

bluish green. The feet and legs were yellowish, becoming duller on the webs between the toes and changing to horn-brown on the anterior scutes of the tarsus and the upper surface of the toes.

Published descriptions of the soft parts of the Anhinga so far as they have come to attention seem to be based upon Audubon's account from which the notes given above vary in certain particulars. Audubon states that the gular sac is orange and makes no mention of the brilliant blue line on the margin of the eyelids. Mr. A. T. Wayne¹ has called attention to the fact that the gular sac is black in the adult male Anhinga.

Examination of dried skins for the color of the soft parts is usually unsatisfactory, but in the present instance may serve to determine the color of the gular sac. In eight males, in the collections of the U. S. National Museum, in fully adult plumage, taken in March, April, May and June, three have the gular sac black while in five it is orange. In four adult females killed in March and May three have the sac orange, while one has it colored a deep black. All of these birds, judging from their plumage, were fully adult. The sac is universally colored yellowish or orange in all of the immature birds that have been examined. From a consideration of these facts it seems probable that the black color of the gular pouch and the brilliant color about the eye are characters that develop with age, and that they may not appear until a bird is two years old, or more. On the basis of this explanation the comparatively small number of Anhingas in full color in collections may be supposed to come from the smaller number of adults, as compared with young birds, and the greater wariness of the adults that enables them more often to elude the collector.—*Alexander Wetmore.*

A NEW NAME FOR HELIASTER MULTIRADIATUS (GRAY).

The *Asterias multiradiata* of Gray (Ann. and Mag. Nat. Hist., Vol. 6, 1840, p. 179) is antedated by *Asterias multiradiata* Linnæus (Syst. Nat., 10th edition, 1758, p. 663); the starfish now known as *Heliaster multiradiatus* (Gray) may be called **Heliaster solaris**, nom. nov.—*Austin H. Clark.*

NOTES ON LUCANIA OMMATA (JORDAN).

When Dr. Hay described this form as *Zygonectes mannii* he held that it might "contend with *Heterandria formosa* for the honor of being the smallest known bertebrate." It has since lost this distinction but yet remains an interesting fish because of its apparent rarity. The discovery of it in the Okefinokee Swamp and its occurrence there in abundance prompts a few notes about its habitat and characters.

We have 63 specimens of this rare form in 13 different collections from the swamp. In the summer of 1912 one of the authors secured it from Honey Island Prairie, May 29, 1912; between Honey and Billy Islands, June 1, 1912; in Billy Lake, June 4; on Billy Island, June 1; on Jones Island, June 24. On Dec. 25 and 26, 1913, Dr. J. C. Bradley secured it at

¹ Auk, 1911, p. 107.

Billy Lake Landing and in a bog on Billy Island. On Dec. 26, 1916, Mr. Francis Harper took it at Minnie Lake Narrows; on Floyd's Island Prairie, on Jan. 4, 1917, and on Chase Prairie, Jan. 12, 1917.

In 1881 R. E. Earll took two females in Indian River and in 1884 Jordan described it. In Dec., 1890-Jan., 1891 Albert J. Woolmann found 2 males and 3 females in the Santa Fe river (Suwanee River system). With two specimens (*Zygonectes mannii* Hay) taken by Mann and Davidson in Yellow Water River, western Fla., we have 9 specimens. It is widespread in the swamp and the appearance of such a large series with no conscious effort made to collect them and non-recognition of the species by us during the 1912-1913 trips shows it to be a common form in the swamp. Later in 1916-1917 Mr. Harper was on the lookout for it. He had examined some of the 1912-1913 material.

In total length these specimens range from 10 mm.-25 mm., the largest being a male; the standard lengths 8.5-21 mm. The head varies from $3\frac{1}{4}$ - $3\frac{3}{4}$ in the length, the depth $4\frac{1}{2}$ -5, the lateral row of scales 27-32.

