

Pigmentation of the mantle border in Polish representatives of the subgenus *Radix* (Lymnaeidae, Basommatophora, Gastropoda)

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While working on a large material of the subgenus *Radix* Montfort from various parts of Poland, I noticed marked interspecific differences in mantle border pigmentation. Pigmentation characters may be of taxonomic value in a number of molluscs (e.g., Muus, 1967). Roszkowski (1914) when studying specimens from Ruda Maleniecka near Warsaw found small differences in mantle pigmentation between *Lymnaea* (*Radix*) *auricularia* (Linné), and *L. (R.) peregra* (O.F. Müller); in the latter species the border belt, free from pigmentation, was somewhat wider. Feliksiak (1939) showed *Myxas glutinosa* (O.F. Müller) to possess a characteristic pattern of pigmentation, similar to that found by me in *L. auricularia*, which would provide a further argument for the similarity of these species. Marked differences in the development of this character in *L. auricularia* and *L. peregra* of the Zürich Lake were found by Burla & Speich (1971).

In the investigations here presented I included 5,096 specimens from stations of various type, distributed nearly all over Poland. Mantle pigmentation generally displayed pronounced polymorphism; often several types were present at the same station, but generally the variability was continuous. In most cases the spots of black pigment had an even or a slightly indented border (the specimen shown in fig. 5 is atypical in this respect) in *L. auricularia*, whereas in *L. peregra* the border was always strongly indented. The degree to which the mantle is covered with black pigmentation shows great individual variability, from complete absence of spots (fig. 6), through spots of varying size and the degree to which they are covering the cream-coloured background, to rather infrequent specimens with a completely black mantle except for the border area. In general, a somewhat stronger pigmentation is usually noted in *L. peregra*; specimens with a completely black mantle have been found by me to occur in this species only, but the variability is so high as not to allow for drawing a distinction between the species. I can only partly corroborate the data of Roszkowski (1914): in most *L. peregra* the area without pigment is in fact wider than in *L. auricularia*, yet there are deviations from this rule. A specimen from Lake Sławskie (fig. 12) with an unusually wide strip without pigmentation and in the remaining part of the mantle a pigmentation pattern similar to

that characteristic of *L. glutinosa* is noteworthy. Perhaps the atypical pattern of pigmentation in this animal is connected with the fact of it being strongly infected by larvae of trematodes.

Distinct interspecific differences have been found to occur in the development of the pigmentation pattern near the mantle border. As can be seen from figs. 1-19 the spots disappear at some distance from the border, leaving a belt of varying width, free from pigmentation clusters. There are frequent cases when the spots next to the border are on a background covered with a more or less dense pigmentation (figs. 3, 8-9, 11, 13-16, 18-19), this happening more often in *L. peregra*. On the spotless border strip of the mantle of *L. peregra* there is usually no pigmentation, while in *L. auricularia* there is always a marked line of dark pigmentation approximately in the middle of this belt (figs. 2-11). It is worth noting that such a line is clearly seen even in quite spotless specimens (fig. 6). The line under discussion in most cases in this species is composed of clearly discernible dots, being rarely vague (figs. 7-11), but even then it occurs as a series of dots sharply standing out against the background on the ventral side of the mantle (fig. 2). I should like to stress that the photographs present all pigmentation types found in my material, even those characteristic of individual specimens; hence they do not adequately reflect the distinct specific character of this feature's development, observed in nearly every case.

