

European distribution maps of *Pomatias elegans* (MÜLLER),
Discus rudtatus (FÉRUSSAC), *Eobania vermiculata* (MÜLLER)
and *Margaritifera margaritifera* (LINNÉ).

By

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At the 4th Congress of *Unitas Malacologica Europaea* in Geneva in August 1971 a committee was formed to consider how work on mapping non-marine Mollusca in different European countries might be co-ordinated, leading eventually to the compilation of unified distribution maps for the whole continent. The present members of the committee, as reconstituted at the 5th UME Congress in Milan in September 1974, are Professor Dr. H. ANT (West Germany), Mr. H. CHEVALIER (France), Dr. E. GITTENBERGER (Netherlands), Mr. J. HEATH (Great Britain), Dr. M. P. KERNEY (Great Britain) and Mr. H. W. WALDÉN (Sweden).

The committee believe that a European mapping project for Mollusca is feasible, using cartographic methods similar to those adopted by the *Flora Europaea Atlas Committee*, and also recommended by the committee of the *European Invertebrate Survey (EIS)*. Under this system, the international UTM (Universal Transverse Mercator) grid is used, the basic recording unit at continental level being the 50×50 kilometre square, the presence of a species being shown by a conventional symbol placed within the appropriate square of the base-map. UTM-gridded maps on scales of 1 : 1 000 000 (GSGS, series 1301) and 1 : 500 000 (GSGS, series 1404) are now available for nearly all the countries involved. Further information on the working of the system may be obtained in a booklet available from Mr. J. HEATH, Monks Wood Experimental Station, Abbots Ripton, Huntingdon PE17 2LS, Great Britain (English version), or from Professor H. ANT, Wielandstraße 17, 47 Hamm, Westf., German Federal Republic (German version).

The advantages of grid mapping on any chosen scale over older systems of presenting information about geographical distribution (e. g., locality-dot mapping) are now becoming widely recognized by biogeographers (PERRING & WALTERS 1962). A uniform and systematic coverage — i. e., true mapping — becomes possible, especially if appropriate habitats in each grid square are deliberately searched by a competent fieldworker. Systematic grid mapping of Mollusca is now being undertaken in several European countries (e. g., JUNG-BLUTH 1972). In the British Isles a scheme begun in 1962 will shortly culminate in the publication of a distribution atlas, based on a 10-kilometre square grid; some provisional maps from this have already been published (KERNEY 1970, 1972, 1973, POLLARD 1974), and an example is included here (Fig. 1).

