

**Studies on the genus *Bianium* Trematoda (Digenea) with
description of three new species and discussion
on status of genera *Diploproctodaeum* La Rue,
1926, *Bianium* Stunkard, 1930, and
Diplocreadium Park, 1939**

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Introduction

The present study was motivated by the fact that fishes bear the heaviest burden of fluke parasite and, therefore, there is more likelihood of reporting new and interesting parasitic forms. Furthermore, relatively less work has been done on the parasitic form of marine fishes. The contribution describes three new rare forms of Digenetic trematodes from three different marine fishes from Indian waters. Apart from the interesting morphological details the new forms are characterised by the presence of anal opening—a rare and very significant character of considerable taxonomic significance.

Moreover this genus is of significance for India, as it is being reported for the first time from this country and this prompted the author to take up this study.

Materials and Methods

For the collection and preservation of adult trematodes, the methods detailed by Baylis (1922) and Baylis and Monro (1941) were generally followed. Before fixing the flukes were thoroughly cleansed of the debris in a tube containing 1% sodium chloride.

The fixatives used were Bouin's fluid,

corrosive acetic acid and A. F. A. The staining and mounting of trematodes followed the well known rules of technique. The stains used were Semichon's acetocarmine and Acidified carmine and differentiated them in chlorinated alcohol.

FAMILY: LEPOCREADIIDAE Nicoll, 1934.

SUBFAMILY: DIPLOPROCTODAEINAE Park, 1939.

Bianium madrasi n. sp. (Fig. 1)

Host: *Tetradon viridipunctatus* (Gunther).

Location: intestine.

Locality: Madras (India).

Two dozen specimens were collected from the intestine of the marine fish, *Tetradon viridipunctatus* (Gunther) from the Madras beach.

Description: Body elongated, aspinose with a truncated anterior and roughly rounded posterior end, 1.485–1.635 × 0.390–0.465 mm in size. Lateral margins almost parallel except near ends where they converge slightly. Parenchymatous gland cells in preacetabular part raised like longitudinal ridges, join anteriorly by a thin strip in front of oral sucker. Oral sucker subterminal, shallow cup like, 0.075–0.135 × 0.0105–0.150 mm in size. Prepharynx thin walled, pharynx muscular, globular with 8 characteristic knob like projections, 0.067–0.090 × 0.082–0.105 mm in diameter. Oesophagus small

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0.060–0.090 mm long, bifurcating into two intestinal caeca, these run parallel to body margin and open at hinder edge through anus one on either side of median line. Ventral sucker spherical, median and pre-equatorial, $0.082\text{--}0.105 \times 0.099\text{--}0.120$ mm in size, smaller than oral sucker, at $0.405\text{--}0.435$ mm behind anterior edge, the ratio between two suckers being 1 : 1.6.

Genital pores located close to and on left of acetabulum. Genital atrium at level of bifurcal point, $0.385\text{--}0.392$ mm from anterior extremity.

Excretory pore terminal median. Excretory bladder tubular.

Testes entire, sub equal, post-ovarian, more tandem than oblique. Left testis more or less ovoid, $0.150\text{--}0.180 \times 0.210\text{--}0.270$ mm in size, $0.240\text{--}0.285$ mm in front of hind end. Right testis almost rounded, $0.150\text{--}0.225 \times 0.150\text{--}0.180$ mm in size, Cirrus sac club shaped, $0.330\text{--}0.375 \times 0.090\text{--}0.135$ mm in size, extending from behind the ventral sucker to a little in front of ovary. Vesicula seminalis interna and externa present. Vesicula seminalis externa equatorial, small and saccular, overlaps the ovary, separated from vesicula seminalis interna by a narrow constriction. Parsprostatica large, club shaped. The parsprostatica concludes distally in the ejaculatory duct, the latter eversible as sufficiently long cirrus. Space between cirrus wall and parsprostatica filled with prostate gland cells.

