

FISHERIES RESEARCH BOARD OF CANADA

Translation Series No. 970

Occurrence of Anotopterus pharao Zugmayer
(Pisces, Scopeliformes) in the North Atlantic.

By A. I. Postolaki

Original title: Nakhodka Anotopterus pharao Zugmayer (Pisces,
Scopeliformes) v severnoi Atlantike.

From: Voprosy Ikhtiologii, Vol. 2, Issue 1(22), pp. 25-28, 1962

Translated by the Translation Bureau (ESM)
Foreign Languages Division
Department of the Secretary of State of Canada

Fisheries Research Board of Canada
Biological Station, St. John's, Nfld.

1968

In 1959, during a voyage of the scientific-search ship "Odessa", of the Murmansk fishery search group, in the Davis Strait, on two occasions a specimen of a very rare and little studied fish - Anotopterus pharao Zugmayer - was caught in the bottom trawl. The first specimen with a length of 75 cm was caught at the end of July at a depth of 250-350 m, and the second one, with a length of 82 cm, at the end of August at a depth of 180-275 m. Both specimens were males and were caught between 62°27' - 62°31' north latitude and 51°17' - 51°22' west longitude. The temperature near the bottom was about 4-5°. In the course of the 17th voyage of the expeditionary ship "Sevastopol" (August, 1960), two partly digested heads of this fish were found in the stomach of a cod, caught in the bottom trawl at Flemish-Cap bank (46°31' north latitude and 14°51' west longitude) at a depth of 340-375 m.

The species Anotopterus pharao was first described by Zugmayer in 1911 from a single specimen of 165 mm in length, taken in the Strait of Gibraltar, and allocated by him to a new family of Anotopteridae. In 1934 and 1935, Roule, based on a study of one 276 mm long specimen from the region of Madeira Island and five partially digested specimens ranging from 127 to 144 mm in length (without C) taken from the stomachs of tunnies, Thynnus alalunga, caught in the Bay of Biscay, advanced a hypothesis regarding the lack of originality of the species. He suggested that Anotopterus pharao Zugmayer should be regarded as an early stage in the development of Aphanopus carbo Lowe (Lepidopidae family) or an aberrant form. Subsequent study of this fish indicated that Roule's views were unfounded. In 1946 Nybelin pointed out that the absence of the dorsal fin and scales, as well as the weak skeletal

formation are not features of an aberrance (malformation), but are actually characteristics of the new family of Anotopteridae.

In addition to corroborating the originality of Anotopterus pharao Zugmayer, Nybelin described two further species of the genus Anotopterus - A. antarcticus and A. arcticus and brought into the genus Anotopterus the species previously described by Regan (Regan, 1913; Nybelin, 1946), Eugnathosaurus vorax vorax under the name of Anotopterus vorax (Regan). A. arcticus was described from a head, found in the stomach of an Atlantic halibut Hippoglossus hippoglossus in the Davis Strait and A. antarcticus - from a specimen taken from the stomach of a whale Balaenoptera physalus, caught in the Antarctic (Weddell Sea). Regan took the number of palatine and sub-maxillary teeth and dimensions of the fish to be its visible characteristics. Subsequent descriptions of Anotopterus found in the waters of the North Pacific, the North and South Atlantic and Antarctica (Hubbs, Mead and Wilimovsky, 1953; Marshall, 1955) made it possible to consider all the previously described species as one species - Anotopterus pharao Zugmayer. At the same time, however, Marshall admits that with the accumulation of sufficient material the allocation of independent sub-species (and even species) in the northern and southern hemispheres will be possible. He pointed out that for the southern forms in comparison with the northern ones, a larger quantity of vertebrae and palatal teeth is characteristic.¹

¹ The number of vertebrae and palatine teeth in the Antarctic and South Atlantic ones are 83 and 11-13 respectively; in the specimen from the North Pacific - 79+1 and 10-14; and in the North Atlantic specimens - 80-81 and 4-14 (according to Marshall).

The specimens caught by us are the very large individuals from the North Atlantic, as the sizes of all the previously described specimens did not exceed 342 mm (the known maximum sizes from the North Pacific are 873 mm and from Antarctica - 732 mm). Inasmuch as only the head of the Anotopterus from the Davis Strait was described (Nybelin, 1946), and we were the first to discover it on the Flemish-Cap bank, it is appropriate to give a brief description of the specimens caught.