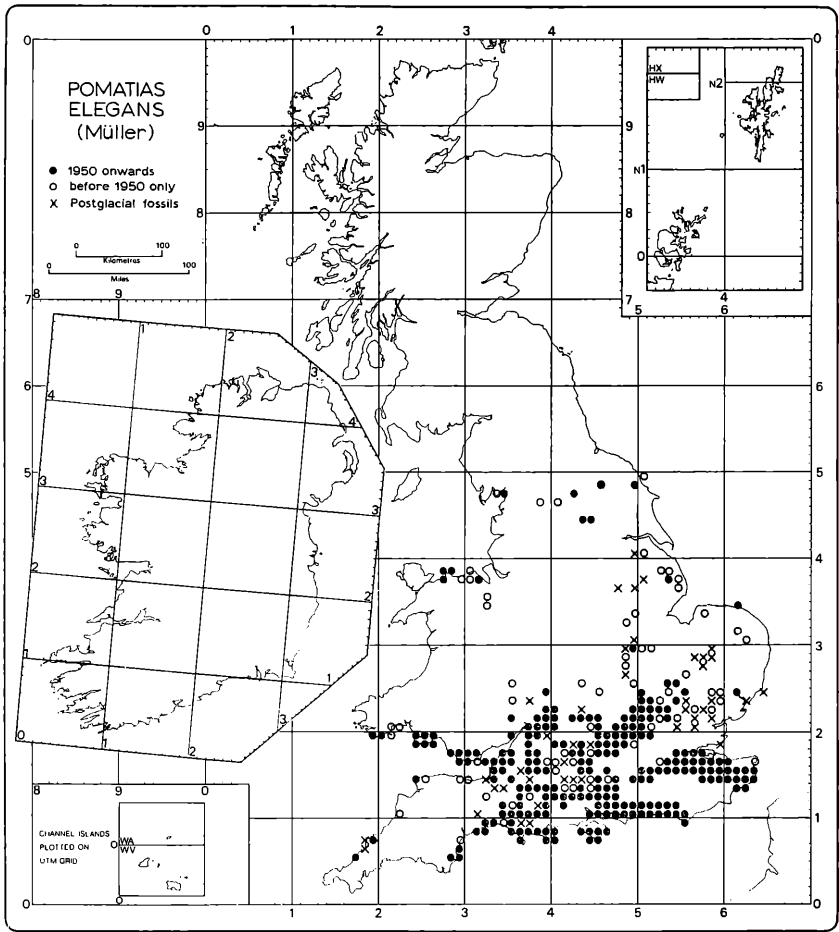


Fig. 1. British distribution of *Pomatias elegans*, plotted on 10-kilometre squares.

The use of the UTM grid at national level has obvious advantages, since the information collected can ultimately be much more easily synthesized internationally. Unfortunately suitable large-scale UTM maps are not yet available in all countries, and in some areas it may be necessary to undertake the primary mapping using other grids. If this is done, the data may be converted to the UTM 50-kilometre grid squares by means of specially constructed transparent overlays (this procedure is followed in the British Isles, where all primary biological mapping is undertaken on the British National Grid (Great Britain) and the Irish National Grid (Ireland)).

In August 1973, at the 2nd International Symposium of the European Invertebrate Survey held at Monks Wood, Great Britain, the UME mapping

committee recommended that a pilot scheme for Mollusca should be organized, to produce European maps for four species: *Pomatias elegans* (MÜLLER), *Discus ruderatus* (FÉRUSAC), *Eobania vermiculata* (MÜLLER) and *Margaritifera margaritifera* (LINNÉ). A circular was prepared in five languages (English, French, German, Italian, Russian) and distributed to all members of UME. Using the information subsequently forwarded to me in London, and supplementing this with other published and unpublished data accessible to me, I have prepared the 50-kilometre square maps which accompany this paper (Figs. 2-5). Obviously, these maps are very incomplete and should be regarded only as provisional models, but nevertheless they represent a more objective presentation of the evidence for the European distribution of these species than any hitherto published. Fossil records have been omitted. Furthermore, except in the case of *Margaritifera*, no discrimination has been made on grounds of date, although this may sometimes be very revealing (Fig. 1) and would certainly be desirable in future for certain species when fuller information is available.

I am grateful to all those malacologists who submitted data, and especially to Professor Dr. H. ANT, Mr. H. CHEVALLIER, Dr. G. M. DAVIS, Dr. I. FLASAR, Dr. E. GITTENBERGER, Dr. F. GIUSTI, Dr. J. H. JUNGLUTH, Dr. W. KLEMM, Mr. J. ØKLAND, Mr. L. PINTÉR, Dr. I. VALOVIRTA, Mr. H. W. WALDÉN, and Dr. A. WIKTOR.

Some notes on the distribution maps:

Pomatias elegans (Fig. 2). The overall distribution pattern for this west European calciphile species is fairly completely known. Even at this small scale, a relationship with areas of limestone or other calcareous rock clearly emerges, the apparent exceptions (e. g., in the Massif Central of France, and the coastal localities in Brittany) being sufficiently anomalous to prompt further investigation into the nature of the habitats at these places. Records of all dates have been used, though it should be pointed out that there is evidence of recent extinction in some of the more northerly colonies (e. g., in the east of England (Fig. 1) and in north Germany and Denmark), where in many places the species is now represented by dead shells only. As has frequently been suggested (SCHLESCH 1961, KERNEY 1968), it is likely that *P. elegans* is cold intolerant, and that its north-easterly geographical limit has receded since the thermal optimum of the Postglacial period. The isolated colonies in areas such as Denmark, Austria and Hungary may be explained by survival in habitats with favourably mild microclimates, perhaps a low incidence of winter frosts.