Ovary lobed, $0.180\text{--}0.270$ mm in size, central lobulated mass with 8–10 outer lobes arranged like a bunch of grapes, short oviduct from inner margin of central lobulated mass. Receptaculum seminis large, $0.060\text{--}0.090 \times 0.135\text{--}0.165$ mm in size, lying left of ovary and anterior testis. Vitellaria richly developed, slightly intercaecal, extending from level of genital pore to hind end; mainly lateral but united in post testicular region. Follicles globular smaller than ovarian lobes. Vitelline reservoir present, immediately in front of anterior testis, overlaps ovarian lobes. Uterus post-aceta-

bular with few loops. Metraterm large, wide muscular tube, parallel to cirrus sac, smaller than cirrus sac, lying between cirrus sac and left caecum. Eggs light yellow, elliptical, 0.045×0.060 mm in size.

Discussion: Stunkard (1930) created the genus *Bianium* for a trematode *Bianium concavum* having two anal openings. La Rue in 1926 had already reported the presence of ani in another trematode, *Hemistomum haustum* Mac Callum, 1918 and had proposed the genus *Diploproctodaeum* for it. Ozaki in 1928 had also observed the presence of ani in two trematodes and *Diploporus*, yet another new genus was erected for these species, it being *Diploporus cryptostoma* n. g. n. sp. and *Diploporus hemistoma* n. g. n. sp. Further Ozaki distinguished the genera *Diploporus* from *Diploproctodaeum* and assigned them under Diploproctoaeidae n. Fam. in 1927.

Later it was discovered that the name *Diploporus* was preoccupied so *Diploporus cryptostoma* and *Diploporus hemistoma* were transferred to the genus *Bianium*. Stunkard in 1931 observed identity between *Psilostomum plicatum* and *Bianium concavum* and thus *P. plicatum* became *B. plicatum*, the type species. *Diplocreadium* n. gen. for trematodes with anal openings was created by Park in 1939 and kept under Diploproctaeinae n. sub. fam. but later on was suppressed to synonymy with *Bianium* by Yamaguti in 1953, on the supposition made by him that Park overlooked the presence of ani in *Diplocreadium*. Yamaguti recognized *Diploproctodaeum* and *Bianium* as distinct genera and *Diplocreadium koreanum* became *B. koreanum* (Park, 1939) Yamaguti, 1953. *Diploporetta* Strandt, 1942 n. gen. was also synonymized with *Bianium* Stunkard, 1930.

Yamaguti in 1953 included the genera *Diploproctodaeum* and *Bianium* in the subfamily Diploproctodaeinae Park, 1929 under the Allocreadiidae Stossich, 1903 and dropped the family Diploproctodaeidae Ozaki, 1928. Sogandares Bernal and Hutton in 1958 while suspecting the distinctness of the

genera *Bianium* and *Diploproctodaeum* upheld *Diploproctodaeum* and suppressed *Bianium*. After considering *B. lecanocephalum* and *Diploproctodaeum haustum* to be identical, they made *D. plicatum* (Linton, 1928) Sogandares and Hutton, 1958 to be synonym of *D. haustum*. These authors, while rejecting the family Diploproctodaeidae assigned the genus *Bianium* under Lepocreadiidae Nicoll, 1934, similar to the view held by Yamaguti, expressed their agreement with most of the synonymies referred to above but differed from Caballero, Bravo and Grocott, 1952 who proposed the synonymy of *B. holocentri* with *B. hemistoma*. A year later these authors, after describing *D. vitellosum* recognized the following seven species under this genus, namely *D. cryptostoma* (Ozaki, 1928); Sogandares and Hutton, 1958; *D. holocentri* (Yamaguti, 1942) Sogandares and Hutton, 1958; *D. haustum* (Mac Callum, 1918), La Rue, 1926; *D. hemistoma* (Ozaki, 1928) Sogandares-Bernal and Hutton, 1958; *D. plicatum* (Linton, 1928), Sogandares and Hutton, 1958; *D. tetradontis* (Nagaty, 1957), Sogandarles and Hutton, 1958 and *D. vitellosum* Sogandares and Hutton, 1959.