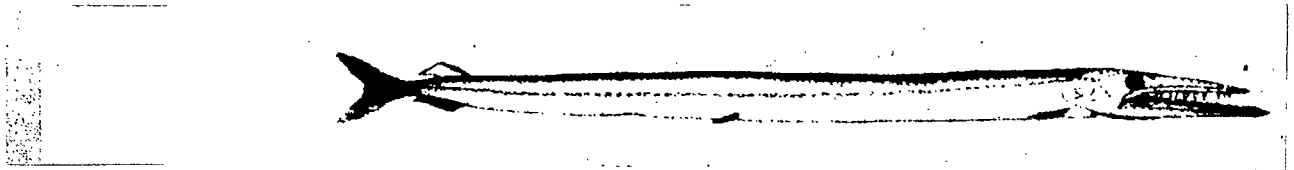


Fig. 1. Anotopterus - Anotopterus pharao Zugmayer. Length 73 cm. Davis Strait (sketch of original)

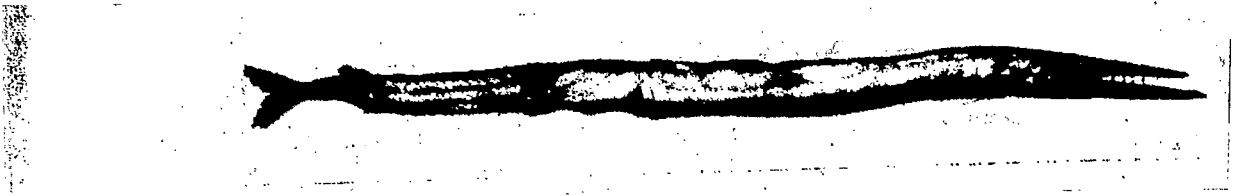


Fig. 2. Anotopterus - Anotopterus pharao Zugmayer. Length 73 cm. Davis Strait (photo of original)

In form and body markings the Anotopteri from the Davis Strait are indistinguishable from one another, but as the 87 cm long specimen was not preserved a description will be given using the 75 cm long specimen (after fixation - 73 cm; figs. 1 and 2),

A 14, P 13, V 9, r. br. - 6 - 7 vert. 78 (48+30)².

²In the 87 cm long sample, 78 vertebrae and 13 palatine teeth.

The body is elongated in shape, compressed from the sides. The head is large, the lower jaw extending forward in relation to the upper one (length of protrusion 15 mm). On the upper jaw there are about 60 small teeth. The teeth on the lower jaw point towards the back. They gradually increase in size, the length of the largest tooth being 5 mm. On the right side there are 14 teeth, and on the left 13. Besides the main row of teeth, on the lower jaw are some movable teeth, positioned on the inner side, and at the base of some of the teeth of the main row there are protuberances. The palatine teeth are flat and curved forward. Behind the third tooth on the palatine bone there is a free space, formed as a result of the loss of two or three teeth. There are 11 or 12 palatine teeth (taking into account those lost). The length of the largest tooth is 12 mm.

The arrangement of the digestive tract is highly unusual. The stomach which is protracted, extends far beyond the anal orifice (10 cm). The intestine does not form folds but emerges from the forward part of the stomach. There are many pyloric appendages. The anal orifice is located several millimetres behind the abdominal fins. There is no swim bladder. There are four branchial arches and a semi-gill. Behind the fourth branchial rib there is a small opening. There are no gill rakers. On the caudal peduncle are two cutaneous tail fins. Beginning at the adipose fin and extending along the back to the head section there is a strong pliable brace under the skin. The anal fin does not reach the first rays of the tail fin. A lateral line extends along the entire length of the body with brightly expressed pores. On the head there is a highly developed system of neuromasts. The scales are situated only on the lateral line. The lamella are very thin, oval-oblong in shape, and deeply sunk into the skin. They are

about 4-5 mm long and 1.5-2.0 mm wide. The colour of the back, tail fin, branchial membranes and forward part of the mouth is dark. The flanks and belly are almost colourless, having a lightly iridescent hue. The iridescence also extends to the back.

Measurements as a percentage of overall body length are: length of head to end of lower jaw 23.3; maximum body height 6.8; height of body at thoracic fins 5.5; distance from end of mouth to beginning adipose fin 87.0, to the beginning of A 85.0, to the base of P 22.2, and to the base of V 57.5; length of P 5.7; length of V 3.0; base of adipose fin 2.7; base of A 5.5; length of caudal peduncle 3.4; height of caudal peduncle 1.7; horizontal diameter of eye socket 2.1; length of head section behind eye sockets 7.3; width of inter-ocular space 1.5; length of mouth 14.0; length of upper jaw 14.0; length of lower jaw 15.7. Measurements as a percentage of the length of the head are: horizontal diameter of eye socket 9.4; head section behind eye sockets 30.5; width of inter-ocular space 6.5; length of mouth 59.6; length of upper jaw 59.9; length of lower jaw 65.0.

