

A C T A Z O O L O G I C A
C R A C O V I E N S I A

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Polish species of the genus *Carychium* MÜLLER (*Gastropoda*, *Ellobiidae*)
[2 maps and 3 text-figures]

Polskie gatunki rodzaju *Carychium* MÜLLER (*Gastropoda*, *Ellobiidae*)

Польские виды рода *Carychium* MÜLLER (*Gastropoda*, *Ellobiidae*)

INTRODUCTION

WATSON and VERDCOURT (1953) have definitively decided the long dispute on the specific distinction of two terrestrial snails, *Carychium minimum* MÜLLER, 1774, and *C. tridentatum* (Risso, 1826), which are very similar and undoubtedly common throughout Europe. In their work they dealt first of all with the essential characters, by which these species might be readily distinguished.

The data on the species of the genus *Carychium* inhabiting Europe so far published are not all accurate, as they refer mostly to *C. minimum*, in which also other forms of this genus used to be included. There being only few publications treating of this genus in Poland (URBAŃSKI, 1939, 1947; RIEDEL, 1954; WIKTOR, 1956, 1959; BERGER, 1960, 1961; DROZDOWSKI, 1961), the present study of the *Corychium* species inhabiting this country will certainly be an actual supplement to the knowledge of their distribution.

Most of the material used for this study came from the collection of the late Antoni JANKOWSKI and from various collections stored in the Zoological Institute of the Polish Academy of Sciences in Warsaw. In addition, I availed myself of the collections of Prof. J. URBAŃSKI, Dr A. RIEDEL, and Dr A. WIKTOR. I wish to express my heartfelt thanks to all of them, and especially so to Prof. J. URBAŃSKI for his valuable advice. I am also deeply indebted to Mr. Hugh WATSON, Cambridge, for his remarks and kindness.

Out of the materials from various parts of Europe (Table I) I worked out only the specimens from Poland and from the adjoining areas of the USSR in

detail. Basing on them I found among other things that *C. tridentatum* falls into two distinct geographical forms: *C. tridentatum tridentatum* (Risso, 1826), and *C. tridentatum elongatum* VILLA, 1841.

Table I

Analysis of the material of the genus *Carychium*

| Country | <i>C. minimum</i> | | <i>C. tridentatum</i> | | <i>Carychium</i> sp. | |
|--------------------------|-------------------|----------------|-----------------------|----------------|----------------------|----------------|
| | Number | | Number | | Number | |
| | of localities | of individuals | of localities | of individuals | of localities | of individuals |
| 1. Poland | 124 | 1863 | 103 | 1249 | | |
| 2. USSA | 15 | 228 | 18 | 142 | | |
| 3. Sweden (Örebro) | 1 | 1 | 1 | 15 | | |
| 4. Czechoslovakia | | | 1 | 1 | | |
| 5. Austria | 1 | 2 | 3 | 236 | | |
| 6. France (Carcassonne) | 1 | 3 | 1 | 3 | | |
| 7. Hungary | 1 | 4 | | | | |
| 8. Bulgaria | 5 | 6 | 2 | 7 | 2 | 17 |
| 9. Rumania | 4 | 16 | 5 | 41 | | |
| 10. Switzerland (Geneva) | | | 1 | 22 | | |
| 11. Yugoslavia | 1 | 14 | 3 | 73 | 2 | 31 |
| 12. Italy (Elba) | | | 1 | 7 | | |
| Total | 153 | 2137 | 139 | 1796 | 4 | 48 |

STRUCTURE OF FOLDS

According to WATSON and VERDCOURT the most important and reliable character for distinction of the species of the genus *Carychium* is the structure of the folds, their shape being invariable in both species. The folds are inside the shell and stick out in its aperture as denticles, a parietal and a collumelar (Fig. 1, 1—12). If the shell is transparent and empty, the folds can be clearly seen through it, but oftener it is necessary to remove part of the shell and occasionally the animal body lying on the folds in order to observe their structure.

The parietal fold of *C. minimum* (Fig. 1, 1—4) is relatively small and resembles a lamella wound up spirally and narrowed at the ends. Its edge, when seen in the frontal aspect, is a nearly regular parabola, the base of which is the long axis of the shell. Both folds are very regular in shape and size in all the specimens of this species that I was able to examine, though the shape of the shell may be very variable; some specimens are considerably elongated, others are short.

The structure of folds in *C. tridentatum* (Fig. 1, 5—12) is quite different. The parietal fold is always relatively very large and has the shape of a lamella