Before Sogandares-Bernal and Hutton (1958) reduced the genus *Bianium* Stunkard, 1930 to synonymy with *Diploproctodaeum* La Rue, 1926 and described *Diploproctodaeum vitellosum* Sogandares-Bernal and Hutton, 1959, seven species were assigned to the genus *Bianium*. The present author, however, does not agree with this synonymy and considers the species described by the joint authors to be a member of the genus *Bianium*. Thus with the addition of *B. vitellosum* (Sogandares-Bernal and Hutton, 1959) n. comb., the total number of species under the genus *Bianium* becomes eight.

The present species *B. madrasi* n. sp. can easily be distinguished from *B. hemistoma* (Ozaki, 1928) and *B. holocentri* Yamaguti, 1942 by the position of its genital opening, which lies lateral to the acetabulum and not close to its posterior margin and also

due to the shape of its forebody which is not greatly expanded as in the two species. Further the ventral sucker is smaller than the oral sucker in the new species in contrast to the *B. holocentri* where oral sucker is larger than the ventral sucker. On the basis of the variations between the two suckers and in having the ovary unlobed, the new species is separated from *B. lecanocephalum* Perez Viguera, 1955. It further stands apart from *B. tetradontis* Nagaty, 1957 which has the following distinguishing features.

1. The genital opening situated at the posterior border of the pharynx.
2. The vitellaria extend anteriorly upto the pharyngeal level.
3. The pharynx is larger than the oral sucker.
4. The ovary lies close to the acetabulum.

B. madrasi sp. nov. shows the presence of a prepharynx, its acetabulum smaller than the oral sucker and the pharynx with knob like projections at its anterior margin. These features distinguish it from *B. cryptostoma* (Ozaki, 1928), *B. koreanum* (Park, 1939) and *B. plicatum* (Linton, 1928).

B. vitellosum (Sogandares and Hutton, 1959) n. comb. differs from the Indian species mainly by the sinistral position of its ovary and by the anterior extent of its vitellaria, reaching upto the border of oral sucker.

Bianium bombayensis n. sp. (Fig. 2).

Host: *Sciaena Russelli* (Bleeker).

Location: Intestine.

Locality: Bombay (India).

Four specimens of this from were collected from the fish, *Sciaena Russelli* (Bleeker) from Bombay-India. Out of 60 hosts, only four yielded one parasite each from its intestine.

Description: Body elongated, aspinose, broadly rounded at extremities, 0.720-0.945 × 1.425-1.905 mm in size. Body divisible, lateral folds of fore-body turned ventrally

with its anterior edges projected beyond oral sucker. Oral sucker rounded, well developed, subterminal, $0.240-0.255 \times 0.255-0.270$ mm in size. Prepharynx small and thin walled, pharynx cup shaped, muscular with wavy anterior margin, $0.195-0.280 \times 0.225-0.250$ mm in size. Oesophagus very small. Intestinal bifurcation $0.540-0.690$ mm behind anterior end, caecum extend upto hind end and open through anus, on either side of excretory opening.

Genital opening lies on left of median line close to posterior margin of pharynx, $0.560-0.600$ mm from anterior end.

Excretory pore terminal and median.

Testes entire, ovoid, slightly sub equal, overlapping, post acetabular. Posterior testis bigger than anterior, $0.330-0.335$ mm in front of hind end, $0.215-0.254 \times 0.245-0.280$ mm in size. Anterior testis submedial, smaller than posterior testis, $0.210-0.255 \times 0.240-0.270$ mm in size. Cirrus sac hockey shaped, overlapped by acetabulum, bent towards right side. Vesicula seminalis interna contained in its bent part, connected with vesicula seminalis externa which lies between acetabulum and ovary. Vesicula seminalis interna long, narrow and short and continues into ejaculatory duct, runs into distal portions of cirrus sac and passes terminally into small cirrus. Prostate gland cells present.

