

Distribution of Neritid, Viviparid and Valvatid freshwater gastropods in Belgium (Mollusca, Prosobranchia)

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Abstract

The distribution of the freshwater gastropods *Theodoxus fluviatilis* (LINNAEUS, 1758), *Viviparus viviparus* (LINNAEUS, 1758), *Viviparus contectus* (MILLET, 1813), *Valvata cristata* MÜLLER, 1774, *Valvata macrostoma* MÖRCH, 1864 and *Valvata piscinalis* (MÜLLER, 1774) in Belgium is recorded using data from the past 140 years.

UTM-maps are presented for each species, based on the collections of the Royal Belgian Institute of Natural Sciences (RBINS), on field observations and on data derived from private collections and literature.

The distribution maps suggest a decline from 1950 onwards for each of the six species. At present only *V. piscinalis* can be considered to be common in Belgium, whereas *V. macrostoma* has the most restricted distribution.

Key-words: Mollusca, Neritidae, Viviparidae, Valvatidae, distribution, Belgium.

Résumé

La distribution en Belgique des gastéropodes dulçaquicoles *Theodoxus fluviatilis* (LINNAEUS, 1758), *Viviparus viviparus* (LINNAEUS, 1758), *Viviparus contectus* (MILLET, 1813), *Valvata cristata* MÜLLER, 1774, *Valvata macrostoma* MÖRCH, 1864 et *Valvata piscinalis* (MÜLLER, 1774) est présentée. Elle se base sur des données des 140 dernières années.

Pour chaque espèce, les cartes UTM présentées sont établies sur base des collections de l'Institut royal des Sciences naturelles de Belgique (IRScNB), des observations de terrain, des collections privées et de la littérature. Les cartes de distribution suggèrent une régression à partir de 1950 pour chaque une des six espèces. Actuellement, *V. piscinalis* peut être considéré comme une espèce commune en Belgique, tandis que *V. macrostoma* présente la distribution la plus restreinte.

Mots-clés: Mollusca, Neritidae, Viviparidae, Valvatidae, distribution, Belgique.

Introduction

In the framework of the European Invertebrate Survey (EIS) the Malacology Section of the Royal Belgian Institute of Natural Sciences (RBINS) is compiling a database on the distribution of freshwater molluscs in Belgium. As a result of this endeavour, following distri-

bution maps have already been published: Planorbidae (SABLON & VAN GOETHEM, 1989), Lymnaeidae (SABLON & VAN GOETHEM, 1992; 1996), Margaritiferidae (VAN GOETHEM, 1995) and Unionidae (VAN GOETHEM, 1995; NIJS & VAN GOETHEM, 1995). Moreover, information on taxonomy and/or distribution of non-marine molluscs in Belgium, is presented in VAN GOETHEM (1988, 1989, 1992).

Most recently, NIJS *et al.* (1996) published a bibliography of the recent non-marine molluscs of Belgium, covering the period 1943-1995.

In this contribution the distribution in Belgium of the following freshwater gastropods is presented and discussed: the neritid *Theodoxus fluviatilis* (LINNAEUS, 1758), the viviparids *Viviparus viviparus* (LINNAEUS, 1758) and *Viviparus contectus* (MILLET, 1813) and the valvatids *Valvata cristata* MÜLLER, 1774, *Valvata macrostoma* MÖRCH, 1864 and *Valvata piscinalis* (MÜLLER, 1774). Previous distribution maps of these species date from ADAM (1947).

Material and methods

A total of 961 records from all over Belgium are analysed, covering a sampling period of 140 years (the oldest samples of each species dating from 1857-1867). The records are based on the collections of the RBINS, on field observations and on data derived from private collections and literature. With this information, distribution maps are made as used in the framework of the EIS, considering a total of 376 Universal Transverse Mercator (UTM) squares of 10 km x 10 km for Belgium. A sample list is available upon request.

