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BRANCHIOSTOMA MORETONENSIS, sp. nov.
(CEPHALOCHORDATA)

SUMMARY

Numerous specimens, (ca. 150) of a new cephalochordate were obtained from Moreton Bay, Queensland during 1961-62 (Fig. 1). The description is based upon 50 specimens examined in detail. Nine meristic characters have been examined statistically and qualitative features are described. The new species occurs sympatrically with another cephalochordate, *Epigonichthys cultellus* Peters (1876).

INTRODUCTION

The occurrence of two species of lancelets during dredging operations in Moreton Bay and the necessity for their identification prompted the present work. One species is clearly *Epigonichthys cultellus* Peters (1876) as identified from Peters, who described the type from material from Moreton Bay, and from Willey (1894), Kirkaldy (1895), and Franz (1922).

One other lancelet has been recorded from Moreton Bay. Willey (1902) gives Moreton Bay as the southern limit of *Branchiostoma belcheri* (Gray, 1847). Whitley (1932) however removed the *B. belcheri* recorded by Willey (1902), Günther (1884), Raff (1912), Haswell (1908), McCulloch & Whitley (1925), which were from the Australian region, and placed them in synonymy with *Branchiostoma (Amphipleurichthys) minucauda* Whitley (1932). *B. minucauda* was described from material from Port Curtis I., Queensland.

The present material from Moreton Bay showed great variability in many features and emphasized the necessity for using a statistical approach comparable with that of Webb (1956).

Qualitative and statistical comparisons were made of *B. moretonensis* with *B. belcheri* and *Branchiostoma arabae* Webb (1956). Comparisons were also made with *B. minucauda*, *Branchiostoma haekelii* Franz (1922a), and *Branchiostoma malayana* Webb (1956a), i.e., species having a larger number of diagnostic characters in common with *B. moretonensis* than with other recorded species.

TAXONOMY

BRANCHIOSTOMA MORETONENSIS SP. NOV

Holotype

Length 28.5 mm. Deposited Australian Museum. Reg. No. IB 7396. (Fig. 2.)

Paratypes

Reg. Nos. IB 7397, IB 7398.

Material examined

Moreton Bay, Queensland.

One, 5 miles W. of Tangalooma Pt., near M.3 Red Beacon, muddy sand, 20 metres (coll. 10.xi.61). One, 2 miles NNW. of Rous Channel Light, coarse culch of mollusc shell, coral, and muddy sand, 20 metres (coll. 1.vi.62). Twenty-six, 1 mile SE. of Hope Banks, culch, 11 metres (coll. author, 1.vi.62). Nineteen, N. of Naval Reserve Beacon, culch, 4 metres (coll. 2.vi.62). Three, W. end of Rous Channel, 6 metres, culch (coll. T. Hailstone and student parties, 2.vi.62).

Length 22–42 mm. (overall range).

Qualitative characters

Notochord: Anteriorly, either tapering and horizontal or thickened and directed downwards; posteriorly attenuated and produced slightly beyond last myotome.

Rostrum: Shape variable; usually separated from dorsal fin by shallow postrostral notch if notochord is thickened and directed downwards; otherwise confluent with dorsal fin.

Dorsal, caudal, and preanal fins: Dorsal fin tends highest posteriorly. Caudal fin usually well defined; dorsal lobe of caudal fin arises perpendicularly above the anus or just anterior to it; ventral lobe of caudal fin may be confluent with preanal fin or deeply notched. Chambers of preanal fin broad and occasionally divided to form double preanal fin chambers.

Gonads: 14–26 pairs; undeveloped in 92 per cent of sample, these collected in June 1962; largest in summer months.

Meristic characters

Numbers of: (1) Dorsal fin chambers, 207–262; mean 234.56; standard deviation 11.32; coefficient of variation 4.8 per cent.

(2) Preanal fin chambers, 62–92; mean 79.32; standard deviation 7.21; coefficient of variation 9.1 per cent.