Ovary slightly submedian, lobed, overlap anterior testis, $0.255-0.262 \times 0.330-0.335$ mm in size. Shell gland complex situated in space in between the ovary and anterior testis. Receptaculum seminis present. Vitellaria richly developed. Dorsally, follicles are present more or less throughout the post pharyngeal region whereas ventrally, seen mostly in lateral region, extending upto the posterior boundary of the oral sucker. Uterus arising from shell gland complex, makes one or two short loops in front of ovary, the uterus has some loops overlapping the ovary in its posterior extent and some overlapping the acetabulum in its anterior extent. Metraterm run obliquely

parallel to cirrus sac left of acetabulum. Eggs, oval, light yellow, fill the space between gonads and ventral sucker, covering vesicula seminalis externa, $0.045-0.060 \times 0.065-0.076$ mm in size.

Discussion: Of all the species belonging to the genus *Bianium* Stunkard, 1930, the present form shows the greatest resemblance to *B. cryptostoma* (Ozaki, 1928). It can, however, be distinguished from *B. cryptostoma* chiefly by the forward extent of its vitellaria. Apart from its profuseness and distribution, uniformly throughout the post-pharyngeal region on the dorsal side, vitellaria reach almost upto the anterior margin of pharynx. Furthermore, the presence of the prepharynx and of the lobes at the anterior margin of the pharynx and the more anterior location of the genital opening in the new species, are characters which separate it from the Japanese species.

Bianium purii n. sp. (Fig. 3)

Host: *Arius sona* (Guv and Vel)

Location: Intestine.

Locality: Puri (India).

Three dozen forms of this parasite were collected from the intestine of *Arius sona* (Cuv and Vel) from Puri Sea-beach (India). The infection with this parasite in these fishes at Puri was quite common.

Description: Body spinose, $0.360-0.420 \times 0.900-0.930$ mm in size, elongate divided into two parts fore and hind body. Anterior edge of fore body produced into thin, narrow fold, continuous on either side with lateral folds, whose edges are turned over ventrally, but do not form the scoop. The anterior and lateral folds appear like collar of a coat and besides this other patterns of the folds also observed. Hind end broadly rounded. Oral sucker subterminal, elliptical, $0.060-0.075 \times 0.090-0.095$ mm in size. Prepharynx small and thin walled, pharynx globular, its anterior margin wavy and walls divided longitudinally into 8-10 long flaps, 0.060×0.065 mm in size. Oeso-

phagus short bifurcating into intestinal caeca at 0.090 mm behind oral sucker, caeca run laterally extending upto hind end where they open through ani. Ventral sucker rounded with irregular opening, equal to oral sucker, 0.065×0.065 mm in size. The area in front of intestinal arch filled with parenchymatous gland cells, the latter surrounding the oral sucker and pharynx situated in that region. These gland cells situated laterally, extend posteriorly upto acetabular level but meet anteriorly in front of oral sucker.

Genital pores lie on left of body at level of oesophagus.

Excretory pore terminal with ani on either side. Excretory vesicle tubular elongated and saccular.

Testes post ovarian, post equatorial, intercaecal, more tandem than oblique to each other. Posterior testis close to anterior one, more or less ovoid, 0.150×0.160 mm in size, at 0.135 mm in front of hind end. Anterior testis immediately behind ovary, ovoid, 0.105×0.135 mm in size. Cirrus sac club shaped, $0.210-0.285 \times 0.075-0.080$ mm in size, extend obliquely backwards from genital opening to little in front of ovary, situated on left of acetabulum in level of its anterior margin. Small, saccular vesicula seminalis interna contained in the basal saccular parts of cirrus sac, anteriorly it is continued into parsprostatica. Ejaculatory duct long, winding, passes into short protrusible cirrus. Vesicula seminalis externa, extending half of the distance between cirrus sac and anterior testis.

