Navicula citrus KRASSKE (Bacillariophyceae) in the Czech Republic

Navicula citrus KRASSKE (Bacillariophyceae) v České Republice

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Abstract

Navicula citrus KRASSKE (1923), an extremely rare species of the Czech diatom flora, was up to now known from a few South Moravian localities (BÍLÝ 1945). Its recent findings, mainly in running waters, both in the River Morava Basin and the River Labe Basin, suggest the possibility of its just beginning expansion wave.

Abstrakt

Navicula citrus KRASSKE (1923), patří k velmi vzácným druhům středoevropské rozsivkové flóry. Z území České republiky byla dosud známa jen z BÍLÉHO (1945) sběrů na jižní Moravě. V současné době jsme tento druh zaznamenali na více místech v povodí Moravy i Labe, a to hlavně ve vzorcích z tekoucích vod a mělkých průtočných nádrží. Druh je znám i ze sousedního Slovenska a je možno očekávat jeho další šíření ve Střední Evropě.

Navicula citrus, a rare species of Central European diatom flora, was described by KRASSKE (1923) from Kassel Basin in Germany. HUSTEDT (1930) quotes this species only from its locus classicus. Authors of Bacillariophyceae in Süsswasserflora von Mitteleuropa, KRAMMER & LANGE-BERTALOT (1986), mention a few further localities from adjacent Franken. However, 4 new records of this species from South Moravia, namely from the Middle fishpond near Lednice, a pond at the sugar factory in Sokolnice (Fig. 1), the sluice of the Zlatý potok stream at Měnín and from the Říčka brook by Šlapanice, were published by BÍLÝ already in 1945. Three last localities are situated very close to each other, while the first one is more remote. One further locality, i.e. the River Visla in Warsaw, is mentioned by SIEMIŃSKA (1964) in Flora słodkowodna Polski. On the contrary, *Navicula citrus* appears not to be known from the former territory of the Soviet Union at the time of the publication of Diatom volume in Opredelitel presnovodnych vodoroslej SSSR (ZABELINA et al.,

1951). Nowadays, *Navicula citrus* is still classified as "extremely rare" species in the red book of Germany (LANGE-BERTALOT 1996).

Since BÍLÝ's records, *Navicula citrus* was not noticed anywhere in the Czech Republic for many consequent years. Its next finding dates back as late as 1996. Living cells of *N. citrus* with well preserved protoplasts were found (quite sporadically) among filaments of *Cladophora glomerata* in the River Berounka near Černošice, Bohemia (leg. by MARŠÁLEK). Quite recently, *N. citrus* started to occur in samples from some South Moravian areas. Most records refer to shallow reservoir cascade of Nové Mlýny. Living cells of this species were repeatedly observed in the plankton samples taken during the period of dominance of filamentous Cyanobacteria of genera *Pseudanabaena, Limnothrix*, and *Planktothrix* (MARVAN). Further occurrence of this species was reported from Lednice (Zámecký Fishpond, Růžový Fishpond, the River Dyje in Lednice; RAMEZANPOOR), from plankton samples of the River Dyje near Drosendorf (a locality situated already in the territory of Austria; GERIŠ) and in the same river at Pohansko (Fig.2; GERIŠ), from a fish pond beside the road connecting Nová Říše and Bohuslavice (during the period of strong development of Euglenophyceae *Trachelomonas armata, Euglena* sp, *Phacus suecicus*, etc.;.GERIŠ), and in plankton samples of the River Morava near Veselí n. Moravou (MARVAN). Further Bohemian localities are known from the River Ohře near Terezín and Lenešice in 2002 (June 2002, JANEČEK). Map 1 presents a complete survey of all up-to-now known localities in the River Morava Basin. Outside the Czech Republic, it is known to occur in Slovakia (HINDÁK & HINDÁKOVÁ 1998 and 2001: in the second named publication it is classified in the category of vulnerable species) and in Austria (ROTT et al. 1991; precise location not given).