Results and discussion

In table 1 different data in relation to the distribution of the six species are summarised. The last column presents 101 records which are known from the literature and which we leave out of account in the following discussion. Hence all results are based on the RBINS collections, on field observations and on data derived from private collections. These show that *V. piscinalis* is found in the largest

Table 1

Species:	Total number of squares with data	Pre 1950 squares	1950 onwards squares	Pre 1950 and 1950 onwards squares	Total number of records	Oldest record	Most recent record	Total number of specimens	Records from literature
<i>T. fluviatilis</i> :	60	44	9	7	147	1860	1993	4060	20
<i>V. contectus</i> :	43	28	6	9	146	1860	1996	1469	7
<i>V. viviparus</i> :	60	36	17	7	151	1857	1993	866	22
<i>V. cristata</i> :	39	22	12	5	104	1864	1995	1940	15
<i>V. macrostoma</i> :	14	8	6	0	19	1867	1989	2527	0
<i>V. piscinalis</i> :	106	43	36	27	293	1858	1996	3795	37

The **first** column presents the total number of UTM-squares sampled per species. The **second** column presents the number of only pre 1950 UTM-squares sampled per species. The **third** column presents the number of only 1950 onwards UTM-squares sampled per species. The **fourth** column presents for each species the number of UTM-squares which are sampled pre 1950 and 1950 onwards. The **fifth** column presents the number of records per species. Records are based on shells, living animals and observations. The **sixth** and **seventh** column specify for each species the year of resp. the oldest and most recent record. The **eighth** column presents the total number of specimens per species. The **last** column presents for each species all records derived from literature.

number of UTM-squares, while *V. macrostoma* is the rarest species, even though at some sites where it occurs this species is relatively abundant. All six species show a higher number of pre 1950 squares compared to 1950 onwards squares. The number of squares sampled pre 1950 as well as 1950 onwards is relatively small. For *V. macrostoma* there is even no overlap.

V. piscinalis has the highest total number of records, whereas *V. macrostoma* has the lowest one. The oldest records range from 1857 for *V. viviparus* to 1867 for *V. macrostoma*, the most recent ones date from 1989 for *V. macrostoma* to 1996 for *V. piscinalis*.

Theodoxus fluviatilis (LINNAEUS, 1758)

Seems at present more or less common in Belgium (fig. 1) and lives in running waters like rivers (e.g. Meuse in Hermeton-sur-Meuse, Ourthe in Hamoir and Durbuy) and brooks. Of all records, 20% are sampled from more or less stagnant waters (e.g. kanaal van Dessel-Schoten in Beerse and Turnhout, Kempisch kanaal in Retie). Former findings are thus not so exceptional as stated in ADAM (1947, p. 15). Records from brackish water are absent for Belgium, which confirms earlier findings by ADAM (1947, p. 16, 1960, p. 126) and is in agreement with a situation in France (GERMAIN, 1930, p. 682). On the other hand, *T. fluviatilis* has been found in brackish water in the Netherlands (JANSSEN & DE VOGEL, 1965, p. 26), in Great-Britain and Denmark (FRETTER & GRAHAM, 1978, p. 105) and in Germany (GLOËR & MEIER-BROOK, 1994, p. 36).

Viviparus contectus (MILLET, 1813)

Seems at present less common in Lower and Middle Belgium (fig. 2). Samples are found in stagnant water like ponds (e.g. étang du Hazendaal in Hoeilaart), pools and ditches. There are also records from running waters like brooks (e.g. Nieuwe Sluisbeek in Baasrode). According to ADAM (1947, p. 20; 1960, p. 130) the species

does not occur in the province of Luxembourg, yet, we came across two records from that province: 5 specimens from Marche-en-Famenne, 1933 and 1 specimen from Grandmenil, 1869.

Viviparus viviparus (LINNAEUS, 1758)

Seems at present more or less common in Lower and Middle Belgium, with some rare occurrences in Upper Belgium (fig. 3). *V. viviparus* lives in rivers and canals (e.g. Meuse in Hastière-par-Dela and in Yvoir, Durme in Hamme, Albertkanaal in Geel, canal de Bruxelles-Charleroi in Godarville). A few records are from brooks, riverbanks, as well as from stagnant water like ponds (e.g. étang du Hazendaal in Hoeilaart).

Valvata cristata MÜLLER, 1774

Seems at present more or less common in Lower Belgium and Middle Belgium (fig. 4). This species occurs in more or less stagnant waters like ponds (e.g. étang du Fer à Cheval in Watermael-Boitsfort, étangs d'Auderghem in Auderghem), pools (e.g. les mares de Herstal), marshes and canals. The species has been recorded in brooks and only one sample was found in a river (Zenne in Brussels).

