NEW RECORDS OF *VERTIGO ANGUSTIOR* JEFFREYS 1833 IN NORTH-WESTERN POLAND

Vertigo angustior inhabits Europe from Portugal to the Caspian Sea, in the north to ca. 60° but is not recorded from the southernmost fringes of the continent. In the east it ranges to the Urals and northern Iran (Pokryszko, 1990). It is very rare throughout much of Europe (Wells & Chatfield, 1992) and is listed in the Red Data Books of the following countries: Austria (Frank & Reischütz, 1991), Czech Republic (Slovak Academy of Sciences, 2001–2006), Finland (Rassi & Väisänen, 1987), Great Britain (Bratton, 1991), Ireland (Byrne *et al*., 2009), Poland (Pokryszko, 2004), Switzerland (Turner, 1990). In addition, it is scheduled in the threatened species list for Bavaria (Falkner, 1991) and in the national list of threatened species of Sweden (Andersson *et al*., 1987). The mollusc is also listed on the 2000 IUCN/WCMC Global Red List of Threatened Species with LR/cd category (Hilotn-Tylor, 2000) and mentioned in Annex II of the European Union's Habitat Directive.

Vertigo angustior is a hygrophilic calciphile and needs stable conditions (Boycott, 1934; Norris & Colville, 1974; Pokryszko, 1990). It has been recorded from a wide range of habitat categories (so-called multihabitat species) but within each habitat is only found in specific microhabitat conditions (Holyoak & Willing, 1999; Pokryszko, 2003; Cameron *et al*., 2003). These include permanent dampness without inundation, herbaceous or other cover supplying litter and friable refuges not dense, grazed turf with a tough root mat, and relative openness rather than heavy shade cast by trees or very dense, tall herbs (Cameron, 2003). The species is particularly vulnerable to habitat change (Fowles, 1998) as a consequence of either anthropogenic or climatic changes. Sites are altered by eutrophication, drainage and vegetation succession (Pokryszko, 2003; Książkiewicz, 2010). Nevertheless, recent research conducted in Poland has produced new records of *Vertigo angustior* (Książkiewicz, 2010) but the species remains rather rare throughout its range and localities are scattered in all the studied regions within the country (Pokryszko, 1990).

New records of Vertigo angustior Field studies were conducted on August and September 2008: 68 sites were tested and 8 new locations of *Vertigo angustior* were discovered. The following information gives geographical coordinates, site description and number of individuals seen:

1. 53°74´75´´N, 16°83´94´´E. Semi-open swamp bordering Dołgie lake and Piławka river covered with *Carex paniculata* clumps, the area is partly shaded by trees, flooding episodes occurring regularly. Four specimens of *Vertigo angustior* were found climbing on clumps of sedges.
2. 53°77´05´´N, 16°78´04´´E. Calcareous and non-shaded habitat situated near to the Wielimie lake borders, covered mostly with *Carex paniculata* and reed, eutrophication is visible – *Urtica dioica* numerously present, the site is temporarily flooded (yearly episodes). Two specimens of *Vertigo angustior* were found on clumps of sedges.
3. 53°51´21´´N, 17°10´14´´E. Swamp covered with *Caricetum acutiformis* bordering Modra river, the location is calcareous, partly shaded by alder *Alnus glutinosa* and eutrophicated moderately. Five specimens were found.
4. 53°52´09´´N,17°10´41´´E. Open, calcareous swamp bordering the Modra river and covered by sedges (*Carex paniculata* dominating), inactive draining channels present interspersed with over-dry fragments. Three specimens of *Vertigo angustior* were found on clumps of sedges near the river.
5. 53°26´53´´N, 15°40´02´´E. Open, calcareous swamp covered mostly with *Carex acutiformis* and *Thelipteris palustris*, partly dried-out and broken up by a few draining channels. Two specimens of *Vertigo angustior* were found crawling among waterlogged litter.
6. 53°25´08´´N, 15°56´14´´E. Calcareous swamp located near a former calcium mine, the habitat borders a trubutory of the Drawa, site is permanently humid and covered with sedges (*Carex acutiformis* mainly) and reed, with also the following, *Lychnis flos-coculi, Ranunculus repens, Mentha aquatica, Plantago lanceolata, Potentilla anserina* and *Alchemilla millefolium*. Three specimens found.

