

PARASITOLOGICAL AFFINITIES IN THE RADIX GROUP

Malacologists are familiar with the work of Ehrmann (1933) and Hubendick (1945 & c.) concerning the taxonomy of the Radix group. The latter concluded from his anatomical studies that there were, in fact, only two species in question, namely Radix limosa (= ovata + peregra + & c.) and Radix auricularia, which reduces the "Lymnaea complex" to the forms: L. truncatula, L. palustris, L. stagnalis, L. (Radix) limosa and L. (Radix) auricularia. Other forms also belonging to the complex have not had very much attention from the parasitologist and are not discussed here.

The larval forms of the Trematoda Digenea, which use molluscs as intermediate hosts in their life-cycles, are as a rule highly host-specific. This specificity has been used here to survey the relationships of the Radix group from the parasitological point of view. In the freshwaters of Europe, there are more than a hundred cercariae described from the members of the Lymnaea complex. Of these, some 70-odd are from the Radix subgroup and these are discussed in this paper.

Beginning with the premiss that the cercariae found in snails are highly specific (a specificity reflecting that of the penetrant stage - the miracidium), it is reasonable to suppose that closely related or identical species of snails will show at least nearly identical cercarial forms. It should be said here that cercariae have been used because they do fall into well-defined types, which cannot be said of the miracidia at the present stage of our knowledge. The following table shows the constitution of the cercariae to be found in the Radix group, with those of L. stagnalis for comparison.

Table I.

Cercariae Snail	Furco- cerc.	Xiphidio- cerc.	Gymnoc. cerc.	Echino- cerc.	Others	Total
<u>L. peregra</u>	7	7	0	3	1	18
<u>L. ovata</u>	7	7	1	3	0	18
<u>L. auricularia</u>	3	0	0	2	0	5
<u>L. stagnalis</u>	10	11	2	7	0	30

This table will be used for analysis. Beginning with the furcocercariae (Column 1), both L. peregra and L. ovata are shown as having seven species of furcocercariae recorded from them. This apparent agreement is spoiled, however, for not only are the species all different, but there exists also a difference in the taxonomic grouping of the cercariae. Those from L. peregra all belong to the "pharyngeal, longifurcate distome" type (using the terminology of Miller, 1926). In the case of L. ovata, the situation is more complex - at least three are synonyms (and perhaps four), so that the group can be reduced to the following: two "pharyngeal longifurcate distome" and two "apharyngeal longifurcate distome". It is also convenient at this point to consider the single entry in the column "Others" in the Table. This is a Lophocercaria, which falls under the heading of an "apharyngeal, brevifurcate, monostome", in Miller's classification. In L. auricularia there are two "pharyngeal, longifurcate distome" and one "apharyngeal, brevifurcate distome" forms.

The results of this analysis are tabulated below, with those of L. stagnalis for comparison. (Table II).

In a similar way, it is possible to analyse the build-up of the xiphidiocercariae in the group. From the seven cercariae in L. peregra, we find that six belong to the group "Armata" and one to the "Microcotyla". In L. ovata and L. stagnalis, they all belong to the "Armata" group.

One of the echinostome cercariae is common to L. peregra, L. stagnalis and to L. ovata. This will be mentioned below, but it is interesting to note that they all belong to the "Echinata" group (sensu Lühe, 1909).

The gymnocephalous cercariae form only a small part of the parasitofauna of the Radix group and they will be no further discussed, other than to say that they are all different species.

TABLE II

Snail Type of furcocercaria	<i>L. peregra</i>	<i>L. ovata</i>	<i>L. auricularia</i>	<i>L. stagnalis</i>	Totals
Apharyngeal, longifurcate monostome	0	0	0	0	0
Apharyngeal, longifurcate distome	0	2	0	2	4
Apharyngeal, brevifurcate monostome	1	0	0	1	2
Apharyngeal, brevifurcate distome	0	0	1	0	1
Pharyngeal, longifurcate monostome	0	0	0	0	0
Pharyngeal, longifurcate distome	7	2	2	7	18
Pharyngeal, brevifurcate monostome	0	0	0	0	0
Pharyngeal, brevifurcate distome	0	0	0	0	0
	8	4	3	10	25

Discussion

A brief outline has been given above of the constitution of the parasitofauna of the Radix group. We began with the statement that there is a great specificity in the occurrence of larval trematodes, in their interhosts (i.e. molluscs).

Beginning with the furcocercariae, it has been shown that a difference exists, not only in species, but also in the general types of cercariae found in. Only two cercariae appear to be present in more than one of the group. The first is recorded doubtfully from the second snail and awaits confirmation. Both are from L. ovata and L. stagnalis, which in any case, stands outside the Radix sub-group! An examination of the table of furcocercariae would suggest that L. peregra is closer to L. stagnalis, although the cercariae are all of different species, in fact. There would appear to be no closer relationship between those present in L. ovata and L. auricularia and those in L. stagnalis.

A much closer relationship would appear to be shown by the xiphidiocercariae, which are regarded as highly specific. This can be discounted, however, as there are, in fact, several groups of xiphidiocercariae, and only the "Armata" type can be said to be typical in Prosobranchiate snails (such as Bithynia spp.). It is, therefore, no surprise to find that all are of the "Armata" type. It is necessary here to consider individual species. Both L. stagnalis and L. ovata have one cercaria in common, and L. peregra and L. stagnalis have also one cercaria in common. The only impression which can be gained from this is that these snails are perhaps closely related, which few malacologists could accept! The other cercariae are all of different species, and are not represented in more than one snail.

The echinostome cercariae are regarded as less catholic in their choice of hosts, although they are mostly restricted to the Pulmonate snails, in contrast to the xiphidiocercariae mentioned above. As stated above, one echinostome is represented in three of the snails - L. peregra, L. stagnalis and L. ovata. The lower degree of specificity in the echinostomes may account for this, but in any case, it is hardly grounds for suggesting a close relationship between L. stagnalis and the other species under discussion, as mentioned above!

Another point is, that because in combinations of hosts, L. stagnalis (which stands outside the Radix group) is frequently involved, these cercariae may be taken as exceptions, until further work has shown that they are, in fact, the same species, or that these species have a special behaviour. The fact that all the other cercariae involved are of different and distinct species, would suggest to the parasitologist that there is no close relationship between the snails discussed here.

- Summary -

/ of the Lymnaea and Planorbis groups - the rest occurring typically

Summary

A brief survey has been given of the parasitofauna of the snails of the Radix group, with those of L. stagnalis for comparison. It has been shown that a marked difference exists between the species present in the various snails discussed. From a parasitological point of view, there would appear to be grounds for considering the snails here discussed as separate species, which would appear to be supported ecologically, see Macan (1949) and Frömming (1956).

Samenvatting

Schrijver vergelijkt de parasietenbezetting van Lymnaea ovata en L. peregra voor zover deze parasieten de larven zijn van Trematoden. De larven zijn cercariën. Deze parasieten zijn specifiek voor hun tussengastheer. Er bestaat niet alleen verschil in de soorten cercariae van R. peregra en R. ovata, maar deze soorten behoren zelfs tot verschillende typen voor zover het de furcocercariae betreft. Slechts één soort van echinostome cercariën komt zowel bij R. ovata, R. peregra en bij Lymnaea stagnalis voor. Deze gehele groep is echter minder soortspecifiek met betrekking tot de tussengastheer.

Vanuit een parasitologisch oogpunt beschouwd zouden er redenen zijn L. ovata en L. peregra als goede soorten op te vatten. Deze zienswijze zou op oecologische gronden kunnen worden verdedigd.

Literature

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