This beautiful little killifish is smaller than *Lucania goodei* and averages larger than *Heterandria formosa*. With both it has some phases of coloration in common. In coloration these 63 specimens fall into two groups; those with lateral black ocellus just in front of the origin of the anal (females); and those without the spots (males). Both sexes have the caudal ocellus in our series except for one specimen which may be male or female and which is without anal or caudal ocellus or any dark bands of minute dots. Woolmann with 2 males in hand declared they have no caudal ocellus but all the males of our series have it. In several it is smaller than in the female and a part of the last brown transverse bar, but in the largest specimen of the 63, a male, the black ocellus has replaced the transverse brown bar. In all the males there is no real clear-cut ocellus just above and in front of the origin of the anal fin, yet in all there is a suggestion of it in an indistinct collection of black dots. The males have from base of caudal to front of the dorsal origin from 5-7 more or less distinct transverse brown bars in the younger individuals, 3-4 in the older individuals. In the latter group these bars are restricted to the caudal peduncle and the oldest males have a tendency to lose transverse bands entirely and become punctate all over the body. In the male the dorsal and anal may be very narrow (D. 4 or 5, A. 6 or 7) and the tip of dark punctate fins reach almost if not to the base of the caudal. In the females these fins are plain, never approach the base of the caudal and usually have 6 or 7 rays in the dorsal and 8-10 rays in the anal. Thus the anal fin may be modified though Woolmann's two specimens did not show it. If both sexes be considered the dorsal may be from 4-7 in rays and the anal from 6-10. Another puzzling condition is that several of the males are amongst the largest specimens of the series. These males have the tips of the ventral fins black. The males have not the lateral brown bands of the female but in addition to the basal transverse brown band (in both sexes) of the

caudal rays they have two or three more transverse bands (not in female), on the caudal fin and occasionally a black tip to the tail.

The female is an exquisite little fish. The most striking marks are the two ocelli one at the base of the tail and one just ahead and above the origin of the anal. A lateral brown band reaches from the anal almost to the caudal ocellus where it may fork and join the caudal transverse brown band above or below. From the tip of the snout backward along the dorsum to the base of the tail is an area of brown minute dots. This area continues as a transverse band around the base of the tail and as a line on the lower edge of the caudal peduncle until it reaches the anal fin where it forks and proceeds to the vent. Sometimes each of these forks join a lateral band which faintly runs from the anal ocellus forward half-way to the pectoral fin. Then from the pectoral fin forward across the opercle and through the eye to the tip of the snout there is a faint suggestion of the lateral band of *Lucania goodei*. Between the brown areas and bands, on the belly and around the caudal ocellus are more or less sharp straw-colored areas.

We found this species in almost all the open prairies visited, in wooded waterways between islands, in cut-off ponds on the islands and in sphagnum areas. Its associates were *Gambusia affinis*, *Fundulus cingulatus* and *Fundulus nottii*. The discovery of this fine little fish in the swamp is one of the best fish records of the Okefinokee list.

Recently, the authors noticed two other records for this same species; one captured at Port Saint Joe, Fla., in Jan., 1917 (Aquatic Life, Mar., 1919, IV, No. 7, pp. 89, 90); and the other at a pond of Milltown, Ga. (tributary to Allapaha River) in May, 1919 (ibid., Jan., 1920, V, No. 1, p. 2). The first of these by Mr. W. W. Welch is synchronous with Mr. Harper's records in the Okefinokee Swamp for Dec. 26, 1916, Jan. 4, and Jan. 12, 1917; and the other by Dr. H. M. Smith is curiously from the same river system as Woolman's specimens of 1890 and our material of 1912-1917. It is interesting to note that these three records come from the three main tributaries of the Suwanee, namely: Allapaha (Smith, 1919), Santa Fe (Woolman, 1890), and source of main river of the Suwanee, the Okefinokee Swamp (Wright and Palmer, Harper, 1912-1917). In other words, the whole Suwanee river system has it and as yet it seems the center of its greatest abundance. Our account written sometime before the appearance of the two recent articles agrees very closely with and only amplifies Mr. Welch's description and his sketches represent our material of this species sufficiently to obviate the contemplated figures of this article.—A. H. Wright and E. L. Palmer.



Wright, Albert Hazen and Palmer, E L. 1920. "Notes on *Lucania omtnata* (Jordan)." *Proceedings of the Biological Society of Washington* 33, 183–185.

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