The Anotopterus heads found in the stomach of a cod on the Flemish-Cap bank belonged to fish of not less than 70 cm in length. As one of them was largely digested all the measurements happened to refer to the more fully preserved one (length of head 17 cm). The measurements are given as a percentage of the head length: horizontal diameter of eye socket 9.7; inter-ocular space 6.0; length of upper jaw 57.0; length of lower jaw 63.0. There were 13 palatine teeth, the third and fourth teeth being straight and directed backwards, the remaining ones curved and directed forward. Length of largest tooth 13 mm. On the lower jaw there were 15 teeth. They were all directed backwards. The otoliths were very small and flat. The annual rings were well marked (in transmitted light). On the otolith of

one fish were twelve rings, and on that of another 15 (the Flemish-Cap specimens). On a scale taken from the rear part of the body of the specimen from Davis Strait, 12 rings were traced. It can be assumed (if these rings on the scale and otoliths are the result of seasonal changes in the rate of growth) that the fish measuring 70-75 cm are about 12 to 15 years of age.

In comparing the head of the Flemish-Cap specimen with that of the specimen from the Davis Strait we were unable to detect any essential differences between them.

In this article we are not proposing to make a review of all the previously described specimens of Anotopterus from the different areas of the World's oceans. We would point out only that the minimum number of vertebrae in the Anotopterus specimens from the Davis Strait corroborates the hypothesis advanced by Marshall regarding the independence of the northern and southern forms.

The distribution of Anotopterus has as yet been poorly studied. Occurrences of this fish have been reported from sub-tropical, temperate, sub-arctic and antarctic regions of the World's oceans, but have not been noted in the tropical regions, in connection with which a hypothesis was advanced regarding the cosmopolitan bipolar distribution of Anotopterus (Hubbs and others, 1953). Such a widespread distribution of the Anotopterus renders its discovery in tropical waters a distinct possibility (Marshall, 1955). The discovery of an 8 cm long Anotopterus in the Davis Strait (Kotthaus and Krefft, 1957) indicates that both adult and young individuals can be encountered in the high latitudes. The temperature range in which the Anotopterus has been found is very wide. It extends from 2° to 24°. The vertical distribution of Anotopterus has also been little studied. The small number of specimens caught at great depths by fishing gear such as the bottom set line , the non-closing net and the bottom

fishing trawl does not provide a basis for considering this a deep-water fish, as they can be caught both when lowering and raising the fishing gear. On the contrary, the discovery of Anotopterus in the stomachs of a whale, a tunny and a lancet fish (Alepisaurus ferox Lowe) as well as their capture in drifting nets³ tends to indicate that this fish is an inhabitant of surface water layers. The markings of the Anotopterus are also characteristic of fish living in the upper water layers. Marshall considers that in the antarctic waters Anotopterus lives most of the time at a depth of 100 m.

Anotopterus is a typical predator (the character of the teeth, absence of gill rakers, the capacious stomach; and straight intestine), apparently feeding exclusively on fish. In the stomachs of Anotopteri caught in the Davis Strait were some freshly swallowed Paralepis coregonoides borealis Reinhardt - in one of them three, and in the other two specimens of 28 to 30 cm in length. In the stomach of an Anotopterus from the Ross Sea (Marshall, 1955) there were two Notolepis coatsi Dalle with lengths of 18 and 27 cm.

Received 12 December 1960.

Bibliography

Hubbs, C.L., Mead, G.W. and Wilimovsky, N.J. 1953. The widespread, probably antitropical, distribution and the relationship of the bathypelagic Inimous fish Anotopterus pharao. Bull. Scripps Instn Oceanogr. Univ. Calif., v. 6.

³ There are indications (Hubbs et al., 1953) that each salmon fishing season the Japanese fishermen catch up to 10 specimens of Anotopterus in their drifting nets.

- Kotthaus, A. und Krefft, G. 1957. Fischfaunenlisten der Fahrten mit F.F.S. "Anton Dohrn" nach Island-Grönland Mai (Juli und September) Oktober 1955 einschliesslich eines kleinen ostgrönlandischen Materials bathypelagischer Fische, gesammelt von Dr. Hermann Einarsson Reykjavik (Oktober 1954 - Januar 1955). Ber. Dtsch. wiss. Kommiss. Meeresforsch., Bd XIV, H. 3. Stuttgart.
- Marshall, N.B. 1955. *Alepisauroid fishes*. Discovery, Rep., v. 27. Cambridge.
- Nybelin, O. 1946. Sur quelques especes du genre *Anotopterus* Zugmayer et sur la position systematique de la famille des *Anotopteridae*. Göteborgs vet. och vitter-hets-samhäl. handl., Ser. 6, 5b, No. 1.
- Regan, C.T. 1913. Ann. Mag. Natur. History (8), v. XII, p. 117
- Roule, L. 1934. Poissons et le monde vivante des eaux (t. VII). Paris - 1935. Nouvelles observations sur un poisson abyssal (*Anotopterus pharao* Zugm.) Bull. Soc. zool. France, v. 60. Paris.
- Zugmayer, E. 1911. Poissons provenant des campagnes due yacht Princesse Alice (1901 - 1910). Res. Camp. Sci. Monaco, Fasc. 35.