Valvata macrostoma MÖRCH, 1864

Seems at present limited to a very few localities in Middle Belgium (fig. 5), with the exception of one shell from Upper Belgium (Meuse in Hastière-par-Dela). *V. macrostoma* is frequently regarded synonymous with *Valvata pulchella* STUDER, 1820, yet currently both are considered separate species (WELLS & CHATFIELD, 1992, p. 78). According to FECHTER & FALKNER (1990, p. 120), *V. pulchella* inhabits the moorland waters bordering the Alps, whereas *V. macrostoma* is distributed over central and northern Europe. It is beyond this contribution to go further into this problem. So far, all our records are treated as *V. macrostoma*.

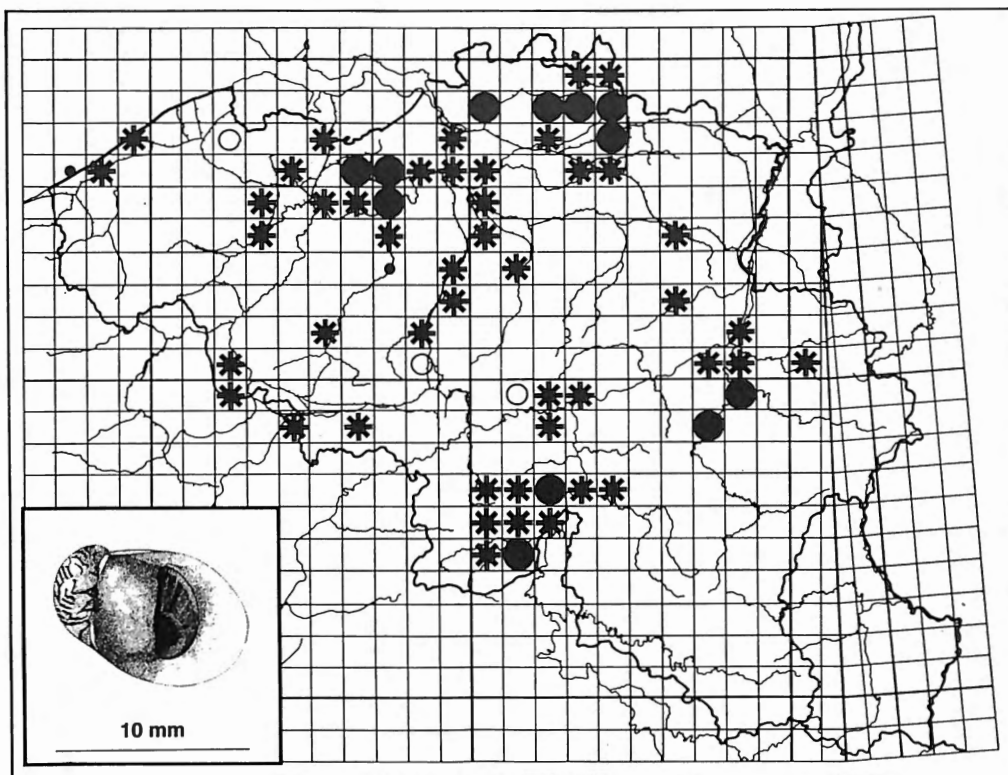


Fig. 1. - Distribution of *Theodoxus fluviatilis* (symbols as in legend).