Navicula citrus is well recognisable even in native preparations (Figs 1-3) on the basis of characteristic rostrate ends of valves. At first sight, it resembles *Navicula gregaria* DONKIN, but it can be distinguished because the cells have only one parietal chloroplast. It occupies 1/3 to 1/2 of the longitudinal axis of the cell and covers nearly the whole circumference of the frustule. (*N. gregaria* possesses always two chloroplasts located side by side in the cells and as a rule shifted significantly towards each other.) No optically distinguishable pyrenoid can be observed. There are some similarities to *Navicula accomoda* HUSTEDT [Syn. *Craticula accomoda* (HUST.) MANN] which also has rostrate, but shorter and relatively broader, ends of valves. In the girdle view, cells of *Navicula citrus* are remarkably narrowed towards both cell ends.

In comparison with other species of *Navicula* sensu lato, *Navicula citrus* shows unusually small variability in its shape, structure of valves and also in size. For the valvar length, KRAMMER & LANGE BERTALOT (1986) give 18 - 22 µm, for width 6 - 7 µm. In the samples from fishponds of Sokolnice, the valves were 18.5 - 19.5 µm long and 6 - 7 µm wide. The same range holds true for the dimensions of *N. citrus* from

Nové Mlýny Reservoir and also from the River Dyje near Pohansko, but also for e.g. HUSTEDT's (1942) material from Luzon.

HUSTEDT (1930) - and accordingly also SIEMIŃSKA (1964) - classified *Navicula citrus* in *Naviculae lanceolatae* s.l. In KRAMMER & LANGE-BERTALOT (1986) it is treated among "rest of the heterogeneous group *Punctatae*". So, it lies somewhere between species groups which some recent authors regard as different independent genera.

Ecological demands of this species are still not very well known. ROTT et al. (1997,1999) categorise it as a taxon preferring water bodies of high trophic level and stronger organic pollution. The findings in Bohemia and Moravia fall generally into eutrophic waters which, however, hardly exceed the upper range of betamesosaprobity. In BÍLÝ´s preparation from the pond in Sokolnice with a well developed population of *Navicula citrus,* the prevailing diatom is *Navicula tripunctata,* i.e. a species avoiding heavily polluted waters. It is worth of remembering that the majority of localities of *N. citrus* belong to running waters or shallow water bodies fed by riverine water.

The repeated records of this yet rare species of our flora suggest the possibility of its just beginning expansion wave. It is hardly possible to predict whether it can reach such a strong development as it was the case in *Actinocyclus normanii* some years ago (once absolutely lacking in our waters but at present fully retreated again) or in *Skeletonema potamos* (similarly once lacking but in contrast to *Actinocyclus* permanently abundant: see MARVAN et al., 1997). Nevertheless, it is worth to bare in mind this possibility and to follow the future fate of this remarkable diatom.

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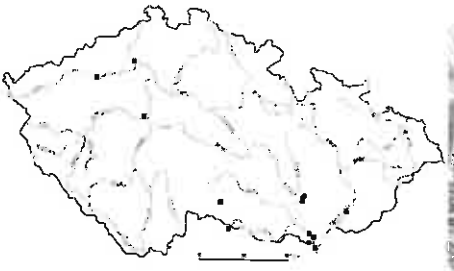

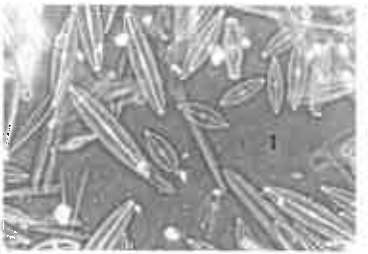

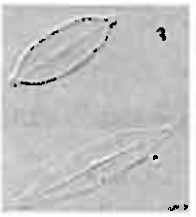

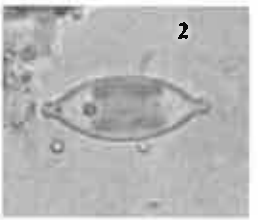

Map 1: Localities of *Navicula citrus* in the Czech Republic. • records of BÍLÝ (1945), ■ recent records

Fig. 1: *Navicula citrus* (18.5-19.5 µm) from the locality Sokolnice, associated with *Navicula tripunctata*, *N. cryptotenella*, *N. capitata*, *Nitzschia dissipata*, etc. Prep. of BÍLÝ.

Fig. 2: Living cells of *Navicula citrus* (18.5-19.5 µm) in plankton of the River Dyje at Pohansko

Fig. 3: *Navicula citrus* (18.5-19.5 µm) and *N. gregaria* from Zámecký rybník on the River Dyje in Lednice