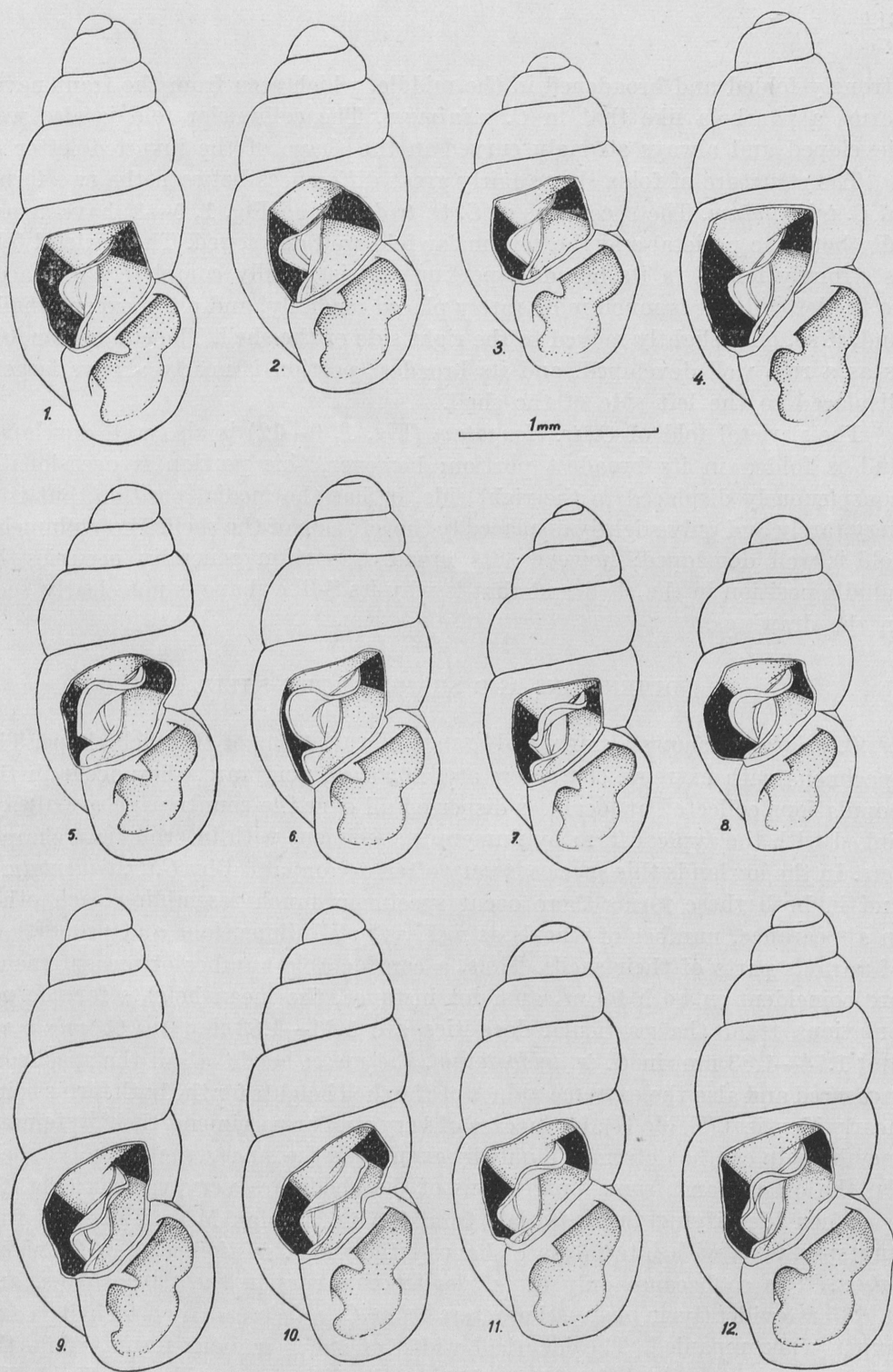


Fig. 1. Specimens of the genus *Carychium*: 1—4 *C. minimum* MÜLLER; 5—8. *C. tr. tridentatum* (Risso); 9—12. *C. tr. elongatum* VILLA

strongly folded and broadened in the middle, which seen from the front never forms a parabola like that in *C. minimum*. The collumellar fold is also well developed and always strongly curved in the shape of the inverted letter S.

The structure of folds shows fairly great differences between the two forms of *C. tridentatum*. The specimens of *C. tr. tridentatum* (Fig. 1, 5—8) have generally both the parietal and the collumellar fold well developed. The parietal fold is strongly folded in its broadest portion and is usually completely displaced to the left side. It is much more rarely placed medially, and quite exceptionally and, if so, only slightly moved to the right side of the shell. The collumellar fold is as a rule well developed, and its broadest portion is nearly always largely displaced to the left side of the shell.

The parietal fold of *C. tr. elongatum* (Fig. 1, 9—12) is also well developed and is folded in its broadest portion; however, this portion is occasionally conspicuously displaced to the right side, or has the medial position, but it is very rarely and only slightly displaced to the left side of the shell. The collumellar fold is well developed; however, its broadest portion generally occupies the middle position in the shell and that is why its S-like shape is not clearly seen in the drawings.

DIMENSIONS AND SHAPE OF THE SHELL

C. minimum shows a fairly wide range of variations of the shell shape. The specimens with extreme characters are, however, very rare, they occur in the populations collected at localities dispersed all over the country and are always linked with the typical form by numerous specimens with intermediate characters. In the lowlands this species is very often accompanied by *C. tr. tridentatum*, and in both these forms there occur specimens much resembling each other in appearance, number of whorls as well as in all dimensions and proportions of various parts of their shells. Thus, a considerable number of measurements are coincident in both forms, and, for instance, the mean heights for the populations from the particular localities are 1.71—1.83 mm in *C. minimum* and 1.74—1.83 mm in *C. tr. tridentatum*, the mean height of all the specimens measured and also the extreme values of the shell heights for the both forms being nearly identical (Table II). In the case of very similar specimens, their systematic membership can be determined only by examining the inner structure of the shell. On the other hand, some proportions of the shells are very various (Fig. 2).

When identifying the materials from the Carpathian Mts., I did not find any specimens with intermediate shapes either in *C. minimum* or in *C. tridentatum*. It is so because only *C. tr. elongatum* occurs in the Carpathians, and it differs evidently in many characters from *C. minimum*, by which it is frequently accompanied. The identical width of shells in both forms, while the other values are quite different, emphasizes the differences still more (Table II).

