

COLEANTHUS SUBTILIS (TRATT.) SEIDEL
– A NEW SPECIES TO THE POLISH VASCULAR FLORA

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ABSTRACT

The authors describe the locality of a so far in Poland unknown species *Coleanthus subtilis*. It was discovered on the Oleśnica Plateau near Wrocław. This grass occurs on a surface of ca. 15 ha, round muddy shores of fishponds. The large stand makes the impression to be at least 50-year old. Together with the grass of our interest there grow also other, not frequent to day, species like *Veronica peregrina*, *Myosurus minimus* and *Limosella aquatica*. The traditional management of fishponds makes the basis of maintenance of all the species and the whole community. The constant filling with water of the reservoirs and application of fertilisers threatens the existence of the whole rare and interesting ecosystem.

KEY WORDS: *Coleanthus subtilis*, *Veronica peregrina*, threatened annuals, protection of therophytes.

INTRODUCTION

The flora of every area has, on one hand, stable properties, resulting from the local, usually longer past, as well as, the contact of plants with the habitat. Moreover, it is characterised by its peculiar dynamics. The dynamic phenomena of local floras escalated together with the growth of anthropogenic impact, which contributes to the decline of many species, as well as to their growth in number. The dynamics of the distribution range is also a characteristic phenomenon for the very rare, monotypic Euro – Asian – American grass *Coleanthus subtilis* (Meusel et al. 1965). The distribution area of *Coleanthus subtilis* includes five geographical centres, which are widely separated by disjunction, measuring several thousand kilometres, i.e. the Western and Central European, Western Siberian, Amur Basin, and American ranges (Nečajev and Nečajev 1972; Hulten and Fries 1986; Fedorov 1999). The first specimens of this grass, according to Hejny (1969), were collected on the banks of the Rhine, Germany, in 1911, and L. Trattinik published its valid scientific description in 1916. At the beginning and in the middle of the 20th century, the Czech and Moravian botanists used to find this grass on rather numerous stands as an ornithochoric species round fishponds. In a new elaboration Čeřovský et al. (2000) informs that the *locus classicus* of the species under discussion, as well as its genus, is situated on the Czech territory (Osek near Hořovic). This problem is not the purpose of our article. In any case, as announced by many authors, since 1920 till the second half of the past century, on the territories of the

present Czech and Slovakian Republics recorded were in their various parts as much as 140 localities of the discussed plant. The local botanists recognised the mentioned territories as the centre of occurrence of this species. The origin of centre of occurrence of this species in the Czech and Slovakian Republics is connected with existence of habitats proper for this grass (numerous fishponds with muddy soils), and with the refuge formed by the mentioned territories situated beyond the area of the last European glaciation.

RESULTS AND DISCUSSION

Distribution dynamics

Since the time of the species description till the present years, it turned out that the distribution range of *Coleanthus* is exceptionally dynamic. Not only new areas of its occurrence were discovered, but it was also noticed that it frequently declines under impact of human activity. As a plant connected with habitats of alluvial muddy soils in river valleys and shores of small water reservoirs, *Coleanthus* appeared to be very sensitive to the progressing anthropogenic transformations in the mentioned habitats (Korneck 1980). Thus, in the mentioned, abundant in stands Czech and Slovakian Republics *C. coleanthus* covers currently already only about 25 stands (Čeřovský et al. 2000). Many of them are threatened by decline. In the general range of this plant observed is its withdrawal from many localities. There exist no longer stands in Scandinavia, as

well as in Austria and northern Italy (Woike 1969; Hulten and Fries 1986; Cornet et al. 1999). Apart of the Czech and Slovakian Republic, at present most stands is accumulated in Germany. In the former GDR., where the species was earliest registered in the so-called red list, the species has as much as 14 stands (Benkert et al. 1996), in that most of them in the Ore Mts., southern of Freiberg (Conert et al. 1998). However, in the former West Germany, Heupler and Schöfelder (1989) noted it on two stands, of which only one of them persisted till the present time. Considerable resources of this species occur in the Siberian centre and in far-eastern Asia at the estuary of the Amur River (Nečajev and Nečajev 1972). Its precise contemporary distribution, based on more recent literature, is not known (this pertains particularly the wide riverside alluvium of the section Chabarovsk – Nikolajevsk). Among the existing in Western Europe, worthy of mention are the French locations in northern Brittany (Woike 1969; Cornet et al. 1998). There are also no current and detailed reports on the distribution range of *Coleanthus* in Northern America (Washington, Oregon), recognised by Conert et al. (1998) in the whole as a component of the local synanthropic flora.