(3) Myotomes anterior to atriopore 32–33; mean 32.24; standard deviation 0.43; coefficient of variation 1.3 per cent.

(4) Myotomes between atriopore and anus 17–19; mean 17.9; standard deviation 0.64; coefficient of variation 3.6 per cent.

(5) Myotomes posterior to atriopore 7–10; mean 8.1; standard deviation 0.57; coefficient of variation 7.1 per cent.

(6) Myotomes (total) 57–60; mean 58.24; standard deviation 0.76; coefficient of variation 1.3 per cent.

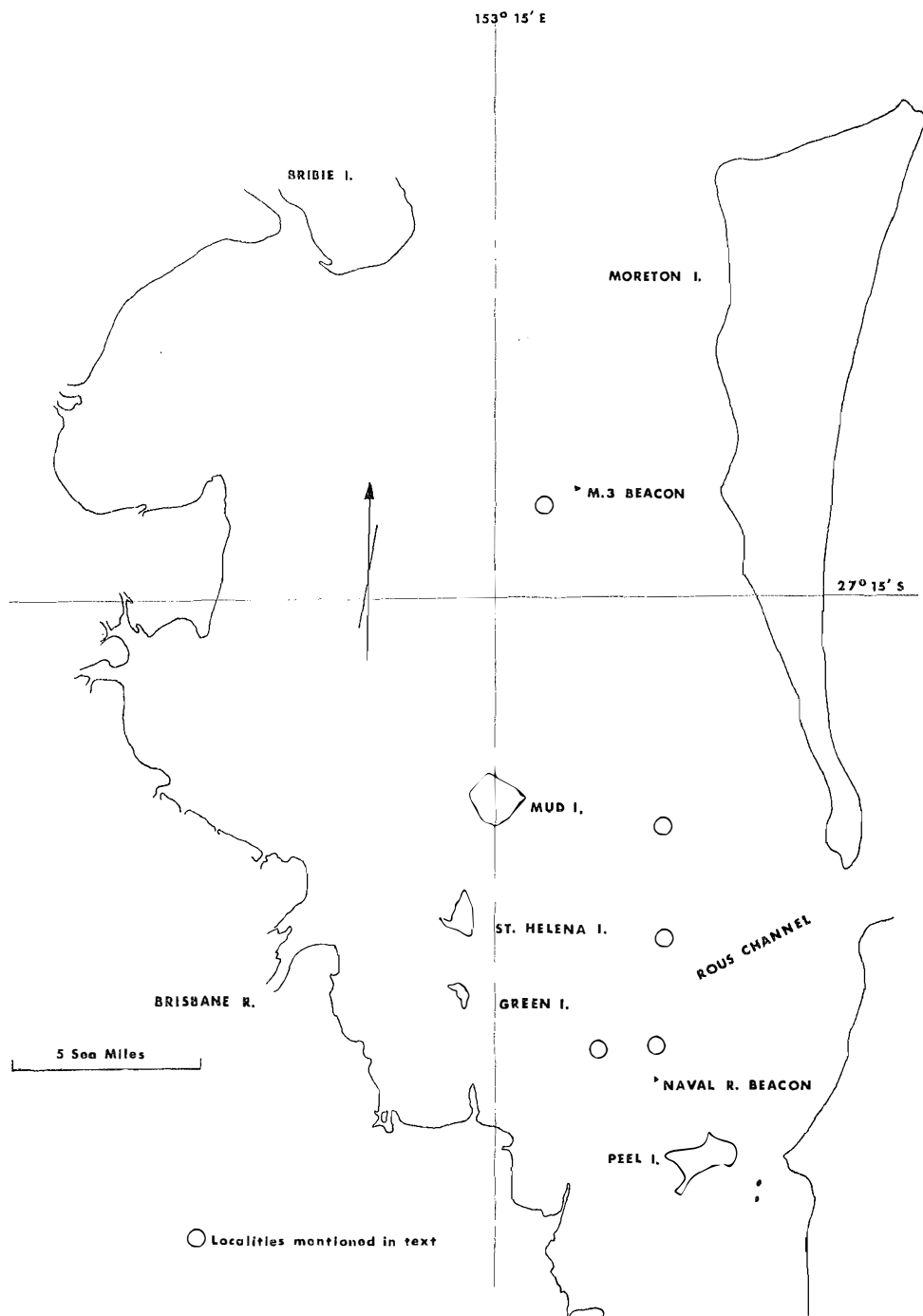


FIG. 1.—Map of Moreton Bay showing localities mentioned in text

Ratios of: (7) Height tallest dorsal fin chamber to dorsal fin chamber breadth 1.43–3.2; mean 2.08; standard deviation 0.33; coefficient of variation 15.8 per cent.

(8) Maximum body height to dorsal fin height 9.73–11.85; mean 10.51; standard deviation 0.59; coefficient of variation 5.6 per cent.

(9) Postatrioporal length to preatrioporal length 0.39–0.56; mean 0.5; standard deviation 0.04; coefficient of variation 8.0 per cent.

COMPARISON OF *B. MORETONENSIS* WITH OTHER SPECIES

B. moretonensis cf. *B. belcheri* and *B. arabae*

Qualitative characters

TABLE I

	Dorsal Fin	Caudal Fin	Preanal Fin Chambers
<i>B. moretonensis</i>	Tends highest posteriorly. May or may not be separated from rostrum by postrostral notch.	Not usually confluent with preanal fin.	Broad and occasionally divided to form double preanal fin.