Tables II, IV, V and Fig. 3 offer the data calculated from the measurements of all specimens of *C. tridentatum* collected in the Carpathians, between the

Table II

Results of measurements of *Carychium* specimens from Poland and U. S. R. R.

| | <i>C. minimum</i> | | <i>C. tridentatum</i> | | | |
|---------------------------------------|-------------------|------------|-----------------------|------------|------------------|------------|
| | | | <i>tridentatum</i> | | <i>elongatum</i> | |
| | Extreme value | Mean value | Extreme value | Mean value | Extreme value | Mean value |
| 1. Number of individuals | 415 | | 395 | | 324 | |
| 2. Height in mm | 1.57—2.05 | 1.78 | 1.58—2.01 | 1.78 | 1.83—2.40 | 2.08 |
| 3. Major width in mm | 0.85—1.08 | 0.95 | 0.75—0.94 | 0.85 | 0.83—1.10 | 0.95 |
| 4. Minor width (turret) in mm | 0.79—0.97 | 0.88 | 0.72—0.88 | 0.79 | 0.75—0.97 | 0.89 |
| 5. Ratio of height to major width | 1.67—2.10 | 1.87 | 1.80—2.31 | 2.10 | 1.97—2.50 | 2.19 |
| 6. Ratio of height to minor width | 1.85—2.30 | 2.05 | 2.00—2.50 | 2.27 | 2.14—2.64 | 2.34 |
| 7. Ratio of turret height to aperture | 1.12—1.71 | 1.37 | 1.32—1.92 | 1.64 | 1.47—2.17 | 1.77 |
| 8. Number of whorls | 4—4.8 | 4.4 | 4.3—5.1 | 4.7 | 4.6—5.9 | 5.3 |

Tatra Mts. and Czarnohora (only part of the specimens from Tyrawa Wołoska have been left out, Table VI), and from the border between Wielkopolska and Silesia in the lowlands of Poland. The Tables show clearly that the snails from the highlands differ from those from the lowlands in very many characters.

As a rule, the specimens of *C. tr. tridentatum* do not exceed 1.9 mm in height. Those that are more than 2 mm high are exceptions (out of 1000 specimens from Poland, collected at about 80 localities only a few slightly exceeded 2 mm). Their mean height is 1.78 mm, and the mean heights of the populations from the particular localities range from 1.74 to 1.83 mm. The largest percentage of specimens of *C. tr. elongatum* exceed 2 mm, whereas only very rare ones are less than 1.90 mm high. The mean height of their shells is 2.08 mm, and the mean heights of shells for the particular populations range from 1.95 to 2.20 mm.

The specimens taken at two different localities in the region of Tyrawa Wołoska (Sanok District) in the Carpathians (Table VI) are the best evidence that from the viewpoint of systematics these two groups of snails should be treated as distinct forms. The specimens from a park situated in the valley are typical members of the lowland form. The mean height of their shells is 1.80 mm and the height-width ratio 2.07. The specimens collected on a brook on the slope of Słona Góra are quite different. Their mean height is 2.185 mm and the height-width ratio 2.27. These data suggest that the two groups of

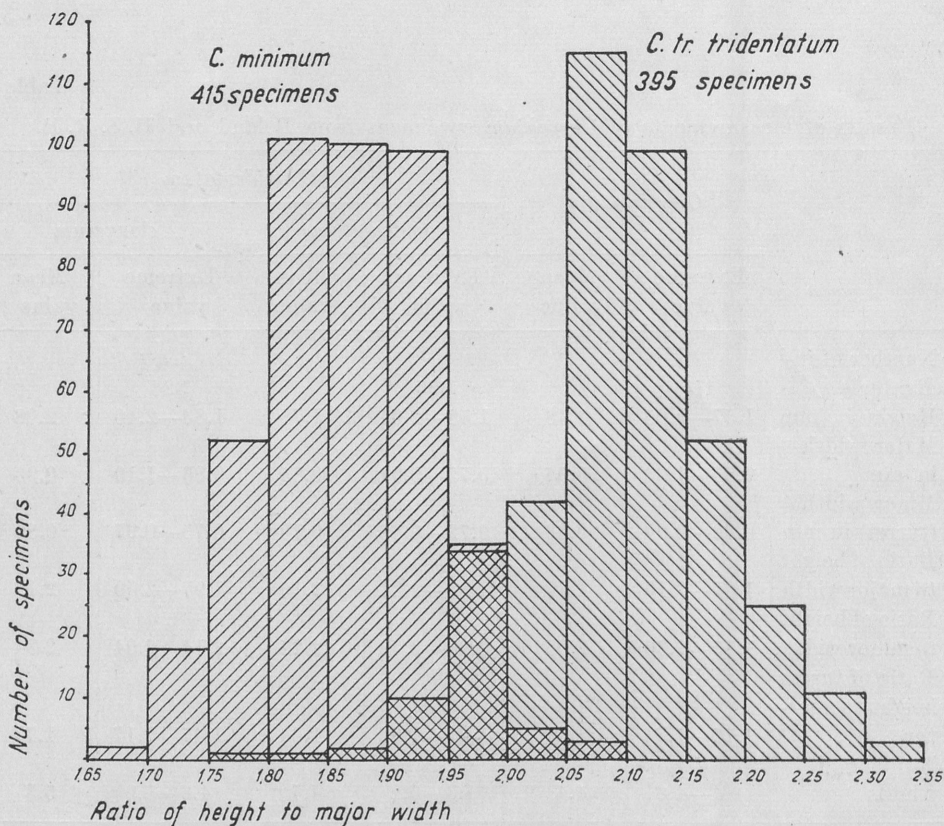


Fig. 2. Forms of the genus *Carychium* collected in the lowlands of Poland, at the border between Wielkopolska and Silesia