Ovary median, lobulated, 10-15 lobes in front of anterior testis. Rectaculum seminis long, vesicular, close to inner margin of left caecum at level of anterior testis, $0.045-0.055 \times 0.135-0.150$ mm in size. Vitellaria profuse, follicular, developed laterally, sometimes intercaecal on either sides and uniting behind testis in zone of ventral sucker, big follicles, $0.30-0.35$ mm in size. Uterus post acetabular with coiled ascending limbs between ovary and cirrus

sac, filled with ova, some overlapping ovary. Metratermwell developed, muscular, left of cirrus sac, open near male genital opening. Eggs elliptical, $0.030-0.035 \times 0.045-0.048$ mm in size.

Discussion: Among all the species, so far assigned to the genus *Bianium* Stunkard, 1930, *B. purii* n. sp. most closely resembles the genotype, *B. plicatum* (Linton, 1928) Stunkard, 1931 in sharing the following characters. (1) The median position of the ovary; (2) the close proximity of the acetabulum to the intestinal bifurcation; (3) the anterior extent of vitellaria upto the cephalic margin of the acetabulum and (4) the general topography of different organs.

The following features of the new species, however, distinguish it from *B. plicatum*. (1) The winding disposition of its ejaculatory duct; (2) the meeting of the two sides in the acetabular region; (3) the presence of lobes at the anterior margin of its pharynx and (4) the slightly smaller size of its acetabulum than that of the oral sucker.

Evidently *B. purii* represents a new species of the genus *Bianium*.

Status, of The Genera *DIPLO-PROCTODAEUM* La Rue, 1926.
BIANIUM Stunkard, 1930 and
DIPLOCREADIUM Park, 1939.

The three genera, *Bianium*, *Diplocreadium* and *Diploproctodaeum* have been the source of much taxonomic and nomenclatorial confusion for more than two decades. Besides the three genera constituting this complex, three more generic names have been used in the past for the species belonging to this complex. They are *Hemistoma* Ozaki, 1928, *Psilostomum* Looss, 1899 and *Diploporetta* Strandt, 1942 which made the problem all the more perplexing. The confusion, in respect of the status of the genera *Bianium* Stunkard, 1930 *Diploproctodaeum* La Rue, 1926, and *Diplocreadium* Park, 1939 has been further heightened by the contribution of Sogandares-Bernal and

reveal that he had already consulted La Rue's paper of 1926 entitled, "A trematode be a synonym of *Diploproctodaeum* La Rue, 1926. They mention emphatically and unequivocally that "There is not a single character upon which 2 separate genera can be established. *Bianium* is clearly a synonym of *Diploproctodaeum*".

Interestingly enough, in the same year, Yamaguti (1958) falling in line with previous worker recognised the two genera to be distinct from each other. The present author, however, differs from Sogandares-Bernal and Hutton and agrees with Yamaguti (1958) and most of the earlier contributors in maintaining *Bianium* as a genus distinct from *Diploproctodaeum*. Contrary to the assertion of Sogandares-Bernal and Hutton (1958), it has been observed that there are a number of characters which separate the two genera. They are as follows:-

1. Shape of the body :

There is little doubt that the body in both the genera is divisible into two parts and that the lateral edges of the anterior region in both are expanded laterally either to remain as such, or to be turned ventrally. In *Diploproctodaeum*, however, the fore-body is greatly dilated, so that it is clearly demarcated from the hind body. But in *Bianium*, both the regions are more or less of the same breadth, so that they are not clearly demarcated from each other. Furthermore, the lateral expansions of the anterior region of *Diploproctodaeum* are turned over and joined ventrally so as to give it the form of a spoon.

2. Length of the oesophagus :

The oesophagus in *Bianium*, is either very short or absent. Even in those species, in which the suckers are relatively widely separated, e. g., *B. cryptostoma* the length of the oesophagus is small. On the contrary, in *Diploproctodaeum*, the oesophagus is quite long. This fact has been corroborated also by Sogandares and Hutton (1958), who studied MacCallum's specimens of *D.*

haustrum.