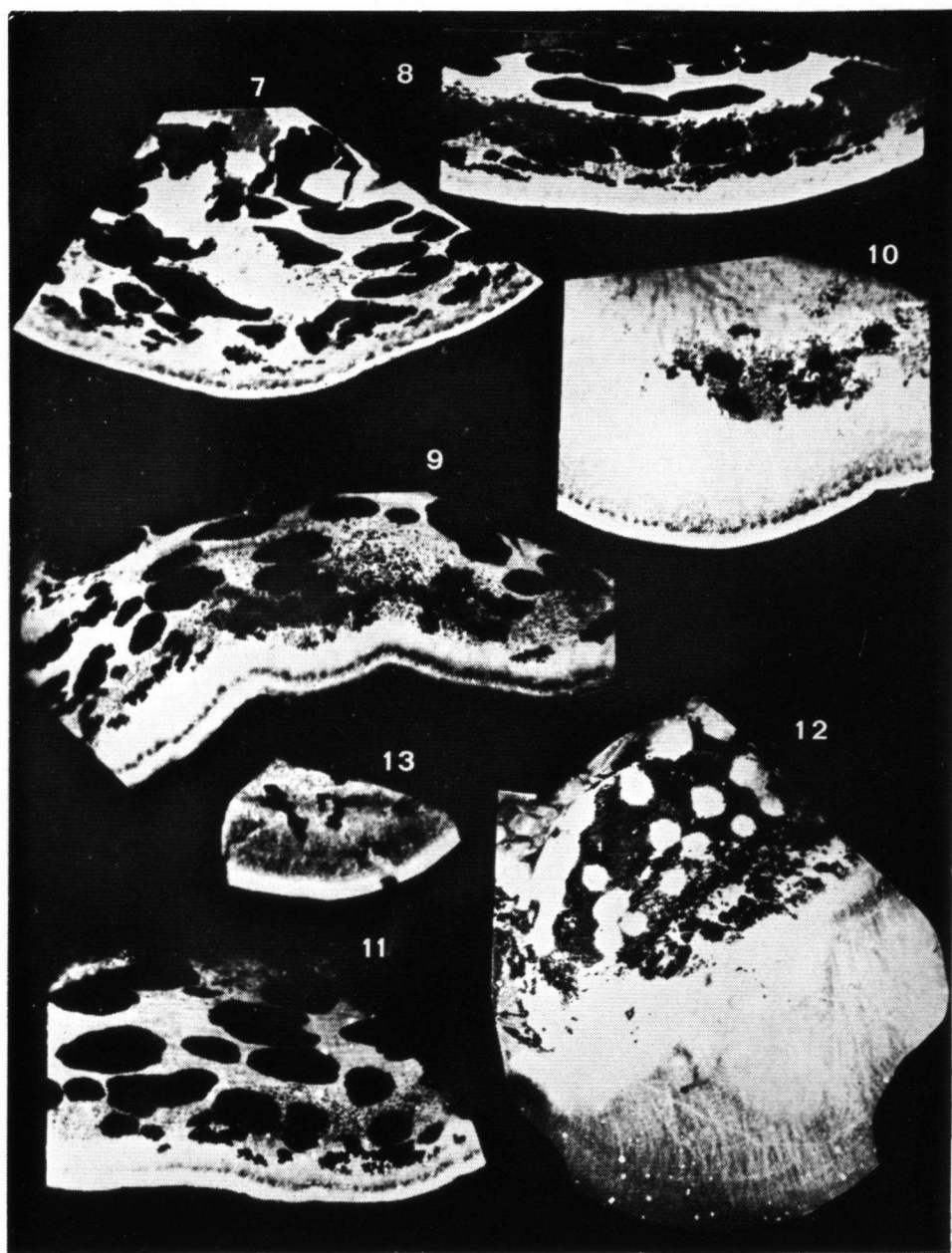
In most cases *L. peregra* has no pigmentation on the border belt (figs. 12-17). Only in two specimens of 5,096 examined, from an atypical, muddy pond near the road Białowieża-Pogorzelce (in the Białowieża Forest) which also had peculiar shells, I have observed a marked strip of pigmentation, similar to that found in *L. auricularia*, but with its central border more faded and invisible from the ventral side of the mantle (figs. 18-19).

Independently of the described pigmentation features in *L. peregra* the background may be lighter or darker; on the darker background a lighter strip could often be discerned, to a varying extent contrasting with the background, so that the general appearance of the border strip could somehow be likened to that found in *L. auricularia*. This happened nearly always in specimens with the bursa copulatrix having a distinct duct.

