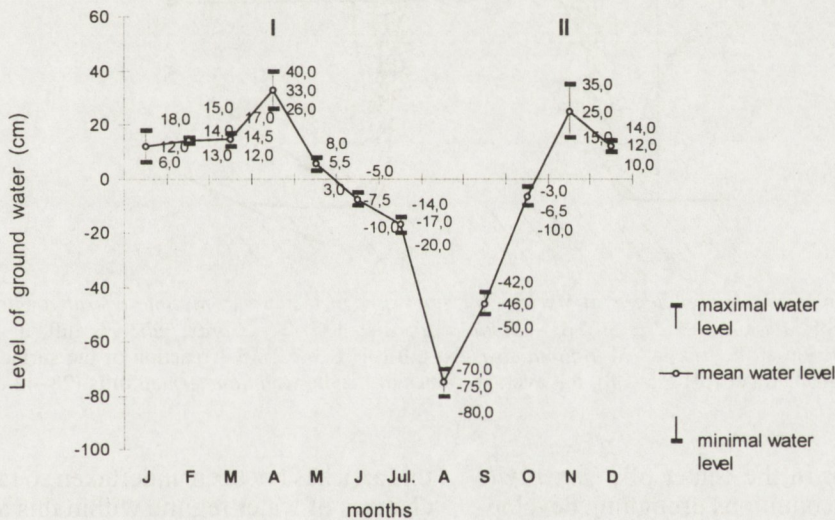


Fig. 2. Average monthly values of ground water level in *Myrico-Salicetum sphagnetosum* var. *Molinia caerulea*, I – spring backwater, II – autumn backwater.

Carex pulicaris was observed in the *Myrico-Salicetum sphagnetosum* Pass. 1961 var. *Molinia caerulea* association (Jasnowska 1968). The patches of this community with specific mosaic-tuft structure developed on the edge of land form of reed rushes *Phragmitetum australis* (Gams 1927) Schmale 1939. *Carex pulicaris* created concentrations at the top of the *Molinia caerulea* tufts (Fig. 3). This area, with predominant *Phragmites australis*, is seasonally flooded in early spring and autumn by backwater and overdrying in the middle of summer (Fig. 2). Outflow of inundation waters is artificially regulated by system of sluice gates in drainage ditches and canals. Wide reed bed are spread on the private area and every year are regularly mowed by holders.

onstrated alkaline reaction (pH 6.3–7.2) (Fig. 3). Also, such alkaline species like *Carex davalliana*, *Carex flacca* and *Dactylophiza majalis* were observed there. Their occurrence testified presence of calcium carbonate which was outwashing by moving surface waters from deeper layers of substratum.

Distribution and spatial structure of observed *Carex pulicaris* patches had a character of small tufts growing in loosy concentrations in the area of about 3 hectares. Abundant flowering, fruiting and appearing of many young specimens indicated high viability and good condition of examined *Carex pulicaris* population.

Patches of *Carex pulicaris* concentrated on the *Molinia caerulea* tufts were situated

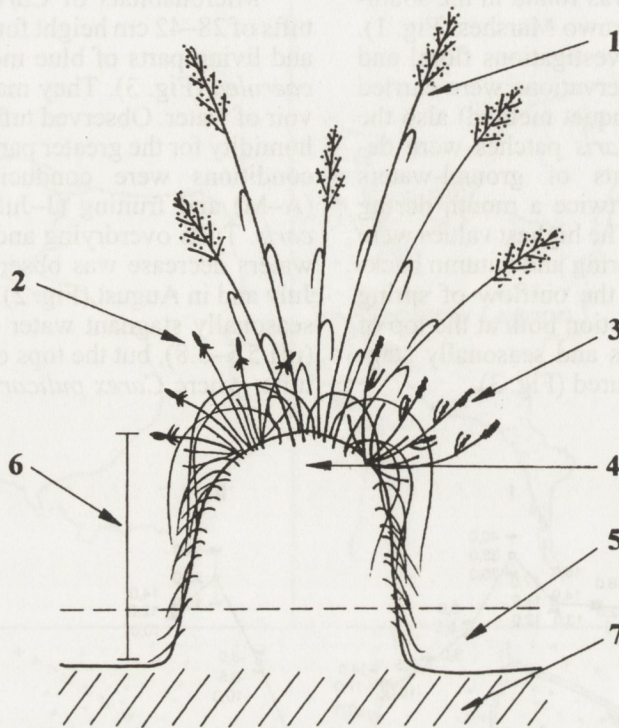


Fig. 3. Microhabitats of *Carex pulicaris* in *Myrico-Salicetum sphagnetosum* var. *Molinia caerulea* association. Vertical section of *Molinia caerulea* tuft: 1 – *Molinia caerulea* tuft, 2 – *Carex pulicaris* tuft, 3 – *Carex panicea*, 4 – reaction at the top part of *Molinia caerulea* tuft (pH 6.3–7.2), 5 – reaction of the surface layers of seasonally stagnant water (pH 5.5–5.8), 6 – average values of height *Molinia caerulea* tufts (28–42 cm), 7 – peat litter.

on the edge or in the center of *Myrica gale* bush. Habitat conditions promoting development of *Myrica gale* bush were observed on poor, mineral-peat soils with high level of ground water with slight fluctuations (Czubński 1950). Variable degree of soil-moisture in examined patches of *Myrico-Salicetum sphagnetosum* var. *Molinia caerulea* association promoted appearing of peat-bog species from *Scheuzerio-Caricetea* class like *Comarum palustre*, *Menyanthes trifoliata*, *Peucedanum palustre* and *Carex nigra*. Also penetrating of meadow species from *Molinio-Arrhenatheretea* class and *Molinietalia* order to the wide patches of *Myrica gale* was observed. Among predominant *Molinia caerulea* in herbaceous layer also occurred *Cirsium palustre*, *Carex panicea*, *Potentilla erecta*, *Thalictrum flavum* and *Galium uliginosum*. *Phragmitetea* class, besides common reed, was represented by *Agrostis stolonifera*, *Lysimachia vulgaris* and *Lythrum salicaria*.

In spite of projects of nature reserve establishment, any form of legal protection of

this area has not been undertaken so far. Total changes of water regime within this area, especially too long periods of ground over-drying could destroy or weaken condition of *Molinia caerulea* and as a result threaten the site of *Carex pulicaris* in Rozwarowo Marshes.

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