<i>B. belcheri</i> *	Tends highest posteriorly. Separated from rostrum by shallow postrostral notch.	Runs smoothly into preanal fin with little indication of point of termination of lower lobe.	Broad, but not divided to form double preanal fin.
<i>B. arabae</i> *	Approximately same height throughout. Not separated from rostrum by postrostral notch.	Runs smoothly into preanal fin with little indication of point of termination of lower lobe.	Broad, but not divided to form double preanal fin.

*Data after Webb (1956).

Meristic characters

Data were obtained upon 50 specimens of *B. moretonensis*. The means, standard deviations, and coefficients of variation of the nine characters selected were computed and compared with 25 individuals of *B. belcheri* and 25 of *B. arabae*. (Data after Webb, 1956.)

Comparisons of the meristic characters of *B. moretonensis* with those of *B. belcheri* and *B. arabae* are given in Table 2.

B. moretonensis cf. *B. belcheri*

Significant differences were evident in all characters, ($P < 0.001$), excepting 2 and 5. ($P = \text{ca. } 0.4, \text{ ca. } 0.8$ respectively.)

B. moretonensis cf. *B. arabae*

Significant differences were evident in all characters ($P < 0.001$).

B. moretonensis cf. *B. minucauda*

As the Moreton Bay form (previously regarded as *B. belcheri*) had been placed in synonymy with *B. minucauda*, it should be noted that the myotome formula of

TABLE 2
 MERISTIC CHARACTERS OF 50 *B. moretonensis* COMPARED WITH THOSE OF 25 INDIVIDUALS
 OF *B. belcheri* AND 25 OF *B. arabae*.