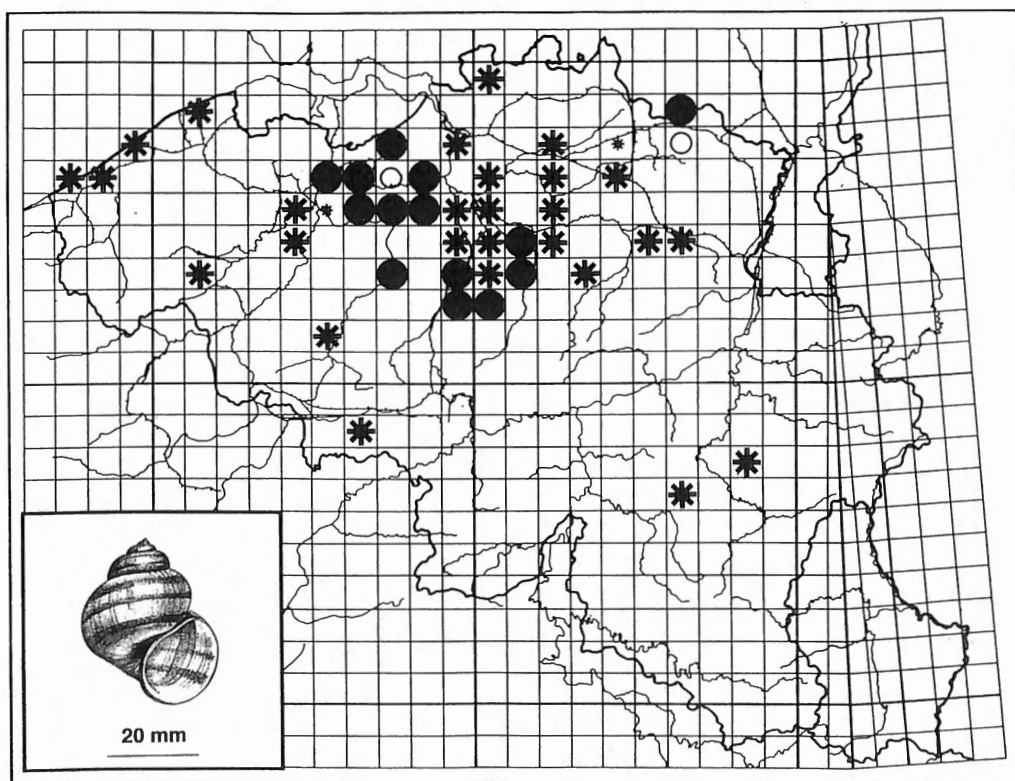


Fig. 2. - Distribution of *Viviparus contectus* (symbols as in legend).

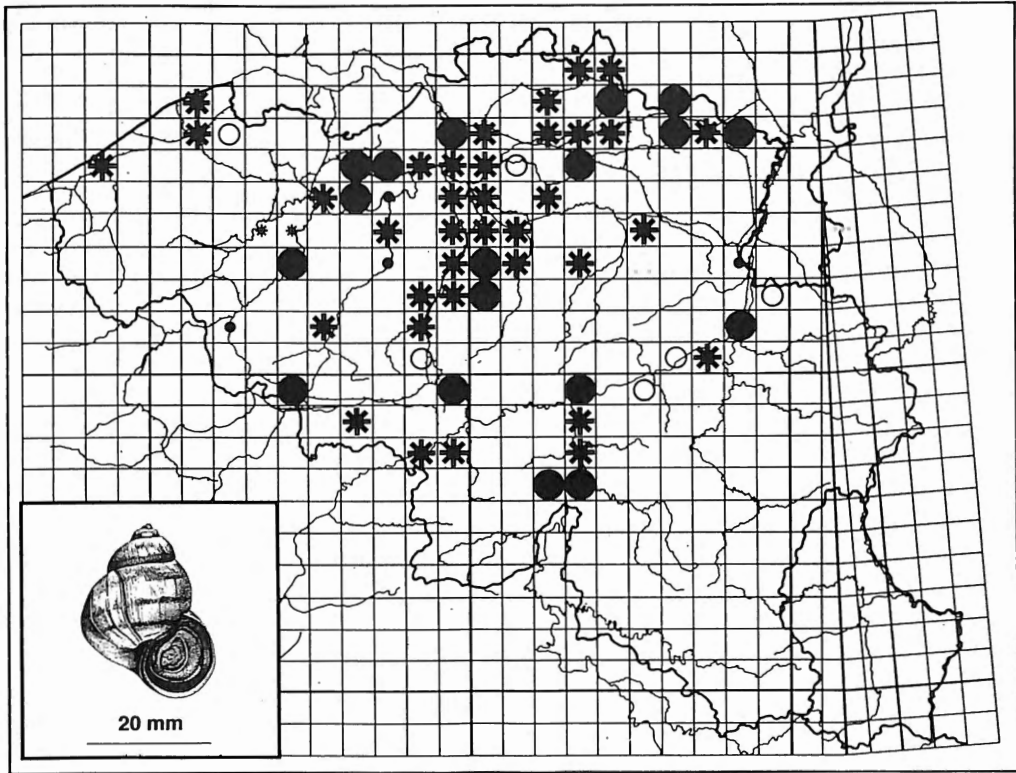


Fig. 3. - Distribution of *Viviparus viviparus* (symbols as in legend).