Table III

| <i>Carychium minimum</i> MÜLLER | | | | | | | | | | | | | | | |
|---------------------------------|--------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Height in mm | Ratio of height to major width | | | | | | | | | | | | | | |
| | 1.65 | 1.70 | 1.75 | 1.80 | 1.85 | 1.90 | 1.95 | 2.00 | 2.05 | 2.10 | 2.15 | 2.20 | 2.25 | 2.30 | 2.35 |
| 1.55 | | | | | | | | | | | | | | | 4 |
| 1.60 | | | | | | | | | | | | | | | 8 |
| 1.65 | | | | | | | | | | | | | | | 68 |
| 1.70 | | | | | | | | | | | | | | | 88 |
| 1.75 | | | | | | | | | | | | | | | 90 |
| 1.80 | | | | | | | | | | | | | | | 90 |
| 1.85 | | | | | | | | | | | | | | | 39 |
| 1.90 | | | | | | | | | | | | | | | 18 |
| 1.95 | | | | | | | | | | | | | | | 8 |
| 2.00 | | | | | | | | | | | | | | | 2 |
| 2.05 | | | | | | | | | | | | | | | |
| 2.10 | | | | | | | | | | | | | | | |
| 2.15 | | | | | | | | | | | | | | | |
| 2.20 | | | | | | | | | | | | | | | |
| 2.25 | | | | | | | | | | | | | | | |
| 2.30 | | | | | | | | | | | | | | | |
| 2.35 | | | | | | | | | | | | | | | |
| 2.40 | | | | | | | | | | | | | | | |
| | 2 | 18 | 52 | 101 | 100 | 99 | 35 | 5 | 3 | | | | | | 415 |

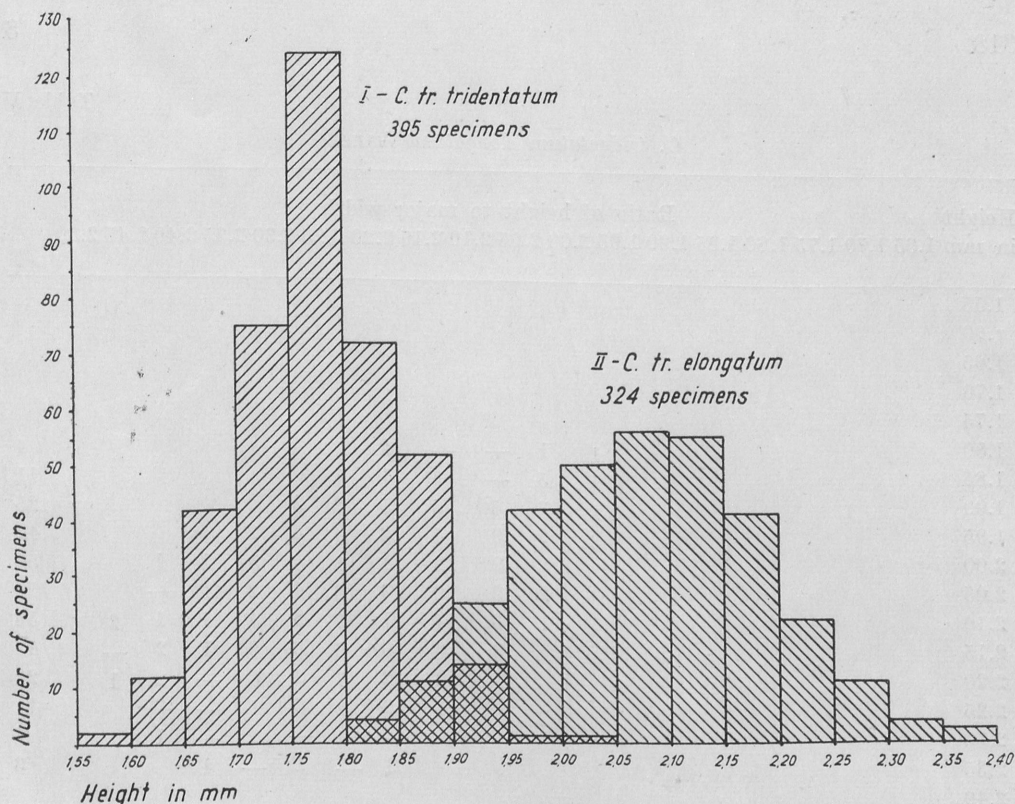


Fig. 3. Forms of *C. tridentatum* collected (I) in the lowlands of Poland and (II) in the Carpathians