In Poland *Coleanthus* was hitherto not recorded (Mirek et al. 1995), though its stand in Silesia is located in the zone of best penetrated, since the 19th century, floristic lands in Poland and Europe.

The purpose of the present article is the description of the new stand, and to pay attention to the threat of its existence. Other plants accompanying this grass enrich the Silesian stand. All of them are alluvial therophytes like *Veronica peregrina*, *Myosurus minimus* and *Limosella aquatica*. The first mentioned was recently recognised as a new in Poland kenophyte of American origin. All the three plants belong among rare and endangered species in Silesia and Poland.

Description of the new locality

The discovered stand, new to Silesian and Polish flora, is located ca. 20 km eastwards of Wrocław (Fig. 1). It is situated on the area of the Oleśnica Plateau, near the railway track Wrocław – Oleśnica, next to the village Borowa. All the noted patches of *Coleanthus* cover a large area, ca. 15 ha of surface. They occupy the shores of four fishponds, and after letting out the pond water they occupy also the muddy pond bottoms. The situation and type of habitats reminds the localities announced from the Czech and Slovakian Republics (Hejny 1996; Čerovský et al. 2000). In the mentioned countries *Coleanthus* grows also round and on the bottoms of fishponds, due to the traditional fish management and cultivation of fishponds. The most important element of this tradition favouring the settlement and development of therophytes, consists in periodical letting out of the pond water (autumn – winter – spring), exposing the bottom previously settled by the seed pool of annual plants. Fishponds are an old element of the scenery of the surroundings of Wrocław and Oleśnica for they have been established as early as in the 12th century. At the beginning of the 20th century on this territory there existed over 390 ponds. Most of them were part of church properties (order of Cistercians). The presently existing ponds are mainly used for raising carps and their fry. At the present time in the discussed area there remained a little over 20 ponds, but in most of them the traditional management is carried out, which favours the settlement of ephemerals on the muddy

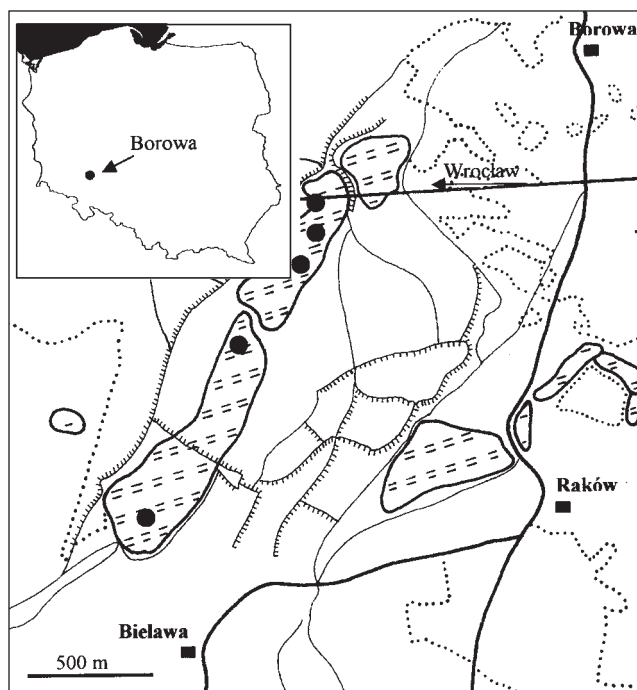


Fig. 1. Location of the new Polish vascular species.

shores and bottoms. The grown fish are transferred to deeper reservoirs and the pond water is removed for the wintertime. The repeated filling of the ponds with water takes place only at the end of May. Autumn, winter and spring allow numerous annuals for passing through or two developmental cycles. Thus, a permanent enlargement of the local seed pool takes place, which every year is violated by ploughing the bottoms of the reservoirs without using other agricultural procedures, and especially fertilisation. *Coleanthus subtilis* usually passes through two full developmental cycles (in spring and autumn). A similar reproductive potential shows also the frequent here *Veronica peregrina* L., *Myosurus minimus* L., and *Limosella aquatica* L. are rarely able to pass through two cycles – in these plants seed production ends usually late spring. Because of the high density of specimens, reaching up to 500 individuals per m², the reproductive potential of *Coleanthus* is huge, as one plant produces up to 1000 caryopses in spring, and about 1/4 less in autumn.