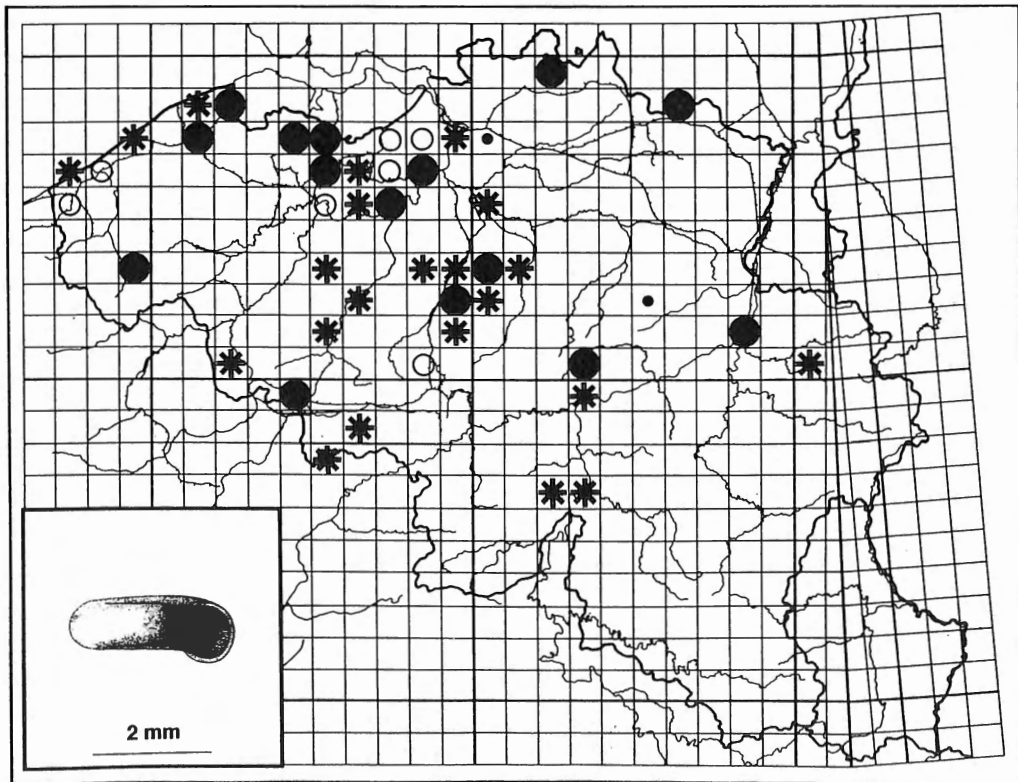


Fig. 4. - Distribution of *Valvata cristata* (symbols as in legend).

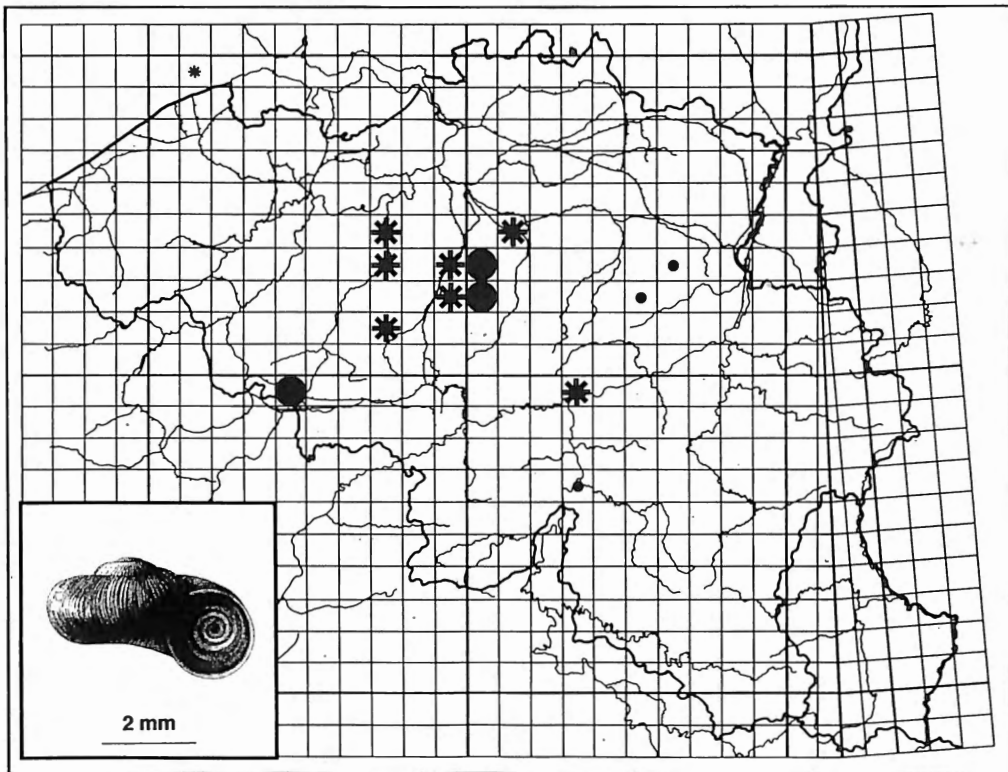


Fig. 5. - Distribution of *Valvata macrostoma* (symbols as in legend).