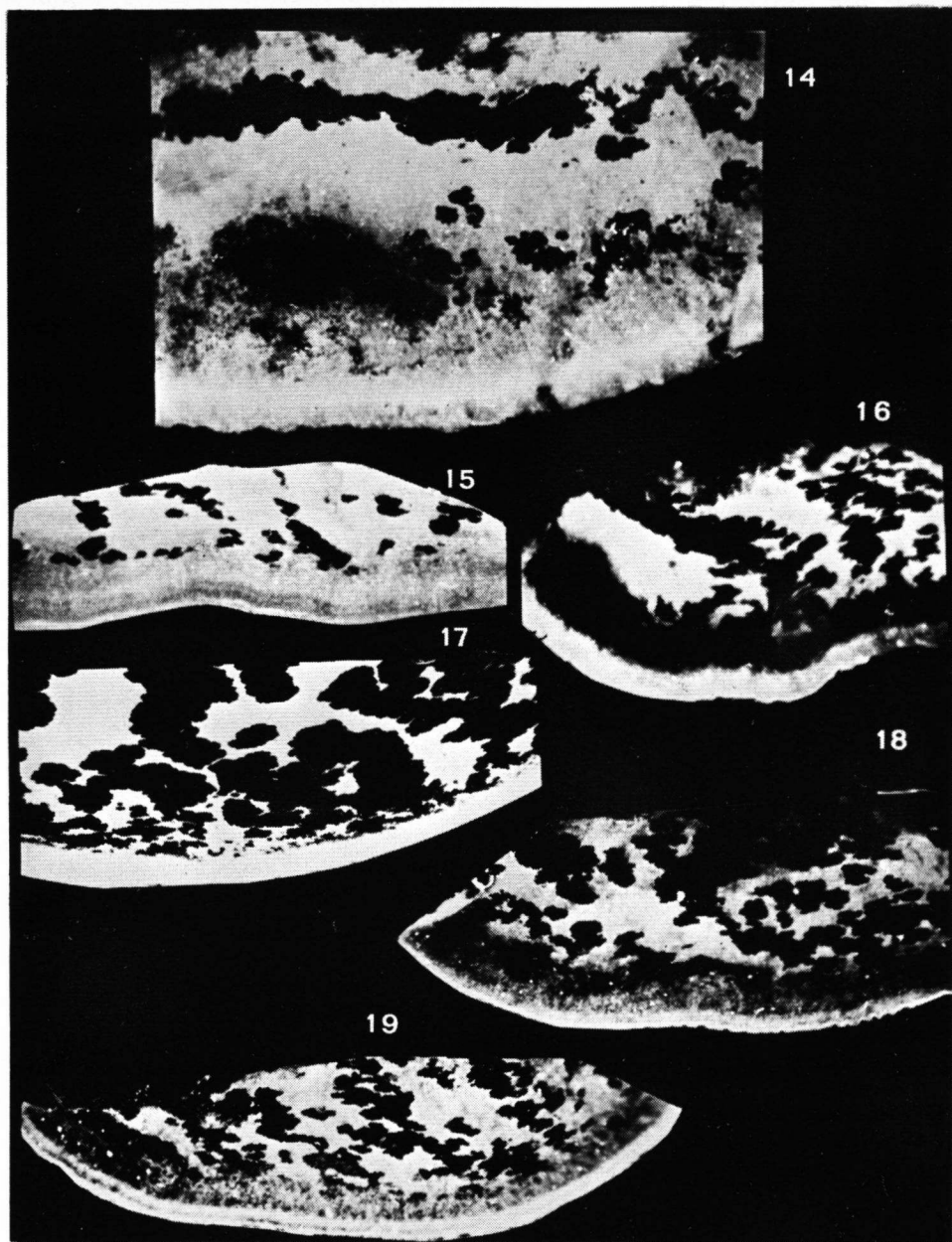
The interspecific differences shown above in the development of pigmentation seem to be good diagnostic features and one may well be surprised that they have not been taken into consideration yet. It should be emphasized that, in spite of the rare specimens with atypical pigmentation and pronounced variability of border pigmentation as well (yet with the general scheme intact), at any station the variability was always discontinuous and easily allowed determining the species, even in the case of juvenile specimens, which would not be possible if a different method were to be applied. The simultaneously found great anatomical variability makes us consider the pigmentation features here described as one of the best diagnostic criteria which are, moreover, most convenient to apply.



Figs. 1-6. Habitus and pigmentation of the mantle in *Lymnaea (Radix) auricularia* from Lake Gardno, Poland. 1. Snail in the shell, dorsal view; 2. Do., ventral view, note the band of black grain-like pigmentation, which never occurs in *L. peregra*; 3-6. Mantle pigmentation in specimens from different stations in Lake Gardno.



Figs. 7-13. Pigmentation of the mantle in different localities in Poland, figs. 7-11 *Lymnaea (Radix) auricularia*, figs. 12-13 *L. (R.) peregra*. 7-8. Nida River near Pińczów; 9-10 Lake Sarag; 11. Odra River near Zielona Góra; 12. Lake Slawskie; 13. Niepolomice Forest (specimen with distinct duct on bursa copulatrix).



Figs. 14-19. Pigmentation of the mantle in *Lymnaea (Radix) peregra* in different localities in Poland. 14. Lake Gardno (specimen with distinct duct on bursa copulatrix); 15. Bay of Puck, southern Baltic Sea (specimen with distinct duct on bursa copulatrix); 16. Lake Gardno; 17. Nida River near Pińczów; 18-19. Białowieża Forest (specimen with distinct duct on bursa copulatrix).

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SAMENVATTING

In Polen blijken *Lymnaea (Radix) auricularia* en *L. (R.) peregra* van elkaar te onderscheiden aan de pigmentatie van de mantelrand. Bij *L. auricularia* komt een band van kleine pigmentvlekjes aan de mantelrand voor, die bij *L. peregra* ontbreekt (fig. 2). Slechts bij twee exemplaren op een totaal van 5096 van *L. peregra* werd een pigmentband als bij *L. auricularia* gevonden (fig. 18-19), met dien verstande dat de band wel enigszins afwijkend was. De schelpen van deze dieren waren ook niet geheel typisch voor *L. peregra*, evenals trouwens de vindplaats. Bij deze soort blijkt een correlatie te bestaan van de aanwezigheid van een pigmentband op de mantelrand en een goed ontwikkelde afvoergang van de bursa copulatrix.