Discus ruderatus (Fig. 3). Information is good to adequate for west and central European countries, but very poor for eastern Europe, where the species undoubtedly has a wide range not shown on the map. Nevertheless, the distribution pattern presents several features of interest. *D. ruderatus* has a broadly boreo/alpine/continental range, being widespread in Scandinavia, the Alps, the Carpathians, and the eastern part of the north European plain. It becomes noticeably scarce in the coastal region of western Norway, and is totally absent from the British Isles. Since fossil evidence shows that the species formerly occurred in Britain in the early Postglacial (early Boreal period), its disappear-

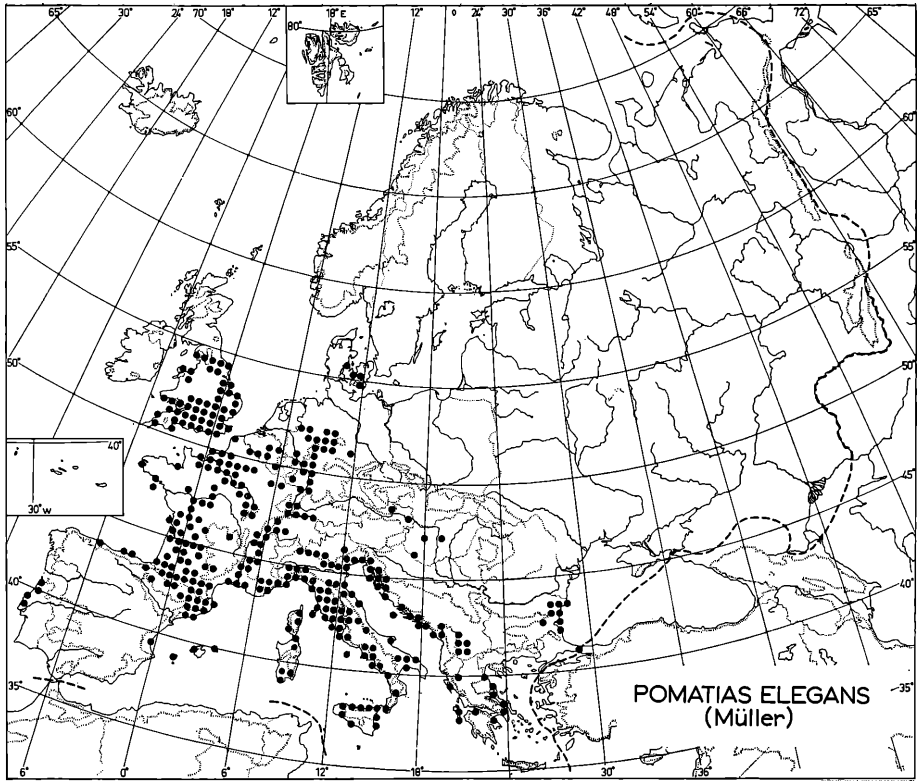


Fig. 2. European distribution of *Pomatias elegans*, plotted on 50-kilometre squares.

ance from this area is likely to have been caused by later climatic changes towards a more oceanic (atlantic) environment. The scattered localities in the north German plain are similarly probably relicts. Possibly *D. ruderatus* requires low winter temperatures for its survival (cf. *Pomatias elegans*).

Eobania vemiculata (Fig. 4). Information is reasonably adequate for this typically Mediterranean snail. The distribution is seen to be mainly coastal, though locally extending some distance inland, as in central and northern Italy, and in southern France along the lower Rhône valley. The species is occasionally reported as a chance introduction much further north (e. g., Switzerland (Neuchâtel, Geneva), West Germany (Zwingenberg) and Scotland (Edinburgh)), but such colonies are unlikely to become established and have not been included on the map.

