THE TрематоIDE GENUS ALLOCREADlUM IN NORTH INDIAN FRESH-WATER FISHES.*

BY B. P. PANDE.

(Zoology Department, University of Allahabad, Allahabad, U. P., India.)

Received October 20, 1937.

(Communicated by Prof. C. R. Narayan Rao, M.A.)

The description of Allocreadium handiai—the first member of this genus reported from an Indian fresh-water fish, Ophiocephalus punctatus, has been dealt with in another paper (Pande, 1937). In this communication is given a description of two new species of Allocreadium obtained from Gobius guiris and Barbus chilinoides in the course of the studies on digenetic trematodes of various fresh-water fishes examined at Allahabad and Almora.

Historical Review of the Genus Allocreadium.

The type species of this genus was originally recorded by Looss (1894) as Distomum isoporum and was later placed with Distomum angusticolle Hausmann (1896) in a new genus Creadium (1899) which name was later changed by him to Allocreadium in 1900. Since then the inclusion of a large number of species under this genus has been proposed by Odhner (1901), Stossich (1906), Linton (1908) and Wallin (1909). For some of these species, new genera were created by Odhner (1902, 1905) and Nicoll (1909). The latter author also pointed out in the same paper the systematic position of certain other species described by Stossich near some of his newly created genera. The remaining species of Allocreadium after this grouping are:—A. isoporum, A. angusticolle, A. transversale Rudolphi, A. pallens Rud., A. lobatum Wallin, A. colligatum Wallin (later removed from Allocreadium by Nicoll in 1915) and A. dubium Stossich. Subsequently to this date the description of other species found in the literature are:—A. annandalei Southwell (1913), A. fowleri Leiper and Atkinson (1914), A. pisacanthi Mac Callum (1921), A. hasu and A. japonicum Ozaki (1926)—both having been redescribed by Yamaguti (1934), A. ictaluri and A. beleosomi Pearse (1928), A. halli Mueller and van Cleave (1932), A. polymorphum Layman (1933), A. psuedotritoni Rankin (1937) and A. handiai Pande (1937). Van Cleave and Mueller (1934) came to the conclusion that A. halli and A. ictaluri represent one and the same species. For these two species Arnold (1934) had created a new genus Polylekithum. The differences between the latter genus and Allocreadium

* A part of the work done while a D.Sc. scholar of the University of Allahabad.
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have not been regarded of more than specific value by the present author in his previous paper and consequently the only species, *P. ictaluri* (syn. *A. ictaluri*), has been transferred back to *Allocreadium*. The descriptions of *A. annandalei*, *A. fowleri* and *A. pisancanthi* being inadequate, these species are treated as *species inquuirendae*. It is not possible to assign them to their proper generic rank particularly in view of the large number of closely related genera known in the sub-family Allocreadiinae—a consideration of which is beyond the scope of this paper. Moreover, the account of *A. fowleri* given by Leiper and Atkinson deals with immature specimens.

The author is greatly indebted to Dr. H. R. Mehra, under whose direction this work was undertaken, for his many valuable suggestions; and to Dr. D. R. Bhattacharya for the facilities provided in the Department.

*Allocreadium nicolli* n. sp. (Figs. 1 and 2).

*Host*—*Gobius guiris*.

*Position*—Small intestine.

*Locality*—Allahabad.

*Description.*—Body elongated, thick and plump, somewhat rounded at anterior and pointed at posterior ends, narrow in posterior half, measuring 4–4.2 in length and 1.1 in maximum breadth which lies in the neighbourhood of the acetabulum. Cuticle thick and aspinose. Oral sucker sub-terminal, 0.45–0.46 × 0.43–0.48 in size, larger than acetabulum; pre-pharynx present; pharynx large 0.18–0.22 × 0.25–0.28 in size; oesophagus 0.36 in length, slightly curved in contracted specimens; intestinal bifurcation close to dorsal surface, situated a little in front of acetabulum; caeca running back dorsally near lateral body margins, ending about one-fourth of post-testicular space in front of hinder extremity. Sub-cuticular unicellular glands more conspicuously developed in pre-acetubular part of body. Acetabulum, 0.36–0.4 in diameter, situated at anterior third of body. Genital pore median, leading into a short and narrow atrium with male and female ducts opening into it dorsally, lies immediately below intestinal bifurcation. Excretory pore terminal, near dorsal surface, leading through short thick walled duct to tubular bladder; excretory bladder close to dorsal body wall, extending anteriorly to inter-testicular space and receiving the two collecting ducts a little behind its anterior end. Testis nearly spherical and equal in size, behind one another, in posterior body half with a small space between them; anterior testis, slightly sinistral, 0.32–0.34 × 0.28–0.3 in size, situated at about 0.5 distance behind equator of body; posterior testis, slightly dextral or median, 0.3–0.34 in diameter, at middle of posterior body half. Cirrus sac elongated, curved round anterior half of
acetabulum, extending posteriorly near its centre, placed only slightly off the median line in its posterior half; vesicula seminalis much coiled in basal half; pars prostatica spherical; ductus ejaculatorius slightly convoluted.