3. Position of the genital opening :

The genital opening in *Diploproctodaeum* has been shown in the figure of *D. haustum* to lie in the median line, just anterior to the acetabulum. This fact is also mentioned in the generic diagnosis and has been taken into account by Ozaki (1928) while separating his new genus, *Diploporus* from it. But in *Bianium* its position is always lateral to acetabulum, either close to its anterior margin or its hind margin.

4. The shape of the ovary :

The unlobed nature of the genus *Diploproctodaeum* appears to be quite distinctive, when contrasted with the deeply lobed nature of this of this organ in the members of the genus *Bianium*.

5. Extent of vitellaria :

Vitellaria, being confined only to hind body in *Diploproctodaeum*, does not extend anteriorly beyond the equator, whereas in the species of the genus *Bianium* it extends much more forward.

In addition to the above mentioned points, which distinguish *Bianium* from *Diploproctodaeum*, the absence of a muscular metraterm and the more tandem than oblique position of the testes, in the latter, further make its separation from *Bianium* quite obvious.

While proposing the synonymy between the two genera, Sogandares and Hutton mentioned that Linton (1928), Ozaki (1928) and Stunkard (1930) were obviously unaware of La Rue's (1926) description of *Diploproctodeum*. This is, however, untenable. Ozaki (1928), while erecting the genus *Diploporus* did compare it with the genus *Diploproctodaeum* and distinguished it by the shape of its ovary and by the position of its genital opening. He went to the extent of even stating that "The published description of *Diploproctodaeum haustum* is extremely scanty and it is not possible to make detailed comparison of the two genera". The very title of Stunkard's paper (1930). "Another trematode with two anal openings"

Hutton (1958), in which they have considered the genus *Bianium* Stunkard, 1930 to with two ani”.

The present author is, therefore, of the view that *Diploproctodaeum* La Rue, 1926 and *Bianium* Stunkard, 1930 are separate and valid genera.

As regards the third genus *Diplocreadium* Park, 1939, which has been considered synonymous to *Bianium* by Yamaguti in 1953 and maintained as such also in 1958, the present author also holds a similar view. While Yamaguti's guess was “that Park overlooked the presence of ani in *Diplocreadium*”, Sogandares and Hutton (1958) prefer to retain this genus until such time as ani are demonstrated. In support of their view, they also refer to other genera of Lepocreadiids with a scooped out fore-body but without ani. A number of specimens, in the collection of the present author, are so mounted that they do not show the presence of the anus, while most of the other specimens collected from the same host do demonstrate it. It, therefore, indicates the possibility that the anus may not be visible in all specimens - a condition leading to a suspicion about the presence of ani, such a view is also harboured by Yamaguti. The present author therefore, is compelled to differ from the joint authors and agrees with Yamaguti in reducing *Diplocreadium* in synonymy with *Bianium*, in view of the above conditions and of the general resemblances shown in the topography of the organs.

In pursuance of this opinion, *Diploproctodaeum vitellosum* Sogandares and Hutton, 1959 is transferred under the genus *Bianium* and is designated as *B. vitellosum* (Sogandares and Hutton, 1959) n. comb. A comparison of this species with the other members of the genus is, however, not meaningfully possibly, since the account of Sogandares and Hutton, 1959 is lacking in many respects. The eggs, oesophagus and metaterm which are mentioned in their description, have not been shown in their dia-

grams. On the other hand the parenchymatous gland cells and receptaculum seminis which have been figured, have not been referred to in the description. Their description further lacks in mentioning the number of eggs and the nature of the ejaculatory duct.

The present author, however, agrees with Sogandares and Hutton in maintaining *Bianium holocentri* as a valid species and not a synonym of *B. hemistoma* as has been regarded by Caballero, Bravo Bravo and Grocott (1952). Sogandares and Hutton (1959) while comparing *D. vitellosum* with *D. holocentri* do not take into account the suckers' ratio and the winding nature of the ejaculatory duct of *D. holocentri*, which are features worthy to note. The lines, on which the joint authors, compared the species *D. vitellosum* with other species of the genus, need probing in respect of the suckerratio and the course of the ejaculatory duct.