Margaritifera margaritifera (Fig. 5). A species mainly of soft waters in the highland zone of northern Europe, and in the north alpine foreland region. Information is reasonably good for most west European countries, but very in-

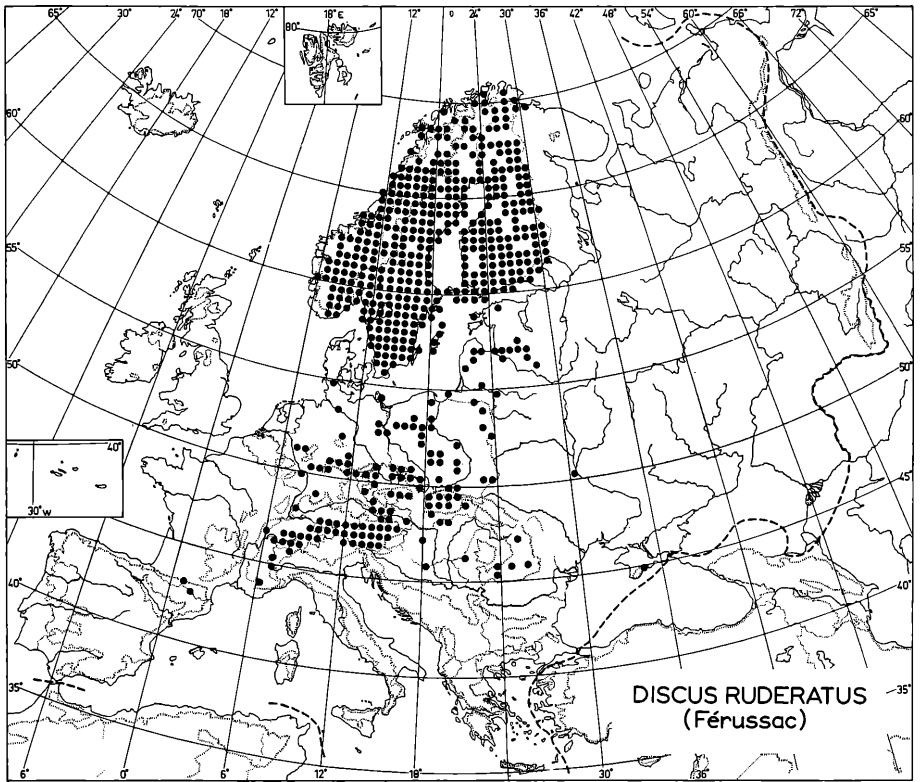


Fig. 3. European distribution of *Discus rudерatus*, plotted on 50-kilometre squares.

complete for eastern Europe. A difficulty is that although the older literature is very large, many references are only to general areas rather than to localities, so that the information cannot be plotted accurately within the 50-kilometre grid.

As has long been recognized, *M. margaritifera* is a declining species. It is now extinct in many places where formerly it was common, due partly to the destruction caused by pearl fishing, and partly to its sensitivity to pollution (BJÖRK 1962). A well-documented study of its gradual disappearance from the system of the R. Elster in Saxony has been published by HERTEL (1959). On the map an attempt has therefore been made to distinguish „living“ (post-1950) occurrences from older records. Unfortunately for several countries (e. g., Sweden) comprehensive modern data were not available, and the high proportion of pre-1950 records in such areas may therefore have little significance. Information is perhaps most complete for Britain, Ireland, Norway and Finland, and some quantitative estimate of its decline in these countries can be made from the map: thus in Norway there are records from 55