prostate gland cells surrounding distal coils of vesicula seminalis, pars prostatica and ejaculatory duct. Ovary nearly globular, median, dorsal, 0.22–0.23 × 0.23–0.25 in dimensions and situated close behind acetabulum—
in contracted specimens above posterior half of latter; oviduct arising ventrally near middle of ovary; receptaculum seminis $0.11 \times 0.23$ in size, post-ovarian, placed transversely to body length at middle of body close to dorsal body wall; the short and nearly straight Laurer's canal, after its origin, winds posteriorly to open on the dorsal surface behind acetabulum; shell gland mass situated posteroventrally to hinder margin of ovary slightly lateral to median line; transverse vitelline duct and yolk-reservoir just below receptaculum seminis; descending coils of uterus after origin from shell gland mass, filling up inter-cæcal space between receptaculum seminis and anterior testis with coils extending back in convoluted course as far as middle of anterior testis situated dorsally and laterally to it; ascending limb of uterus in front of receptaculum seminis ventral to ovary and intestinal cæca but dorso-lateral to acetabulum opening into well-developed metraterm; metraterm lying parallel to terminal half of cirrus sac; ripe eggs yellowish, measuring $0.072 \times 0.054$ in size; vitelline follicles commencing anteriorly from near anterior margin of acetabulum, mostly lateral and ventral to intestinal cæca, but extending inwards between testes and filling entire inter-cæcal space behind posterior testis with follicles lying ventral to cæca and excretory bladder in this part of body.

Remarks.—The proposed new species *A. nicoli* agrees with *A. isoporum*, *A. transversale*, *A. pallens*, *A. lobatum*, *A. hasu*, *A. japonicum*, *A. beleiosomi* and *A. handiai* in that the vitellaria do not extend anterior to the acetabulum. The type species, *A. isoporum*, is easily distinguished from it in a number of features such as the ratio of the suckers, anterior extent of the excretory bladder (excretory bladder reaching to hinder margin of posterior testis in *isoporum*), position of the receptaculum seminis in relation to the ovary (in *isoporum* ovary is on the right side and receptaculum seminis in level...
with it), posterior extent of the uterus, anterior extension of vitelline follicles (in isoporum the vitellaria do not reach the posterior level of acetabulum), length of eggs and their number in the uterus. From A. transversale and A. pallens the new species differs in the ratio of suckers (acetabulum is one and a half times larger than oral sucker in transversale and twice as large as oral sucker in pallens). A. lobatum differs from A. nicoli n.sp. in the equal size of the two suckers, position of its acetabulum in the posterior part of the first fourth of the body, excretory bladder reaching to the posterior testis, lobed nature of the testes, the vitellaria reaching anteriorly to the level of the ovary, posterior extent of the uterus (uterus fills up the space between the anterior testis and the acetabulum in labatum) and the presence of numerous eggs. A. hasu can be separated from the new species on account of the acetabulum being much larger than the oral sucker, uterus coiled between anterior testis and acetabulum, and the excretory bladder extending anteriorly midway between the posterior testis and the hinder extremity of the body. A. japonicum also differs from it in the acetabulum being larger than the oral sucker. From A. beleosomi the new species is distinguished by the difference in the ratio of the suckers (oral sucker is slightly more than half the acetabulum in beleosomi), presence of a prepharynx, length of the oesophagus, position of the acetabulum (acetabulum situated at anterior fourth of body length in beleosomi), position of the ovary (in beleosomi ovary lies immediately in front of anterior testis), position of the uterus (between the ovary and the acetabulum in beleosomi) and size of the eggs. A. handiai differs from it among other characters in the position of the genital pore posterior to the intestinal fork and the extent of the cirrus sac.

Allocreadium kosia n. sp. (Fig. 3).

Host—Barbus chilinoides.

Position—Small intestine.

Locality—Almora; Kumaon Hills.

Description.—Body elongated, flattened behind acetabular level and cylindrical in front, with bluntly pointed ends, length 6, breadth 1–1.1, nearly uniform. Oral sucker subterminal 0.43 × 0.41 in size; prepharynx present; pharynx 0.18 × 0.2 in size; oesophagus 0.28–0.33 long; intestinal bifurcation some distance in front of acetabulum; caeca terminating a short distance in front of hinder end. Subcuticular gland cells predominantly developed in body parenchyma. Acetabulum slightly smaller than oral sucker, 0.38–0.39 in diameter, situated in posterior part of first quarter of body. Genital pore, leading into a small and narrow atrium, lies just below intestinal bifurcation. Excretory pore terminal, median; excretory bladder
extending anteriorly nearly midway between posterior testis and hinder end of body. Testes tandem, median, in third quarter of body; anterior testis nearly spherical, 0.4–0.45 x 0.38–0.4 in size, situated just behind middle of body; posterior testis ellipsoidal, 0.55 x 0.38 in size, situated 0.2 distance behind anterior testis. Cirrus sac curved in a crescent-shaped manner around acetabulum on its left side and extending posteriorly slightly beyond its hinder margin; vesicula seminalis coiled; pars prossalica spherical, continuing into a nearly straight ejaculatory duct. Ovary median, dorsal, nearly pear-shaped, situated at one-third of body length from anterior end, 0.31 x 0.36 in size; shell gland mass immediately postero-lateral to ovary; receptaculum seminis elongated, 0.4 x 0.14 in size, obliquely placed just behind ovary under dorsal body wall; the short Laurer's canal, the narrow duct of the receptaculum seminis, and the duct from the yolk reservoir, situated close underneath the dorsal body wall, run together towards the shell gland mass; uterine coils between acetabulum and anterior testis in intercæcal space with coils extending laterally to middle of anterior testis; ripe eggs brownish, measuring 0.072–0.075 x 0.054–0.057 in size; vitellaria extend laterally from middle of acetabulum to posterior tip of body, follicles meeting in intercæcal space between testes and behind posterior testis.

Remarks.—Among the species of *Allocreadium* characterised by the vitellaria not extending anteriorly beyond the anterior limits of the acetabulum the new species is closely related to *A. hasu* on account of the anterior extent of the excretory bladder and the vitellaria. But it differs from it in the position of the acetabulum, greater length of the posterior testis, and the extent of the cirrus sac and the uterus.

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All measurements in millimetres.