The following species are, therefore, listed as valid under the genus *Bianium* Stunkard, 1930.

1. *B. bombayensis* n. sp.
2. *B. cryptosoma* (Ozaki, 1928).
3. *B. hemistoma* (Ozaki, 1928).
4. *B. holocentri* (Yamaguti, 1942).
5. *B. koreanum* (Park, 1939).
6. *B. lecanocephalum* (P. Vigueras, 1955).
7. *B. madrasi* n. sp.
8. *B. plicatum* (Linton, 1928), Stunkard, 1931.
9. *B. purii* n. sp.
10. *B. tetradontis* (Nagaty, 1956) and
11. *B. vitellosum* (Sogandares-Hutton, 1959).

Summary

Three new species of the genus *Bianium* viz: *B. madrasi*, *B. bombayensis* and *B. purii* are described from the marine fishes, *Tetraodon viridipunctatus* (Gunther), *Sciaena Russellii* (Bleeker) and *Arius sona* (Cuv and Vel) from the Indian waters. The status of the

genera *Bianium*, *Diploproctodaeum* and *Diplocreadium* has been discussed and *D. vitellosum* has been transferred to the genus *Bianium*. Yamaguti's (1958) opinion reducing *Diplocreadium* to synonymy with *Bianium* is upheld. The latter genus is reported for the first time from India.

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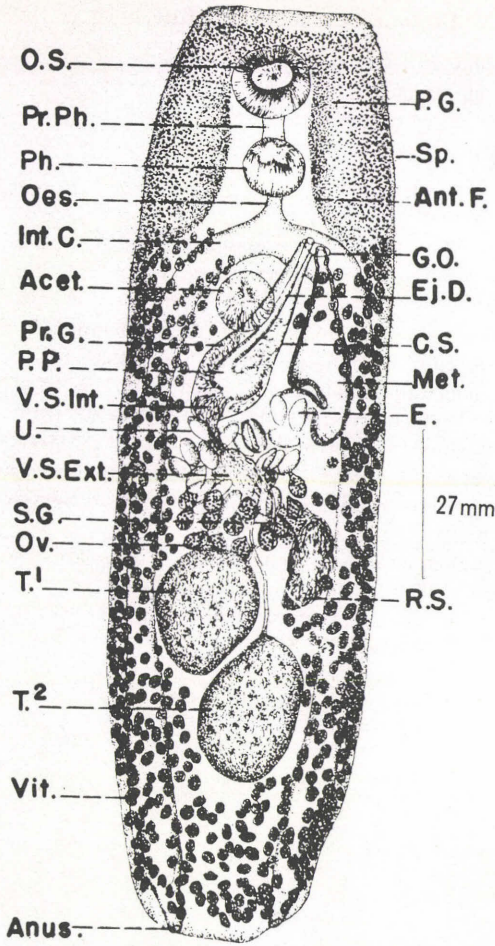


FIG. 1

Abbreviations used

Ant. F., anterior fold; Acet., acetabulum; C. S., cirrus sac; E., egg; Ej. D., ejaculatory duct; F. G. O., female genital opening; G. O., genital opening; Int. C., intestinal caecum; M. G. O., male genital opening; Met., metraterm; O. S., oral sucker, Oes., oesophagus; Ov., ovary; P. G., parenchymatous gland; P. P., parasprostatica; Ph., pharynx; Pr. Ph., prepharynx; Pr. G., prostate gland; R. S., receptaculum seminis; Sp., spine; S. G., shell gland; T., testis; U., uterus; V. S. Int., vesicula seminalis interna; V. S. Ext., vesicula seminalis externa; Vit., vitellaria.

