

THE OCCURRENCE OF *AMPHIOXIDES PELAGICUS* (Günther)
IN THE FERNANDO DE NORONHA ISLAND PLANKTON

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Two specimens of *Acrania* larvae were found in the plankton caught with a small net by Vannucci and Nonato off Fernando de Noronha Island, 10m deep, at 4 p.m., the 21st January 1954, the surface water temperature being 28 °C, classified by Vannucci as *Amphioxides pelagicus* (Günther) 1889, which has been considered the larva of *Asymmetron lucayanum*. In fact, according to Bigelow and Schroeder, these are "small Lancelets, living pelagically, in which (as in larval Lancelets in general) the mouth is on the left side, without oral tentacles, the metapleural folds are separate one from another, so that there is no closed atrial cavity. Ventral gill slits in single row, but grow to greater length (up to 21mm) and develop a greater number of gill clefts than is usual for the Lancelet larvae before metamorphosis". Also they show a "caudal fin usually not sharply marked off, its tip lancet-shaped, usually pointed; notochord tapering to a narrowly pointed tip; dorsal finfold originates about opposite the 21st to the 25th myotome; the ventral, farther posterior in some, but farther forward in others; the dorsal fin-ray chambers extend forward to only the posterior edge of the 1st myotome, anterior to which they are replaced by an undivided tapering canal; 2 chambers per myotome anteriorly, increasing to 3 or 4 per myotome posteriorly, gill clefts 16 to 18 in specimens of 5 to 6mm, with 24-26 reported for Bermuda specimens of 8 to 10mm or longer, 30 for the Indian Ocean form; myotomes usually 63-64 (50 to 51 preanal and 13 post-anal)".

Our specimens (Fig.1) of 7mm show all these features having 21 gills, 62 myotomes, the dorsal finfold originates at the 23rd myotome, the ventral further back. There are 50 pre-anal myotomes and 13 post-anal.

These specimens cannot be *A. valdiviae*, nor *A. stenurus* (the other two known species of these larvae) because of differences in the dorsal fin-ray chambers, in the place where the dorsal finfold originates, and in the number of myotomes.

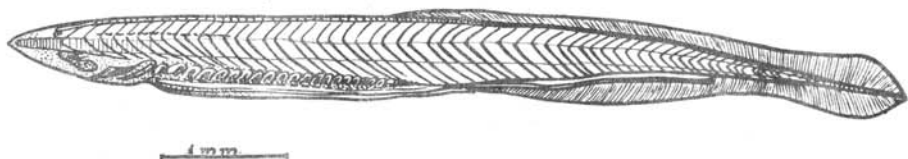


Fig. 1

DISTRIBUTION RANGE - *Amphioxides pelagicus* has been found in the vicinities of the Hawaiian Is., in the tropical belt of the Indian Ocean, at St.Helena, between the Ascension Is. and the African Coast, at the mouth of the Amazon and at Bermuda. Our discovery shows that it may occur also further south near the Brazilian Coast, as could be expected since this is a species with circum-tropical distribution. It is for geographical reasons that we have thought to be interesting to record this finding.

DISCUSSION - These larvae have always been the center of controversy because they show quite a different type of life from the adult Lancelets and their larvae. It was believed at first that these animals were adult forms adapted to the pelagic life, but, now they are considered as representing larval stages of adult Lancelets because of several characters which they have in common with the larvae of these animals (Pietschmann, 1929:109). According to Pietschmann they are paedogenetic larvae therefore with arrested

metamorphosis and prolonged pelagic phase, a fact common amongst animals that are sessile or living in a restricted area when adult and which have these free-swimming larvae to spread the species (Goldschmidt, 1933:325).

These larvae should be considered of great importance for evolution, because according to Garstang's theories, also Hadži's and others', they are the starting point of new paedomorphic (or neomorphic - Beurlen) forms (Hardy, Huxley *et al* - 1954:124,125). Goldschmidt is of the opinion that all Lancelets have two types of larvae: one which metamorphoses in loco, and the other, which has retarded metamorphosis, and lives in the high seas, thus capable of spreading the species. This may also be the explanation for the two observed forms of development in certain *Enteropneusta*, *Glossobalanus minutus* for example: one, the direct form, and the other, the reproduction by means of a free-swimming larva.

According to Garstang, as quoted by Hardy (Huxley *et al*, 1954:124,125), the larval phases of development are "special developmental adaptations thrown up by sessile bottom-living creatures to spread the species far and wide in the ocean currents," "in each of these larvae there is a compromise and adjustment between two rival needs - on the one hand to grow up into the adult so as to reproduce the species as quickly as possible, and on the other to remain floating as long as practicable so as to distribute the species over the widest possible range". The young stages will thus suffer selection just as intensely as the adult forms and "may be modified in quite a different direction from that in which the adult structure is adapted, specially if larva and adult live in two very different zones of life" as in the present case. Garstang (l.c.,125) thus explained ontogeny as creating phylogeny, by means of neotenic larval forms, a process which he called paedomorphosis.

Amphioxus is already considered by many authors (Romer, Young, Garstang) as the permanent larva (paedomorphic) of some early vertebrate type. As none of the adult Lancelets can easily be related to *Amphioxides pelagicus* (neither *Asymmetron lucayanum*, nor *Branchiostoma bermudae*, which occur in the Bermudas where this *Amphioxides* is found) is highly probable that this form shows a paedomorphosis under way or already established in a group which is already paedomorphically originated. Under this respect, if this should prove to be correct, *Amphioxides pelagicus* may be considered as a definitely separated species produced by its peculiar reproductive habits and by its ecology.

RESUMO

Trata o presente trabalho do encontro de duas larvas de Acrania, no plancton da Ilha Fernando de Noronha.

Esse material, frequentemente considerado como larva de *Asymmetron lucayanum*, foi determinado por Vannucci como sendo de *Amphioxides pelagicus* (Günther).

Os adultos e as larvas dos Acrania tem hábitos de vida um pouco diferentes. Por isso as larvas desse tipo foram sempre objeto de controvérsias. Pensou-se de início, que se tratava de formas adultas adaptadas a vida pelagica mas, atualmente, são consideradas como estádios larvares de adultos de anfioxo, a vista de exibirem vários caracteres peculiares as larvas desse animal.

Concluindo, o autor explica como esta forma pode ser considerada como uma espécie definitivamente separada, produzida por seus hábitos peculiares de reprodução e por sua ecologia, desde que seja provado tratar-se de uma pedomorfose estabelecida.

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