MALACOLOGIA, 1969, 9(1): 297-299

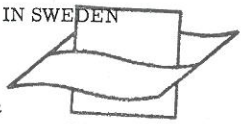
17000

PROC. THIRD EUROP. MALAC. CONGR.

RECENT ADVANCES IN LAND MOLLUSC RESEARCH IN SWEDEN

Henrik W. Waldén

Natural History Museum, Göteborg, Sweden



Vlaams Instituut voor de Zee
Flanders Marine Institute

ABSTRACT

An extensive, faunistic-ecological survey of the land molluscs (and some further terrestrial groups) in central and southern Sweden, is being carried out by the Göteborg Natural History Museum. It was started in 1921 by the late Dr. Hans Lohmander. The survey was presented by the present author at the First Europ. Malac. Congress, 1962. Since that time the survey has advanced considerably, and a brief report about the most important advances is justified.

Concerning the scope, principles and methods reference should be made to the Congress Report (Waldén, 1965). Fig. 1 shows how far the survey has advanced up to 1968. The black areas are surveyed in detail, from the dotted areas only scattered literature or museum records exist, and the white areas are entirely unknown. Besides the coherently surveyed area in southern and central Sweden, certain river valleys in northern Sweden have been investigated, in connection with their exploitation for hydroelectricity, which makes it necessary to collect documentary evidence of the destroyed areas for the future.

Since 1962 more than 2,600 collecting sites have been investigated, of which about 2,250 are situated in southern Sweden and more than 350 in the northern river valleys. In all more than 18,000 localities have been investigated in Sweden since the survey started. Parallel with the field work, the large amount of material left behind by Dr. Lohmander is being gradually worked out.

Besides the Swedish survey the Museum carries out surveys of a more extensive character in neighbouring countries. Thus a revision of the Norwegian collections of land molluscs has been undertaken and supplementary work has started, in cooperation with the Zoological Museums in Norway. Already the present work has rather profoundly modified the picture of distribution of the species of *Carychium*, *Succinea*, *Columella*, *Cochlicopa*, *Vitrea*, *Nesovitrea* and *Euconulus*, of certain species of *Vertigo*, *Vallonia*, *Arion* and *Deroceras*, and of *Acanthinula aculeata*. Two species, viz. *Clausilia dubia* and *pumila*, should evidently be eliminated from the list of Norwegian species, whereas others should be added, as *Vertigo genesii* and *geyeri*, *Limax valentianus* and *Zonitoides arboreus*. Obviously the results from Norway are of great importance when the conditions in Sweden are interpreted.

In connection with his survey in southern Sweden Dr. Lohmander did extensive collecting work in Denmark during 1930-39 and 1954-58. In all he investigated some 1,500 localities. Owing to the decease of Dr. Lohmander this survey also was not finished by him. However, an agreement has been made to undertake supplementary collecting work in cooperation with the Aarhus Natural History Museum in Denmark, so the remaining gaps in the survey will be covered.

TAXONOMIC REVISION

The genera *Nesovitrea* and *Columella* have been revised. In the genus *Nesovitrea* (Waldén, 1966b) the specific distinction between *hammonis* (Ström) and *petronella* (L. Pfeiffer) has been definitely proved. The nearctic species, *electrina* (Gould) and *binneyana* (Morse), are clearly distinguished from the European species, without any intermediates.

In the genus *Columella* a new species, *C. aspera* Waldén (1966a, p 53) has been recognized. It is definitely clear that *C. columella* (Martens) also is a distinct species. The survey has also made clear that the nearctic so-called *C. edentula*, described as *C. simplex* by Gould, is remarkably distinct both from the European *edentula* (Drap.) and *aspera*. It may possibly be a distinct species, but this needs further work to be proved. On the other hand *C. alticola* (Ingersoll) without any doubt is conspecific with *C. columella*.

Until now very little has been published about *C. aspera*, but it appears to be the prevalent species of the genus in NW Europe. Fig. 2 shows its distribution in the province of Halland in SW Sweden. It is almost ubiquitous here, being particularly prevalent in oligotrophic areas. *C. edentula* (Fig. 3) proved to be rare and local, mainly confined to luxuriant woods and fens, especially on calcareous soil.

For a number of further aggregate groups conclusive evidence has been obtained that they are composed of distinct species, though the results have not yet been published. These are *Vertigo arctica* and *ronnebyensis* (the relation to the nearctic *V. modesta* is disregarded in the present connection), *V. genesii* and *geyeri*, *Arion circumscriptus*, *silvaticus* and *fasciatus*. In addition to this the relation between *Deroceras laeve* and *sturanyi*, which Simroth and his followers considered to represent stages of a sex-change cycle, has been definitively disentangled.

On the other hand, the complex of *Cochlicopa* species must still be regarded as far from solution.