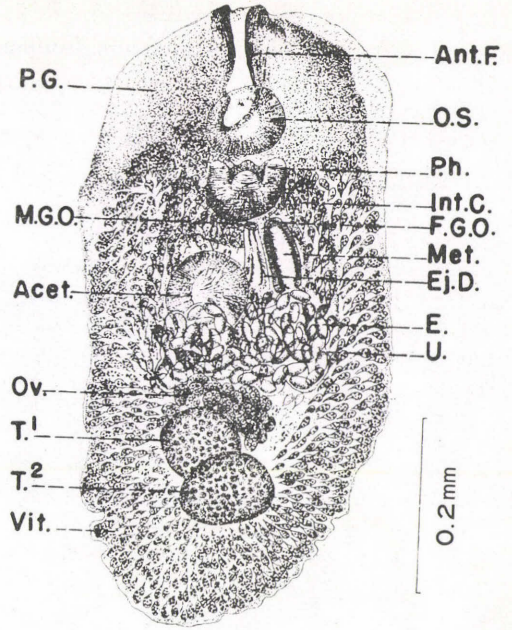


FIG. 2

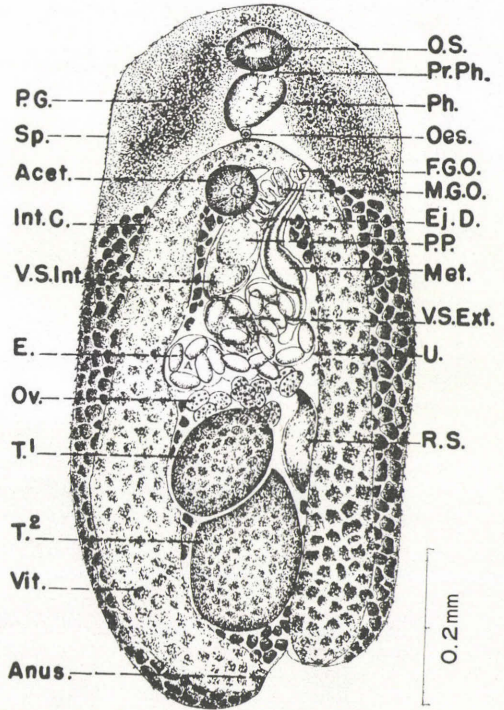


FIG. 3

Bianium 属吸虫（二生類）の3新種の記載と Diploproctodaeum La Rue,
1926, Bianium *Bianium* Stunkard, 1930, および Diplocreadium
Park, 1939 属の形態に関する研究

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Bianium madrasii, *B. bombayensis* および *B. purii* の新しい3種の二生吸虫類がインド海岸域の Madras, Bombay および Puri からの *Tetradon viridipunctatus* (Gunther), *Sciaena Russelli* (Bleeker) ならびに *Arius sona* (Cuv & Vel) からそれぞれ報告された。

B. madrasii n. sp. はその前体部の形状によって特徴づけられる。即ち小さい口吸盤の側方に位置する生殖孔及び生殖孔の高さから体後端までのびている卵黄巣濾胞がそれである。

B. bombayensis n. sp. は豊富に発達した卵黄巣濾胞をもっていることが変わりその独特な分布は体背部の後咽頭域にくまなくみられその濾胞ののびは咽頭の前縁から後端に、またその生殖孔開口部のさらに前方に及んでいる。

B. purii n. sp. は正中央に卵巣が位置し、しかも腹

吸盤に極く近接して腸管分岐部にまでおよび、卵黄巣の前方範囲と腹吸盤位で両側の卵黄巣の会合にまで延びている。

Diploproctodaeum La Rue, 1926, *Bianium* Stunkard, 1930 及び Diplocreadium Park 1939 については Hemistoma Ozaki 1928, *Psilostomum* Looss, 1899 及び *Diploporreta* Srasdt 1942 と共に論議された。

Bianium と *Diploproctodaeum* の二属の妥当性は形態学的特徴からは認められる。しかし *Diplocreadium* Park 1939 は *Bianium* Stunkard 1930 と Synonym であると考えられる。

Diploproctodaeum vitellosum Sogandares and Hutton 1959 は *Bianium* Stunkard 1930 に入れられるべきものである。*Bianium holocentisi* は独立種であって *B. hemistoma* の Synonym ではない。