The described grass grows most often in company with *Veronica peregrina* and *Myosurus minimus*, less often with *Limosella aquatica*. Of pioneering character is *Limosella*, which invades the bare, dry, usually fissured silt, achieving small aboveground rosettes. *Coleanthus*, *Veronica* and *Myosurus* grow in various quantitative combinations, controlled by moisture gradient. Most hydrophilous is *Coleanthus*, which occupies the partly drowned to moderate moist places. In the latter, the optimum of growth achieves *Myosurus*, covering also the periodically dry habitats. All the three mentioned annuals belong probably to some transitional communities of the alliances *Nanocyperion flavescens* W. Koch 1926 and *Polygonion avicularis* Braun-Blanquet ex Aichinger 1933, but the exact assessment of phytosociological affiliation needs further syntaxonomical studies (Fig. 2). In the terrain under discussion they are accompanied, of the mentioned above and dominant annuals, also by *Callitriche verna* L. em. Lönnr. (frequently var. *terre-*



Fig. 2. General view of habitat (A), *Coleanthus subtilis* (B), *Myosurus minimus* (C), *Limosella aquatica* (D).

stre), *Alopecurus geniculatus* L., *Myriophyllum spicatum* L., *Polygonum lapathifolium* L., *P. brittingeri* Opiz, *P. hydropteris* L., *Ranunculus sceleratus* L., *Batrachium aquatile* (L.) Dumort., *B. trichophyllum* (Chaix) Bosch, *Cardamine parviflora* L., *Spirodela polyrhiza* (L.) Schleid., *Potamogeton crispus* L., *P. filiformis* Pers., *Rorippa palustris* (L.) Besser. The presence and quantitative share of the mentioned species is shaped by the water-level fluctuations. From the nearby pond embankments and fields arrive also from time to time to the communities such annuals as: *Chenopodium album* L., *Urtica dioica* L., *Matricaria maritima* L. ssp. *indora* (L.) Dostál, whereas from meadows and rushes: *Phalaris arundinacea* L., *Lythrum salicaria* L., *Glyceria fluitans* (L.) R. Br., and sedges (*Carex rostrata* Stokes, *C. riparia* Curtis, *C. acutiformis* Ehrh.). These plants neither play a greater part in the structure of annuals' phytocoenoses, nor do they constitute a competitive threat to the local, rare therophytes, owing to the specific ecological conditions caused by filling the ponds with water.

CONCLUSIONS

The discovery of clusters of annual plants round fishponds, at the head with the, new for Poland, *Coleanthus subtilis*, creates for the territory of their occurrence interesting research and teaching prospects. The potential instability and non-durability characteristic of annual plants (alliance *Nanocyperion flavescens*) obliges to legal protection of the territory of their occurrence (e.g. establishing a nature reserve). To maintain the stands and communities of the described plants, of great importance is the continuation of the traditional management of fishponds. This depends on exclusion of fertilisation as a factor increasing the throphicity of water and soil. A similar effect of annuals' decline can be evoked by cessation of emptying the ponds in spring and autumn, i.e. constantly filled with water and stocked with fish. Each of these procedures will cause the decline of therophytes, thus the loss for science and also for teaching botany and ecology.

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COLEANTHUS SUBTILIS (TRATT.) SEIDEL – NOWY GATUNEK DLA FLORY NACZYNIOWEJ POLSKI

STRESZCZENIE

Na obszarze Niziny Oleśnickiej, 20 km na wschód od Wrocławia, odkryto wokół stawów rybnych nieznaną dotąd w Polsce trawę koleanta delikatnego. Roślina ta ma niezwykle interesujący zasięg dysjunktywny euro-azjatycko-amerykański, z kilkoma zaledwie centrami występowania. Najbliższe stanowiska koleanta delikatnego znajdują się w Niemczech oraz w Czechach i Słowacji. Obok rzadkiego koleanta, na omawianym terenie zanotowano też inne interesujące rośliny jednoroczne (m.in. *Veronica peregrina* L. i *Myosurus minimus* L.). W artykule przedyskutowano zasięg koleanta oraz możliwości trwałego zabezpieczenia interesującego i licznego zarazem skupiska znalezionych terofitów. Warunkiem dalszego, trwałego występowania odnalezionych roślin jest utrzymanie tradycyjnej, hodowlanej gospodarki rybnej (dwukrotne w ciągu roku usuwanie wody ze stawów), jak i przeciwdziałanie eutrofizacji siedlisk w obszarze występowania roślin.

SŁOWA KLUCZOWE: *Coleanthus subtilis*, *Veronica peregrina*, rośliny jednoroczne, zagrożenie i ochrona.