Table IV

C. tridentatum tridentatum (Risso)

| Height in mm | Ratio of height to major width | | | | | | | | | | | | | | | | | |
|-----------------|--------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | 1.65 | 1.70 | 1.75 | 1.80 | 1.85 | 1.90 | 1.95 | 2.00 | 2.05 | 2.10 | 2.15 | 2.20 | 2.25 | 2.30 | 2.35 | 2.40 | 2.45 | 2.50 |
| 1.55 | | | | | | | | | 1 | 1 | | | | | | | | 2 |
| 1.60 | | | | | | | | | 2 | | | | | | | | | 12 |
| 1.65 | | 1 | 1 | — | 1 | 2 | 5 | 2 | — | | | | | | | | | 42 |
| 1.70 | | | | 2 | 3 | 11 | 4 | 12 | 8 | 2 | | | | | | | | 75 |
| 1.75 | | | | | 2 | 7 | 11 | 32 | 18 | 4 | 1 | | | | | | | 124 |
| 1.80 | | | | | 3 | 10 | 8 | 46 | 34 | 10 | 10 | 3 | | | | | | 72 |
| 1.85 | | | | — | 3 | 11 | 8 | 23 | 16 | 8 | 2 | 1 | | | | | | 52 |
| 1.90 | | | | | 1 | 1 | 2 | 13 | 9 | 16 | 6 | 2 | 2 | | | | | 14 |
| 1.95 | | | | | | | 1 | 1 | 6 | 3 | — | 3 | | | | | | 1 |
| 2.00 | | | | | | | | | | — | — | 1 | | | | | | 1 |
| 2.05 | | | | | | | | | | 1 | | | | | | | | 1 |
| 2.10 | | | | | | | | | | | | | | | | | | |
| 2.15 | | | | | | | | | | | | | | | | | | |
| 2.20 | | | | | | | | | | | | | | | | | | |
| 2.25 | | | | | | | | | | | | | | | | | | |
| 2.30 | | | | | | | | | | | | | | | | | | |
| 2.35 | | | | | | | | | | | | | | | | | | |
| 2.40 | | | | | | | | | | | | | | | | | | |
| | 1 | 1 | 2 | 10 | 34 | 42 | 115 | 99 | 52 | 25 | 11 | 3 | | | | | | 395 |

snails are distinct geographical races. The lowlands of Poland are inhabited by *C. tr. tridentatum* (Risso), while *C. tr. elongatum* VILLA lives in the Carpathians including the Tatras and, in all probability, in the Sudeten Mts. (Map II).

The differences between the specimens of various races of *C. tridentatum* collected at some dozen localities, mainly in the Kłodzko region, in the Sudeten Mts. are not always quite evident. The heights of shells range from 1.66 to 2.15 mm, and the mean heights in the populations from the particular localities lie within limits of 1.83—2.05 mm. Specimens belonging only to one of the two races were found at several localities, and yet some places provided specimens with intermediate characters. The number of specimens collected at the particular localities is, however, too small to render a generalization of the results possible.

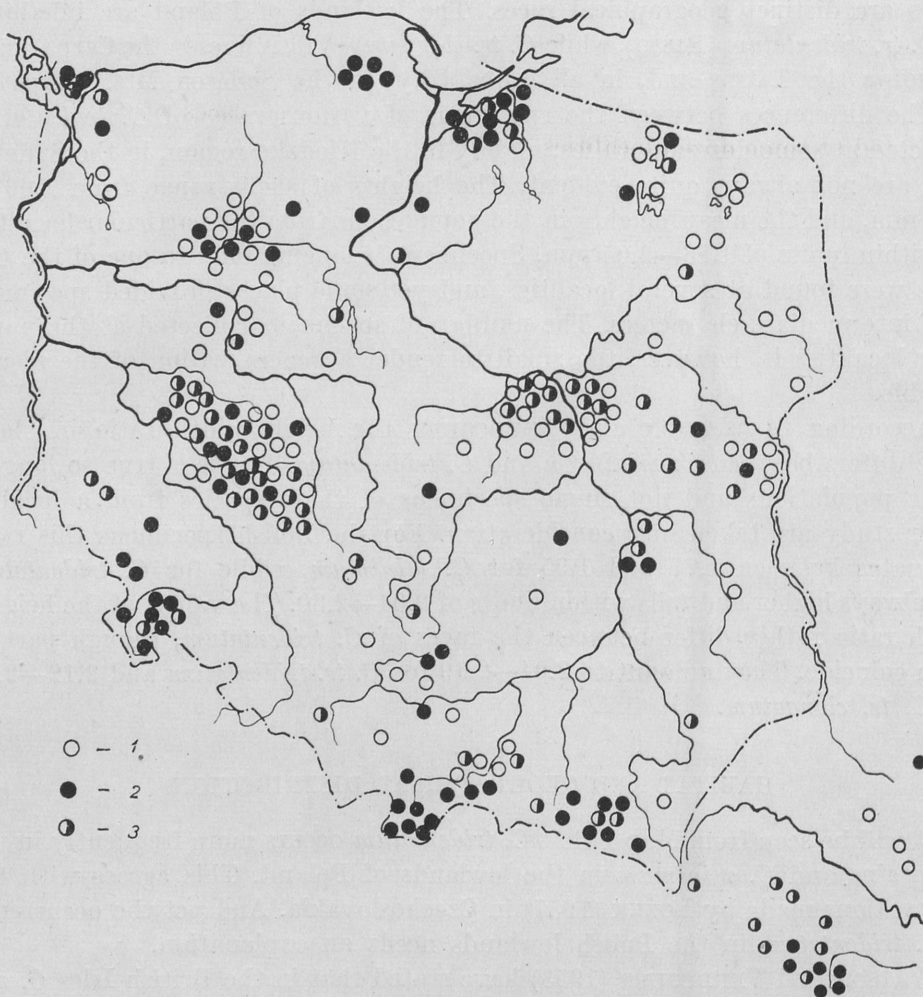
According to WATSON and VERDCOURT the height-width ratio of shells quite differs between *C. minimum* and *C. tridentatum*. But it is true so long as whole populations and not single specimens of these species from a locality under study are taken into consideration. For the Polish specimens this ratio fluctuates between 1.77 and 1.95 for *C. minimum*, while for *C. tridentatum* it is always higher and falls within limits of 2.04—2.30. The values of the height-width ratio rather differ between the races of *C. tridentatum*, though part of them coincide. They amount to 2.04—2.19 for *C. tr. tridentatum* and 2.12—2.30 for *C. tr. elongatum*.