Character	<i>B. moretonensis</i>			<i>B. belcheri</i> *			<i>B. arabae</i> *		
	Mean	Stand- ard Devia- tion	Coeffi- cient of Varia- tion (%)	Mean	Stand- ard Devia- tion	Coeffi- cient of Varia- tion (%)	Mean	Stand- ard Devia- tion	Coeffi- cient of Varia- tion (%)
1. Number dorsal fin chambers	234.56	11.32	4.8	305.0	23.64	7.8	333.2	18.22	5.5
2. Number preanal fin chambers	79.32	7.21	9.1	78.1	5.26	6.7	74.0	5.92	8.0
3. Number myotomes anterior to atriopore	32.24	0.43	1.3	36.5	0.82	2.3	38.96	1.49	3.8
4. Number myotomes between atriopore and anus	17.9	0.64	3.6	17.0	0.76	4.5	16.4	0.65	3.9
5. Number myotomes posterior to anus	8.1	0.57	7.1	10.0	0.54	5.4	9.44	0.71	7.6
6. Total Number myotomes	58.24	0.76	1.3	63.56	1.00	1.6	64.8	1.56	2.4
7. Ratio height tallest dorsal fin chamber to chamber breadth	2.08	0.33	15.8	2.96	0.31	10.5	2.35	0.35	14.9
8. Ratio maximum body height to dorsal fin height	10.51	0.59	5.6	9.08	0.96	10.6	11.52	0.92	8.0
9. Ratio postatrioporal length to preatrioporal length	0.5	0.04	8.0	0.5	0.02	4.8	0.37	0.04	9.5

*Data after Webb (1956).

B. minucauda according to Whitley is $37 + 14 + 12 = 63$. (*B. moretonensis*, mean $32 + 18 + 8 = 58$.)

The holotype of *B. minucauda* in the Australian Museum (Reg. No. IA 4190) was examined by the present author. The myotome formula was confirmed (as far as may be determined, the type having deteriorated over the years). Other features which were examined and not mentioned by Whitley were: dorsal fin chambers, ca. 238, ventral fin chambers, ca. 55. (*B. moretonensis*, mean 234.56 and 79.32.)

B. moretonensis* cf. *B. haekelii

There is similarity in numbers of dorsal and preanal fin chambers, ratio of postatrioporal length to preatrioporal length and total number of myotomes.

B. moretonensis* cf. *B. malayana

Similarity in ratios of height of dorsal and preanal fin chambers to breadth, ratio of postatrioporal length to preatrioporal length, and number of myotomes posterior to anus.

Approximately 22 species of *Branchiostoma* have now been recorded, including 11 from the Indo-Pacific.

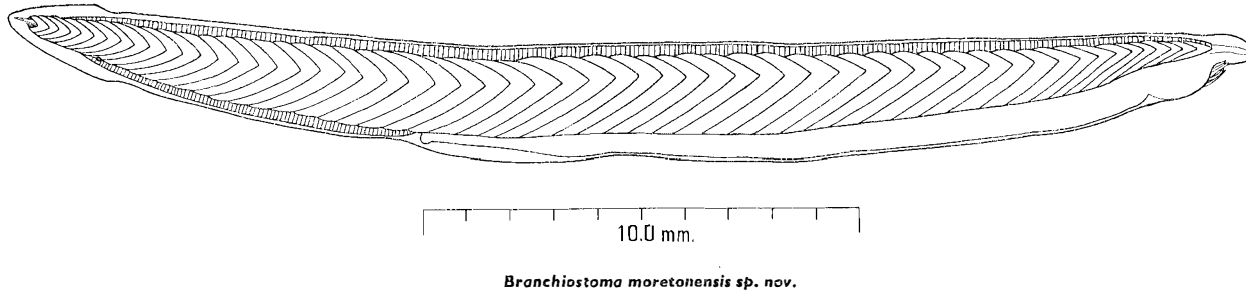


FIG. 2.—Camera lucida outline drawing of holotype

REMARKS

Moreton Bay is the type locality of *Epigonichthys cultellus*. As *B. moretonensis* occurs sympatrically with this species, it is probable that Peters (1876) confused the two. One of his illustrations of the type (1876, Fig. 4) is of a specimen with 17 myotomes between atriopore and anus and 8 postanal myotomes, which places the illustrated specimen well out of the range of *E. cultellus* and within the range of *B. moretonensis*. The mean myotome formula of five specimens of *E. cultellus* taken from Moreton Bay in 1961–62 is $31.8 + 10.6 + 7.2$, which is consistent with subsequent descriptions from other localities by Willey (1894), Kirkaldy (1895), and Franz (1922).

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