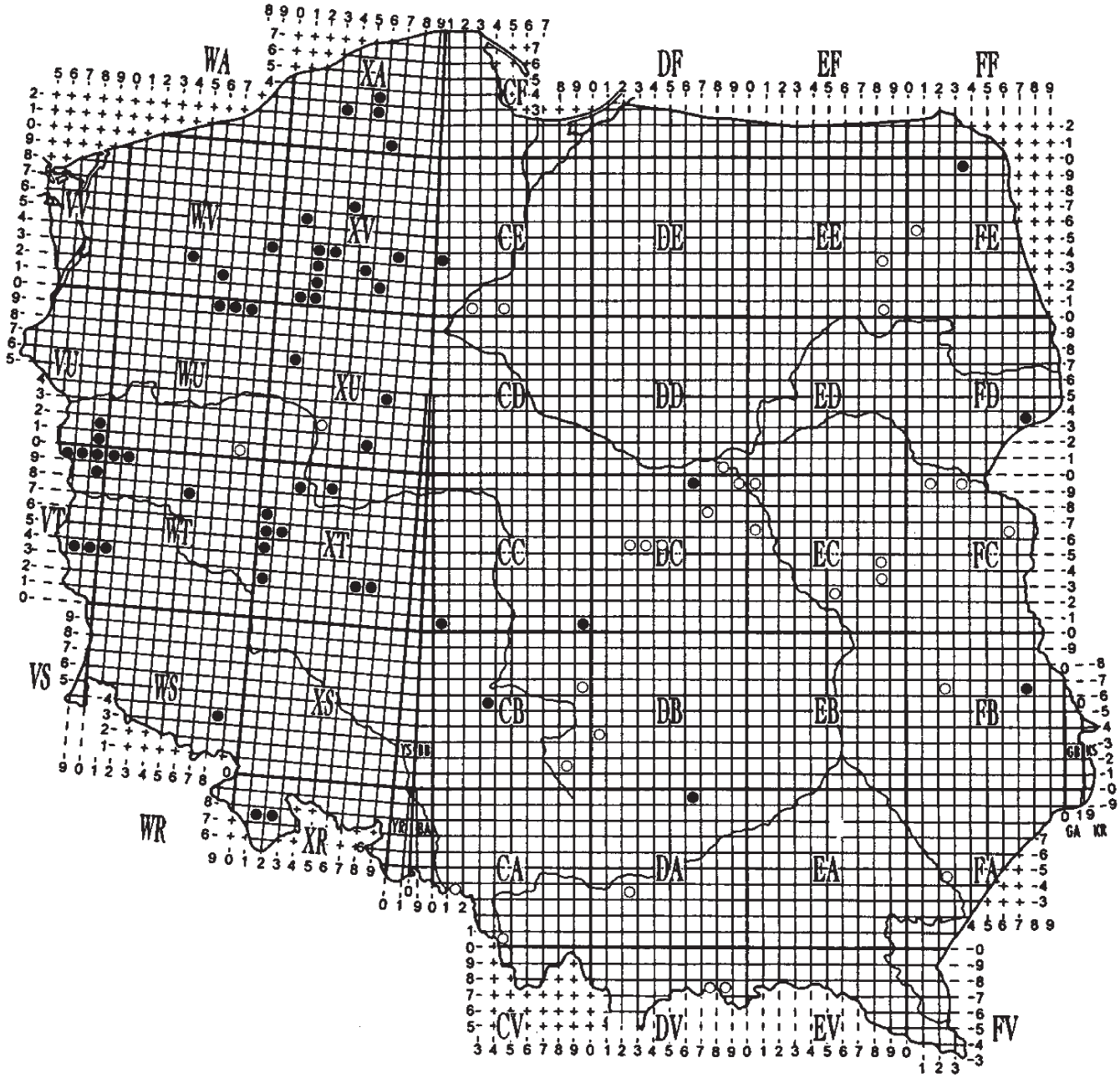

Figure 1 The UTM map of Poland: distribution mapped by Pokryszko (1990), Książkiewicz (2010) and new localities (WV93, WV42, WV61, XV15, XV46, XV61, XV33); circles indicate locations recorded before 1950.

7. 53°24´16´´N, 15°57´17´´E. Calcareous bog situated near the Studziennica river (Drawa tributary) and covered mostly with *Carex acutiformis*, also numerous *Polygonum amphibium*, *Cirsium palustre* and reed. Six specimens found.
8. 53°35´09´´N, 17°01´09´´E. Calcareous, open and permanently damp swamp bordering the Szczyra river, covered mostly with *Carex acutiformis*. Two specimens of *Vertigo angustior* were found crawling among waterlogged litter.

Despite extended studies we were able to find only 8 new localities for *Vertigo angustior*. The mollusc was mainly located in calcareous swamps vegetated with sedges (*Carex acutiformis* and *Carex paniculata*). In the temporarily flooded sites it was found mainly in association with *Carex paniculata* clumps (which reached 50-60 cm). The sedges appeared to create refuges during periods of high water level. In contrast to the *Carex acutiformis* sites, the mollusc was found crawling among waterlogged litter

and only sporadically climbing the vegetation canopy.

The presence of multiple sites in one river valley (Szczyra, Modra, Drawa) supports the efficiency of water-born dispersal in this species as observed by G. Majoros (Hornung *et al*., 2003).

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