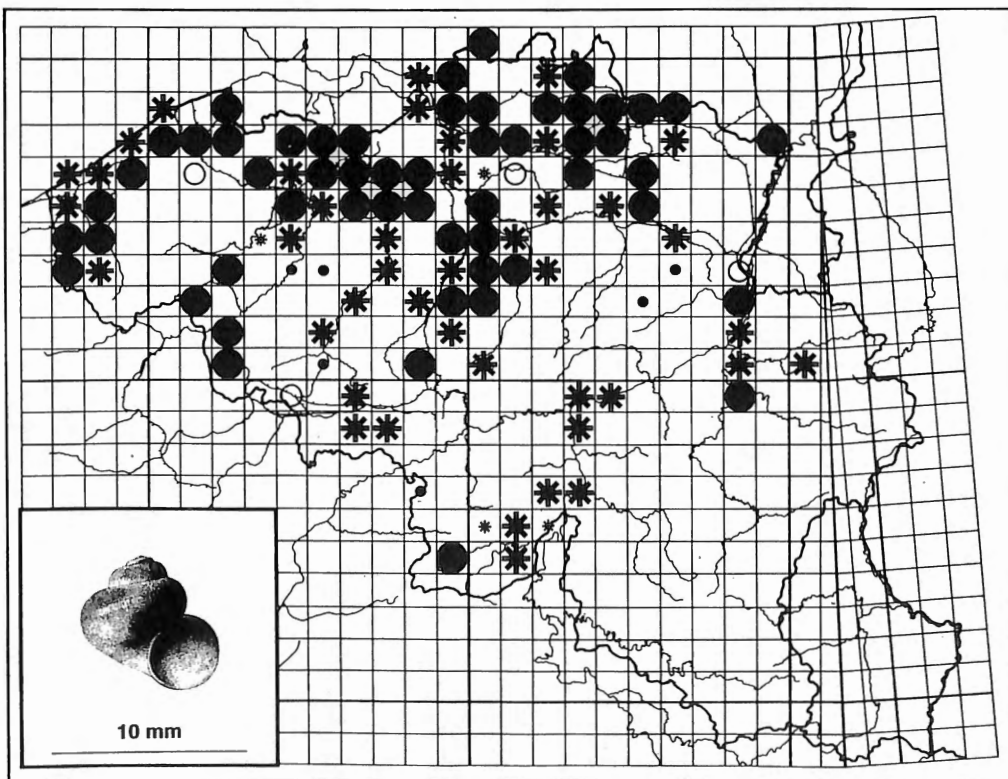


Fig. 6. - Distribution of *Valvata piscinalis* (symbols as in legend).