Fig. 1

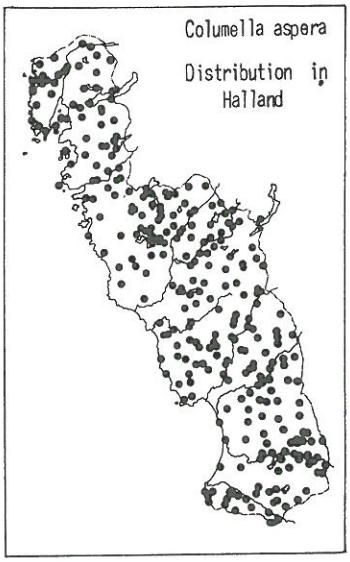


Fig. 2

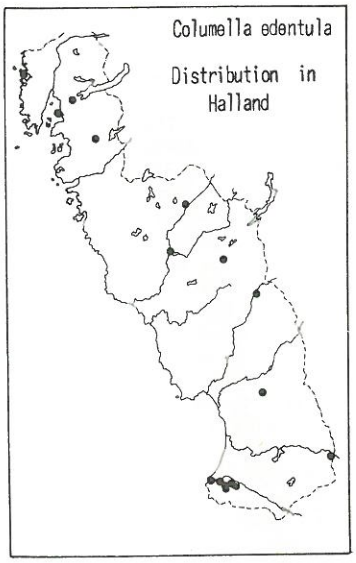


Fig. 3

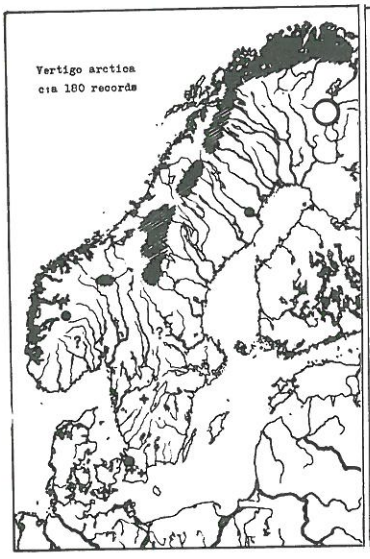


Fig. 4

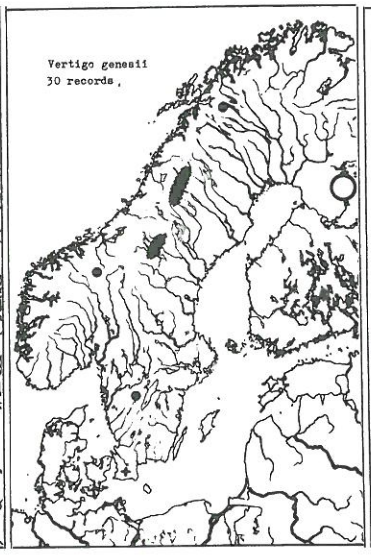


Fig. 5

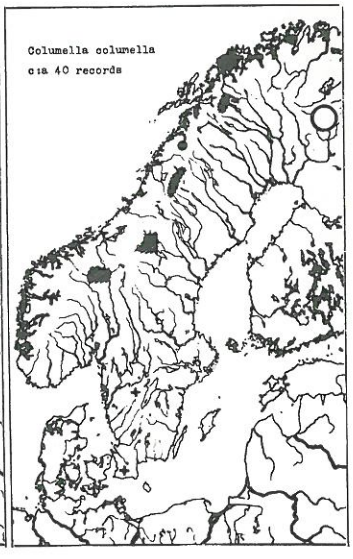


Fig. 6

FAUNISTIC RESULTS

Some examples of a wider zoogeographical interest will be considered. The three species regarded below are of particular interest, because they were characteristic of the coldest phases of the Pleistocene in central Europe and in the British Isles. Today they are, outside Scandinavia, limited to the highest alpine areas of Europe.

The subfossil Mollusca are included in the survey. When the distribution is considered both recent and fossil evidence are included. Subfossil records from localities, where the species are now extinct, have been indicated on the maps by crosses.

Vertigo arctica (Wallenberg) (Fig. 4). This species has proved to be regularly distributed along the high mountain ridge, and on lower levels in northernmost Scandinavia. Besides, it has a seemingly isolated occurrence in the mountain gorge Skäralid in southernmost Sweden. *V. arctica* appeared very early after the ice age. Later it seems to have become extinct, except in the mountains and at Skäralid. Evidence from several sites indicate that it must have survived the Post Glacial Warm Period (Atlanticum) here. The recent occurrence in the south is reasonably regarded as relict.

Vertigo genesii Gredler (Fig. 5) also occurs over a large stretch in the Scandinavian mountains, though it is decidedly rarer than *V. arctica*. In southern Sweden it still lives in cold spring bogs on the calcareous mountains of Västergötland. Fossil evidence is known from this area, from Jämtland in northern Sweden and from southernmost Sweden. In the last area it is now extinct. The recent distribution is quite consistent with the fossil history. The occurrence in Västergötland has a clearly relict character.

Columella columella (Martens) (Fig. 6) has a similar distribution to *V. genesii*, though it is decidedly more northern. It occurs on low levels in northernmost Scandinavia. It is evidently absent in southern Sweden. There it is known only from the oldest strata, and disappears when the Warm Period begins.

Above it has been pointed out that the typical alpine and Glacial Period species *V. arctica* and *genesii* were able to survive the Post Glacial Warm optimum in southernmost Sweden. The mollusc fauna here of this period has a remarkably heterogeneous character. On the one hand it comprises typical central European species, such as *Laciniaria biplicata*, *Iphigena ventricosa* and *Monachoides incarnatus*, which are today much rarer. Together with those species (though, of course, in different habitats) there lived the above mentioned alpine species and, in addition, the boreal species *Nesovitrea petronella* and *Discus ruderatus*, which are today decidedly much rarer in this part of Sweden.

The co-occurrence of these very different faunal groups stands in contrast to the hitherto known botanical evidence. Reasonably it must modify the conception of the climate during the Post Glacial Warm Period.

REFERENCES

WALDÉN, H. W., 1965, Terrestrial faunistic studies in Sweden. *Proc. First Malac. Congress*, 95-109.

WALDÉN, H. W., 1966a, Einige Bemerkungen zum Ergänzungsband zu EHRMANN's "Mollusca" in "Die Tierwelt Mitteleuropas." *Arch. Moll.*, 95: 49-68.

WALDÉN, H. W., 1966b, Zur Frage der Taxionomie, Nomenklatur und Ökologie von *Nesovitrea hammonis* (Ström) und *petronella* (L. Pfeiffer). *Ibid.*, 95: 161-195.