HABITAT AND GEOGRAPHICAL DISTRIBUTION

It will be seen from Map I that *C. tridentatum* occurs more frequently in the mountains and *C. minimum* in the lowlands of Poland. This agrees with the observations made by LOŽEK (1957) in Czechoslovakia. And yet the occurrence of *C. tridentatum* in the Polish lowlands needs an explanation.

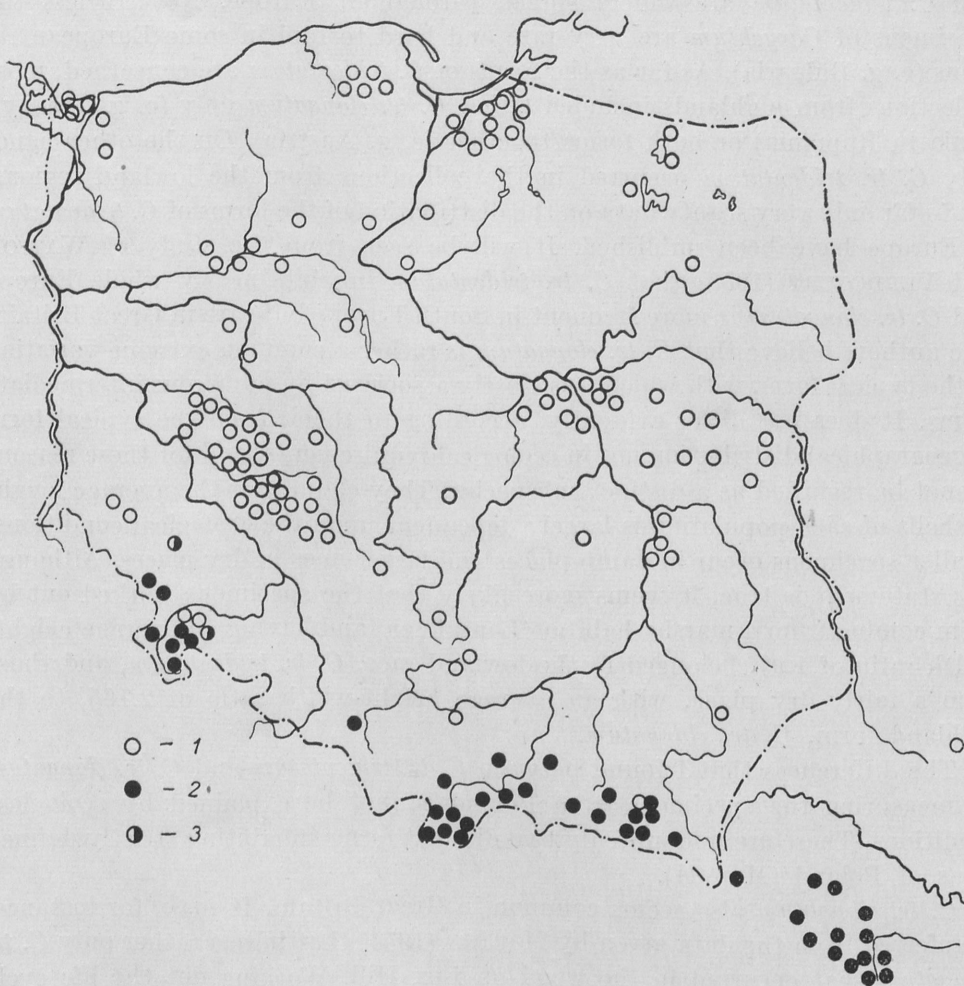
WATSON and VERDCOURT (1953) have stated that in the British Isles *C. minimum* is more frequent in open areas, where it lives mostly in marshes and other very damp places accompanied by typical hygrophilic species of snails, and *C. tridentatum* rather inhabits well-wooded regions, mainly deciduous forests, among fallen leaves in damp places, though not so damp as those in which *C. minimum* occurs. According to these authors both species are fairly common in intermediate types of the habitat, such as banks of brooks and ponds, and marshes. These data are only partly compatible with my observations on the occurrence of these species in Poland.

I collected 810 adult specimens of both forms at 44 localities fairly well explored by me in the lowlands of Poland. *C. minimum* occurred at 35 localities and *C. tr. tridentatum* at 31. Both forms were present together at 22 localities. The specimens of *C. tr. tridentatum* were taken only in damp or watery mixed forests, mainly with an admixture of alder and ash, whereas *C. minimum* occurred both in forests, mostly accompanied by *C. tr. tridentatum*, and in open areas, above all in damp meadows. I only once found a few specimens of *C. mi-*



Map. I. Distribution of localities where the species of the genus *Carychium* were collected: 1 — *C. minimum* MÜLLER, 2 — *C. tridentatum* (RISSE), 3 — *C. minimum* MÜLLER and *C. tridentatum* Risse

nimum in a swampy alder wood. In woodlands both forms inhabit very similar habitats, and in spite of close examination I did not find any distinct difference between the associations of accompanying snails (BERGER, 1961). It seems only that *C. tr. tridentatum* is more frequent in damp but fairly clear deciduous forests and *C. minimum* in shady marshy forests. Both forms avoid dry forests. As may be seen from the labels of the specimens, the majority of the other collections of *Carychium* from the lowlands of Poland which I worked out were taken from grasslands and brook banks, where *C. tr. tridentatum* contrary to *C. minimum* occurs very rarely, and that is undoubtedly the reason why the stands of *C. minimum* are fairly numerous in the Map I. These data and, above all, my own observations



Map. II. Distribution of localities where the forms of *C. tridentatum* (Risso) were collected 1. *C. tridentatum tridentatum* (Risso), 2—*C. tr. elongatum* VILLA, 3—intermediate specimens

suggest that in the Polish lowlands *C. tr. tridentatum* has a strong preference for forest habitats and *C. minimum* occurs both in forests and in open areas, especially in damp grasslands.