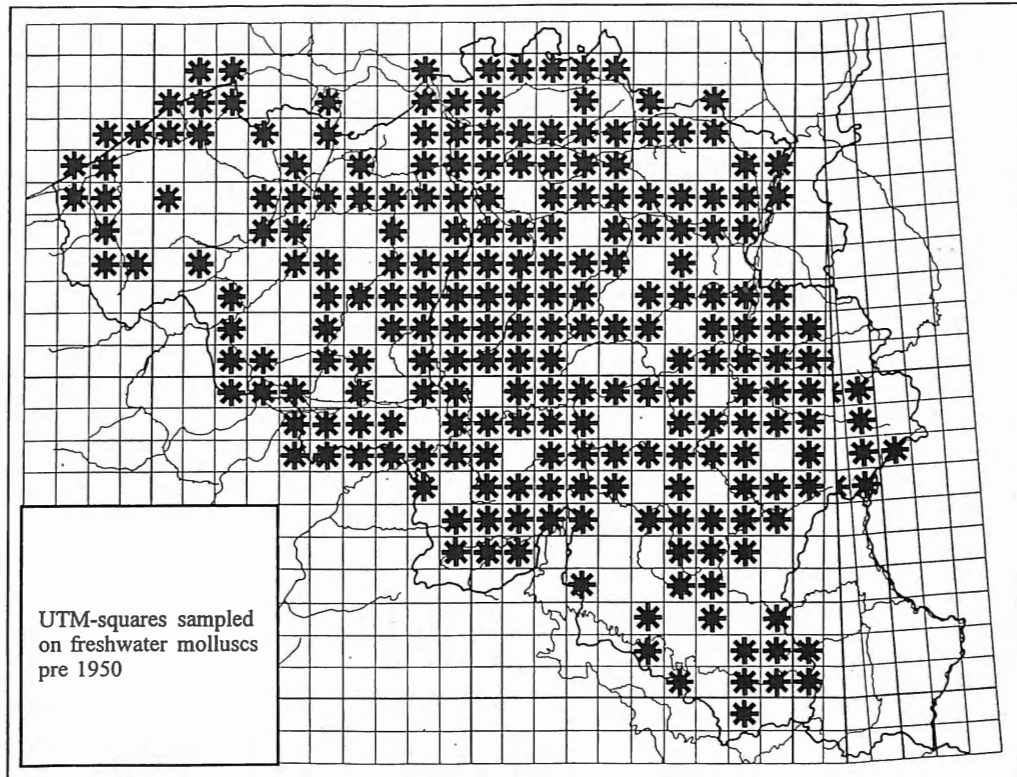


Fig. 7. – All 10 km UTM-squares with records on freshwater molluscs pre 1950.
Situation 30 April 1997 (symbols as in legend).

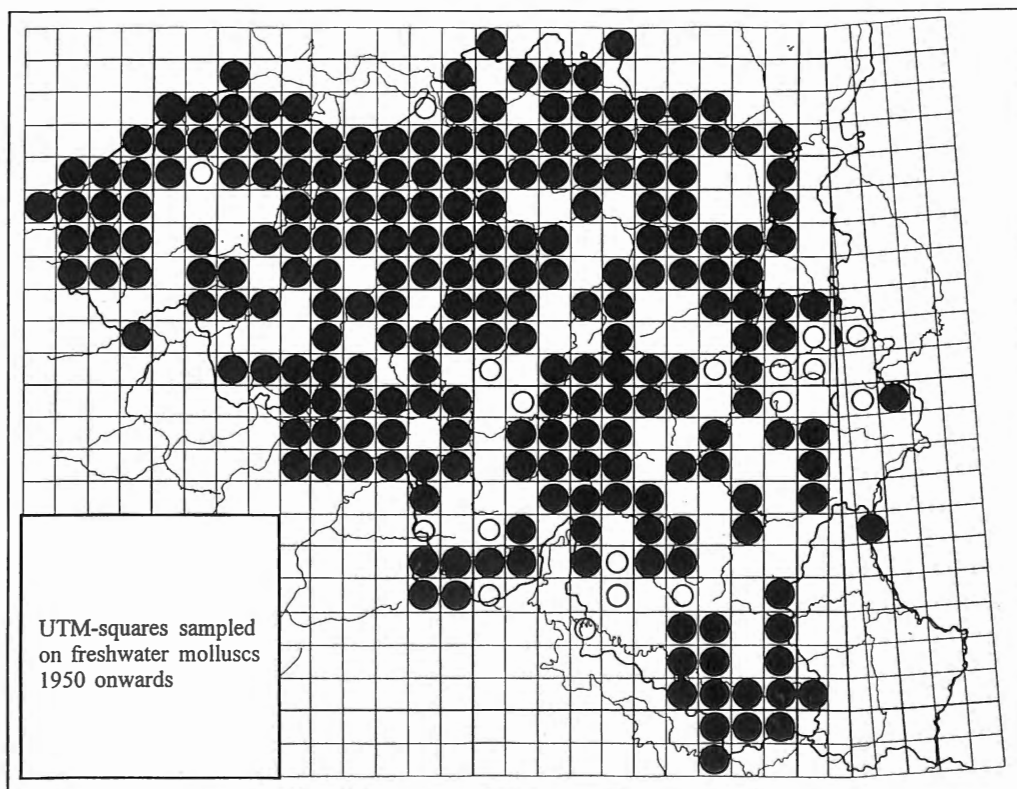


Fig. 8. – All 10 km UTM-squares with records on freshwater molluscs 1950 onwards.
Situation 30 April 1997 (symbols as in legend).