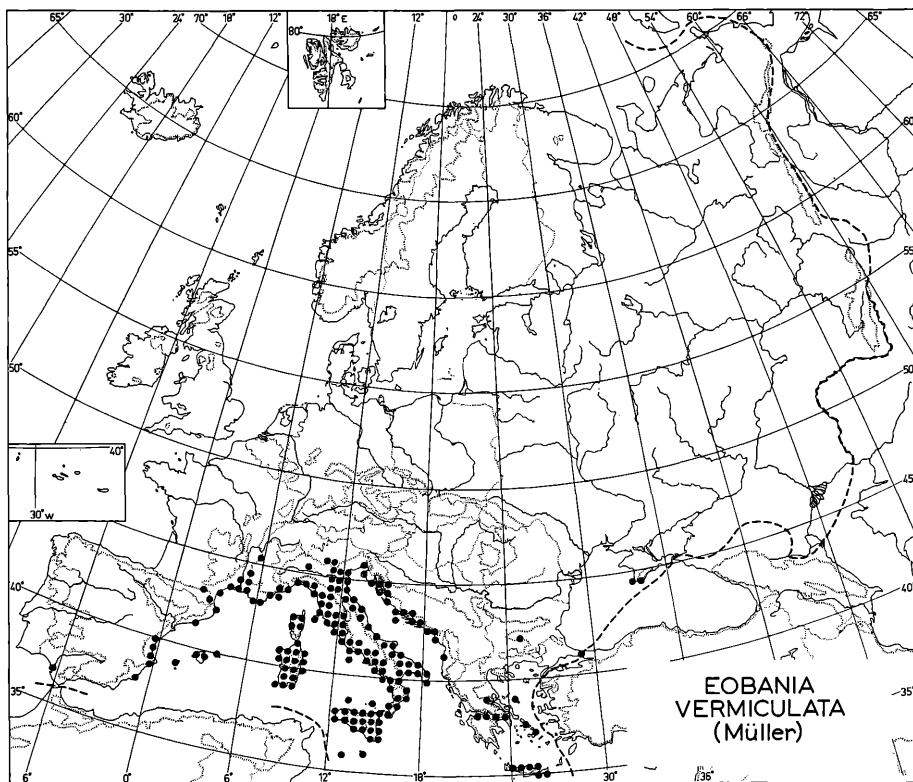


Fig. 4. European distribution of *Eobania vermiculata*, plotted on 50-kilometre squares.

50-kilometre squares, but the species is confirmed living in only 34 of these (62%); in Finland the comparable figures are 71 and 32 respectively (45%); in Britain 53 and 24 (45%); and in Ireland 27 and 5 (19%). If the recording unit is taken as the 10-kilometre square, the decline within the British Isles is even more striking: in Britain the figures become 114 and 37 (32%), and in Ireland 60 and 8 (13%).

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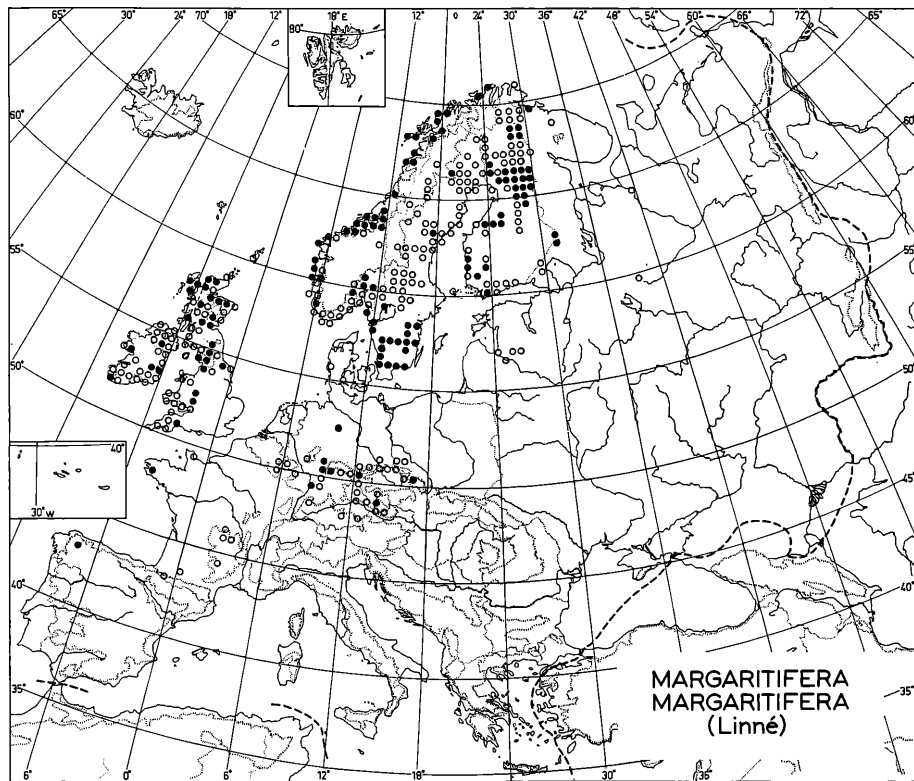


Fig. 5. European distribution of the pearl mussel *Margaritifera margaritifera*, plotted on 50-kilometre squares. Closed circles = living occurrences verified since 1950; open circles = known living before 1950 only.

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