In the highlands, *C. tr. elongatum* lives in habitats which are similar to those inhabited by *C. tr. tridentatum* in the lowlands, which I ascertained on the basis of the notes on the labels. It occurs mostly under stones on mountainous brooks and in fir and beech forests. As for the distribution of the races of *C. tridentatum* in relation to altitude, the upper boundary of their range seems to run approximately at 300—500 m above sea level. However, the exact determination of the distribution of these snails in relation to altitude needs special investigations.

A rather poor material from other parts of Europe I had at my disposal corroborates the opinion of WATSON and VERDCOURT (1953) that *C. minimum*

and *C. tridentatum* are widely spread throughout Europe. Nevertheless the specimens of *Carychium* are very rare and hard to find in some European regions (e. g. Bulgaria). As far as the forms of *C. tridentatum* are concerned, most collections from highlands included either *C. tr. elongatum* only (e. g. Transylvania in Rumania) or both forms together (e. g. Austria). On the other hand, only *C. tr. tridentatum* occurred in the collections from the lowland regions.

So far only very scanty data on the distribution of the forms of *C. tridentatum* in Europe have been published. It will be seen from the study of WATSON and VERDCOURT (1953) that *C. tr. tridentatum* inhabits nearly whole Europe and *C. tr. elongatum* is more frequent in South Europe but rare in Great Britain. The authors believe that *C. tr. elongatum* is rather a common extreme variation of the typical form, with which it is closely associated by numerous intermediate forms. It does not differ evidently, according to them, from the typical form in geographical distribution nor in ecological requirements, and for these reasons cannot be regarded as a distinct subspecies. They claim that the average height of shells of each population is largely dependent upon the ecological conditions: smaller specimens occur in damp places and larger ones in dry places. Although this statement is true, it seems more likely that the specimens worked out by them coming from a marshy habitat (Long Loch) and having an average height-width ratio of 1.97, belonged to the lowland race, *C. tr. tridentatum*, and those from a fairly dry place, with an average height-width ratio of 2.165, to the highland form, *C. tr. elongatum*.

The differences that I found between *C. tr. tridentatum* and *C. tr. elongatum* by measuring the specimens from Poland cannot be explained by ecological conditions. These are undoubtedly two distinct forms inhabiting strictly defined areas of Poland (Map II).

C. tr. elongatum also seems common in Great Britain. It may, for instance, be inferred from the data given by MORTON (1954) that it was rather only *C. tr. elongatum* that occurred in the wood on Box Hill. Working out the life cycle of *C. tridentatum* this author tabulated the dimensions of all his specimens, of which often over 20% exceeded 2 mm in height, and in September 24% of the whole population (juveniles and adults) reached 2.2 mm.

The measurements of the specimens of the genus *Carychium* taken at 15 localities in the British Isles presented by WATSON and VERDCOURT (1953) in Table I of their work show that the average height of shells for the specimens of *C. tridentatum* from the localities where *C. minimum* was also collected lies within limits of 1.75—1.82 mm., while that for the specimens from the localities where *C. minimum* was absent is 1.89—2.04 mm. The former dimensions, which quite agree with the height of shells of *C. tr. tridentatum* from Poland, refer apparently to this form, and the latter rather resemble *C. tr. elongatum*.

It is possible to make some conclusions on the distribution of the *Carychium* forms from the work of ZIMMERMANN (1925), who measured all the specimens of the vast material obtained from various localities in Europe and calculated

the average height of shells and the mean height-width ratio separately for each locality. Considering that the large lowland areas of Europe like those of Poland are inhabited by *C. minimum* and *C. tr. tridentatum* and that both forms have, just as in Poland, the same mean height, 1.78 mm., in which they differ distinctly from *C. tr. elongatum* (Table II), hence it may be supposed that we have to do with a medley of various *Carychium* forms with *C. tr. elongatum* predominating where in ZIMMERMANN'S tables the mean height of shells exceeds 1.85 mm., and certainly so where it reaches 1.9 mm.

The other value used to differentiate *C. minimum* from *C. tridentatum* on which ZIMMERMANN (1925) as well as WATSON and VERDCOURT (1953) lay great stress is the height-width ratio. According to ZIMMERMANN (1925) the mean height-width ratio for the localities where *C. minimum* occurs alone ranges between 1.77—1.93 and for those where only *C. tridentatum* is encountered 2.05—2.20. In his opinion both species are present where the average ratio is within limits of 1.93—2.05. These figures are almost exactly the same as those obtained by me for the *Carychium* specimens from Poland.

Most of ZIMMERMANN'S material was derived from the highlands of South Europe, where *C. tr. elongatum* occurs most frequently and is accompanied by *C. minimum*, which however seems to be less numerous, both these species differing from each other very distinctly. And undoubtedly that was what made FAVRE (1927) state that among the specimens of *C. minimum* and *C. tridentatum* from the Geneva region, collected at the same localities, there were none with intermediate characters. As has been mentioned above, I, too, did not find any specimens with intermediate characters in the material from the Carpathians. ZIMMERMANN'S material from the central and northern parts of Europe was taken mostly from lowlands, inhabited by *C. minimum* and *C. tr. tridentatum*, the differentiation of which by the method applied by ZIMMERMANN (1925) as well as by THORSON and TUXEN (1930) was impossible. These works gave rise to an opinion that *C. tridentatum*, which was besides identified by ZIMMERMANN (1925) as *C. tr. elongatum* (the data given by him, height 1.8—2.3 mm, height-width ratio 1.9—2.4, as a rule conform to my figures, Table II) lives mainly in South Europe, while *C. minimum* with *C. tr. tridentatum* included in it inhabits first of all the northern regions of Europe.