This species occurs in wells, brooks, rivers, canals and ponds (e.g. étang du Hazendaël in Hoeilaart).

The high number of specimens is due to one record of 2400 specimens (register number 8541, Anderlecht, 1928). Only a few records are from 1950 onwards. It is clear that the small number of records seems at odds with the wide array of habitats in which this species can occur.

Valvata piscinalis (MÜLLER, 1774)

Seems to be the most common of all six species dealt with, except for Upper Belgium where the species is less recorded (fig. 6). According to FRETTER & GRAHAM (1978, p. 113), FECHTER & FALKNER (1990, p. 120) and GLOËR & MEIER-BROOK (1994, p. 47) three subspecies *V. piscinalis piscinalis* (O.F. MÜLLER, 1774), *V. piscinalis antiqua* (MORRIS, 1838) and *V. piscinalis alpestris* (KÜSTER, 1853) can be distinguished on the basis of their ecological or geographical presence. In this paper all records are treated as *V. piscinalis*.

This species lives in brooks (e.g. Hondsluybeek in Weerde, Nieuwe Sluisbeek in Moerbeke, IJzerman- and Wolfmanbeek in Ninove), rivers (e.g. IJzer in Bambecque and in Stavele, Meuse in Lixhe, Grote Nete in Westerloo), canals (e.g. Albertkanaal in Oevel, Geel and Kwaadmechelen, kanaal van Machelen-Mechelen in Kampenhout, kanaal van Dessel-Schoten in Mechelen, Schoten, Ravels, Arendonk and Retie) and ponds (e.g. étangs d'Auderghem in Auderghem, étang des Enfants noyés in Watermael-Boitsfort). Records exist from brackish water and banks of rivers and brooks.

None of the six species has been found in the very south of Belgium.

At present, the total number of freshwater mollusc records pre 1950 is 5100 (fig. 7), 5360 records are from 1950 onwards (fig. 8).

Conclusions

Table 1 shows for each of the six species a higher number of pre 1950 UTM-squares compared to 1950 onwards UTM-squares. The number of UTM-squares which are sampled pre 1950 as well as 1950 onwards is relatively low.

Visual inspection of the distribution maps (figs 1-6) confirms the results of table 1 by suggesting a prevalence of "pre 1950" symbols, not covered by "1950 onwards" symbols, even though the coverage of the Belgian territory in both periods was comparable (figs 7-8). This could indicate that the species concerned are no longer present in these UTM-squares from 1950 on. However, pre 1950 and 1950 onwards samplings have not necessarily been done in the same way and/or the same regions. Therefore, such comparisons have to be done carefully.

At present, *V. macrostoma* has the most restricted distribution (fig. 5). According to WELLS & CHATFIELD (1992, p. 78, 79, 113) *V. macrostoma* (and also *V. pulchella*) is apparently declining in a number of European countries and is therefore recommended for protection. Moreover, in Germany *V. macrostoma* is listed in the status categorie 2 (= highly endangered in Germany) of the national Red List (JUNGBLUTH *et al.*, 1995).

The other five species seem to be more frequent in Belgium although their maps reflect a suggestive decline 1950 onwards (figs 1-4, 6). In other European countries similar tendencies are reported. In the United Kingdom *T. fluviatilis* is included among the "vulnerable" freshwater molluscs and in Italy it belongs even to the most threatened species (WELLS, 1883, p. 111). In Germany all five species are listed in the national Red List: *T. fluviatilis* and *V. viviparus* are included in the status categorie 2, *V. contectus* is added to the status categorie 3 (= endangered in Germany) and *V. cristata* and *V. piscinalis* are inserted to the status categorie V (= likely to move into statuscategorie 3) (JUNGBLUTH *et al.*, 1995).

Legend of figs 1-8

- 1950 onwards, data drawn on literature or communications (not checked by the authors).
- * pre 1950, empty shells, faded or broken.
- * pre 1950, collected alive or observed alive.
- 1950 onwards, empty shells, faded or broken.
- 1950 onwards, collected alive or observed alive

Drawings of the gastropods:

from ADAM, W., 1960. Mollusques. I. Mollusques terrestres et dulcicoles. *Patrimoine de l'Institut royal des Sciences naturelles de Belgique, série Faune de Belgique*: 1-402, figs 1-163, pls 1-16, col. pls A-D.

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