

Habitat requirements of the Czech *Pisidium* species (Mollusca: Bivalvia) and possibilities of their application in bioindication



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INTRODUCTION

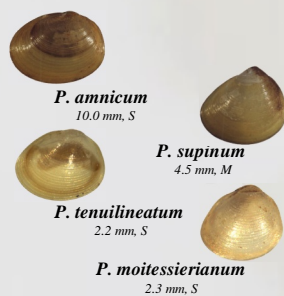
Currently, fourteen species assigned to the genus *Pisidium* (pill clams) are known in from Czech Republic (Horskák 2003, Horskák & Neumanová in press). They belong to the family Sphaeriidae, which comprises the smallest bivalves at all. Pill clams are simultaneous hermaphrodites. They are viviparous, brooding their direct-developing young within specialized structures of their gills - ctenidia (Korniuschin & Glaubrecht 2002) until they are released as free-living juveniles (Heard 1965). They have a cosmopolitan and ubiquitous distribution (Kuiper 1983) but they are exclusively found in limnic habitats where they participate in almost all types of benthic communities. They often dominate in fens, swamps and small pools and represent an ecologically important group that has the potential for utilisation in biomonitoring.

HABITAT REQUIREMENTS

Pill clams are mostly mud dwelling animals, which are able to burrow in the sediment. They have two different modes of feeding: filter- and pedal-feeding. They prefer sediment with higher share of FPOM and lowland water bodies. Regarding the species richness, there are substantial differences between lowland water habitats (up to seven co-existing species) and montane ones. Czech mountains are very poor in *Pisidium* (Horskák 2001) mainly in the comparison with the Alps and Pyrenees (e.g. Kuiper 1974).

Within the Czech *Pisidium* fauna, four species are restricted to running water habitats, three species inhabit only standing waters, and the remaining seven species occur in both running and standing waters.

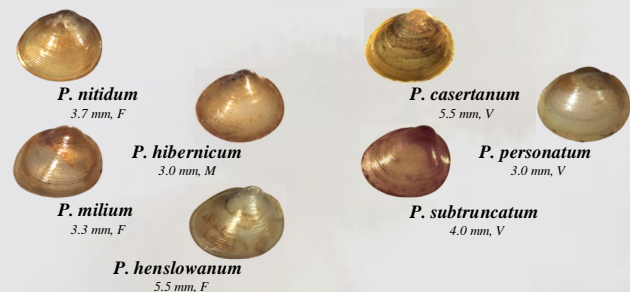
Running water bodies



Standing water bodies



Both running and standing water bodies

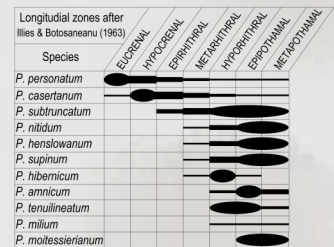


Note: maximum length and frequency are added; S - scarce, M - medium frequent, F - frequent, V - very frequent.

APPLICATION IN BIOINDICATION

Bivalve molluscs (especially pill clams) are good bioindicators because of their bond with the substrate, they are sensitive to changes in flow and oxygen regimes, harmful substance cumulation in sediments as well as to stream regulation (elimination of suitable habitats).

Species of low indicator value (e.g. *P. casertanum*, *P. subtruncatum*) are contrasted with those having a high indicator value (e.g. *P. annicum*, *P. supinum*, *P. tenuilineatum*). Caused by different individual species requirements, pill clam communities of running waters closely match with longitudinal zones according to Illies & Botosaneanu (1963). The most frequent occurrence is expressed by ovals.

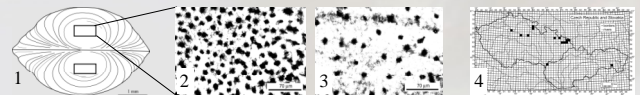


Calcium concentration and pH of the water are two of the factors, which determine presence/absence of the various *Pisidium* species. Thus, they should be used as biological indicator of environmental changes (i.e. acidification). The study on Norwegian lakes (Økland & Kuiper 1982) documented changes caused by acidification. If pH drops below 6.0, many species disappear and if acidification brings pH below 5.0, even the remaining four tolerant species vanish. The most tolerant species at all is *P. casertanum* (Horskák & Hájek 2003).

PISIDIUM GLOBULARE - AN OVERLOOKED SPECIES

Pisidium globulare used to be synonymized with *P. casertanum* for a long time. Korniuschin (1998) was the first to suggest that the name *Pisidium globulare* Clessin, 1873 should be probably assigned to a distinct species inhabiting wetlands and widely distributed in the Palaearctic region. Conchologically, *P. globulare* differs from *P. casertanum* by the inflated shell with prominent umbones (Fig. 1) and especially by the dense porosity of the shells (compare Figs 2 and 3).

Based on the revision of extensive voucher material (642 lots) *P. globulare* was found in 18 sites in the Czech Republic and in one site in Slovakia (Fig. 4, Horskák & Neumanová in press). *P. globulare* is a typical inhabitant of wetlands. It was found in swamps, as well as in open and forest pools of big lowland river alluvia. These habitats are often semi-periodic, shallow, and naturally rich in trophy. It seems to be a rare species inhabiting natural wetlands with no or low human impact.



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