FINAL REMARKS

In the material examined the specimens of *Carychium* from Yugoslavia deserve special attention. Among them there are some typical specimens of *C. minimum* and numerous specimens of *C. tridentatum* with characters much resembling those of *C. tr. elongatum*. In addition I found other specimens belonging to quite a different form or even to two various forms. The occurrence of some other forms in Yugoslavia is also reported by SCHLESCH (1947). The external structure of the shells of these specimens from Dalmatia (Sinj) is quite similar to that of the typical specimens of *C. minimum*, but the shape of the

inner folds is different. Both folds of the specimens reaching 1.9 mm in height resemble those of *C. tr. elongatum* in shape, and in the specimens with a height of 1.5 mm those of *C. tr. tridentatum*. In the specimens from Bosnia (Sarajevo) the folds have an intermediate shape between *C. minimum* and *C. tr. tridentatum*. The structure of the specimens from Bulgaria is also similar. The appearance of the specimens in question differs considerably from the description given by ZIMMERMANN (1925) for the species of the genus *Carychium* so far known from South Europe.

It seems that various systematic values of the southern forms of this genus as well as their distribution in Europe should be subjected to thorough revision. So far the descriptions of these forms have often been based on some not very essential and reliable characters, from which it was impossible to determine which species or forms occurred in a given area. Even now it has turned out that, for instance, such a form as *C. lederi* BOETTGER, 1880, still mentioned by WATSON and VERDCOURT (1953), is only the synonym of *C. tridentatum* (LICHAREV and RAMMELMEIR, 1952), and the only specimen I had from Transcaucasia (Lenkoran), collected and identified as *C. lederi* by BOETTGER was very similar to *C. tr. tridentatum* from Poland.

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STRESZCZENIE

Na podstawie materiałów pochodzących z obszarów Polski i przyległych terenów Związku Radzieckiego, autor stwierdził występowanie dwóch gatunków z rodzaju *Carychium*: *C. minimum* MÜLLER i *C. tridentatum* (RISSE) (Mapa I). Ostatni gatunek tworzy dwie wyraźnie odgraniczone rasy geograficzne, z których *C. tridentatum elongatum* VILLA zamieszkuje Karpaty i prawdopodobnie również Sudety, a *C. tridentatum tridentatum* (Risse) nizinny obszar Polski (Mapa II).

Najpewniejszą cechą przy rozróżnianiu gatunków rodzaju *Carychium* jest budowa fałdek znajdujących się we wnętrzu skorupki, których kształt jest stały u obu gatunków. Fałdki te są zbudowane również dość różnie u ras *C. tridentatum* (ryc. 1).

Ze względu na to, że dotychczasowe dane o gatunkach rodzaju *Carychium* zarówno z Polski, jak i z Europy są bardzo skąpe, autor załącza liczne zestawienia obejmujące różne wartości otrzymane z pomiarów skorupki wszystkich trzech form tego rodzaju. Główną jednak uwagę zwrócono na uzasadnienie odrębności systematycznej *C. tridentatum elongatum*, który dotąd nie był traktowany jako odrębny podgatunek.

W zakończeniu autor wyraża pogląd, że różne wartości systematyczne form południowych tego rodzaju należy poddać dokładnej rewizji. Ich opisy opierały się dotąd często na cechach mało istotnych i trudno uchwytnych. Dlatego też autorowi nie udało się określić przynależności systematycznej części okazów tego rodzaju z Jugosławii i Bułgarii, których zewnętrzne cechy skorupki są bardzo podobne do niektórych wyżej omówionych form, jednak budowa wewnętrzna jest zupełnie inna.

РЕЗЮМЕ

На основании материалов, собранных на территории Польши и прилегающих районов Советского Союза, автор констатирует выступание двух видов рода *Carychium*: *C. minimum* MÜLLER и *C. tridentatum* (RISSE) (карта 1). Последний вид образует две ярко ограниченные географические расы, из которых

C. tridentatum elongatum VILLA обитает в Карпатах и правдоподобно в Судеттах, а *C. tridentatum tridentatum* (Risso) в низменной части Польши (карта 2).

Самым верным признакам при отличии видов рода *Carychium* является строение складок, находящихся внутри раковины, форма которых у обоих видов постоянна. Складки эти имеют также разное строение у рас *C. tridentatum* (рис. 1).

В виду того, что известные до сих пор данные о видах рода *Carychium* из Польши и Европы очень незначительны, автор прилагает многочисленные сводки, охватывающие промеры раковин всех трех форм этого рода. Основное однако внимание обращено на доказательство систематической обособленности *C. tridentatum elongatum*, который до сих пор не считался отдельным подвигом.

В заключении автор выражает свой взгляд относительно систематики южных форм этого рода, которые следует подвергнуть точной ревизии. При описаниях этих форм опирались до сих пор часто на мало важных и трудно определяемых свойствах. Поэтому автору не удалось определить систематическую принадлежность части экземпляров этого рода из Югославии и Болгарии, раковины которых по внешним особенностям очень сходны с некоторыми вышеупомянутыми формами, однако внутренние строение их совершенно иное.

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