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Some new data on the distribution of the *Arnoglossus rueppelli* (Cocco, 1844) in the Adriatic sea (Pisces, Heterosomata, Bothidae)

Novi podaci o rasprostranjenju *Arnoglossus rueppelli* (Cocco, 1844) u Jadranskom moru (Pisces, Heterosomata, Bothidae)

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On the basis of the data on the records of the adult specimens of the species *Arnoglossus rueppelli* in the Adriatic (Šoljan, 1948; Merker and Ninčić, 1973; Jardas and Županović, 1980) published up to now, this rather rare Adriatic species of *Bothidae* family vas held to inhabit exclusively a limited area of the southern Adriatic along the margin of the South Adriatic Pit at muddy bottoms between 110 and 300 m depths. This paper reports some new records of this species from other Adriatic areas on the basis of which now its horizontal distribution is known to be much wider. Larval stages records are reported in addition to the adult ones.

After the earlier contribution to the knowledge of the species *Arnoglossus rueppelli* in the Adriatic was published (Jardas and Županović, 1980), in which, among the others, the data on some earlier records of adult specimens were given, we found among the unpublished data on an hour experimental houls of the depth trawls on the area of the open central Adriatic in 1960 some new records of this species at Stations 89, 95 and 110 of the »Hvar« Expedition (Fig. 1).

These findings are exactly as follows:

Station 89. Coordinates: 42°49'N and 15°55'E, depth: 154—156 m, bottom: loam, date of record: Jan. 21, 1960. A male of 13.0 cm in total length was caught.

Station 95. Coordinates: 42°29,5'N and 16°00'E, depth: 137 m, bottom: clay, date of record: Jan. 23, 1960. A male of 6.6 cm in total length was caught.

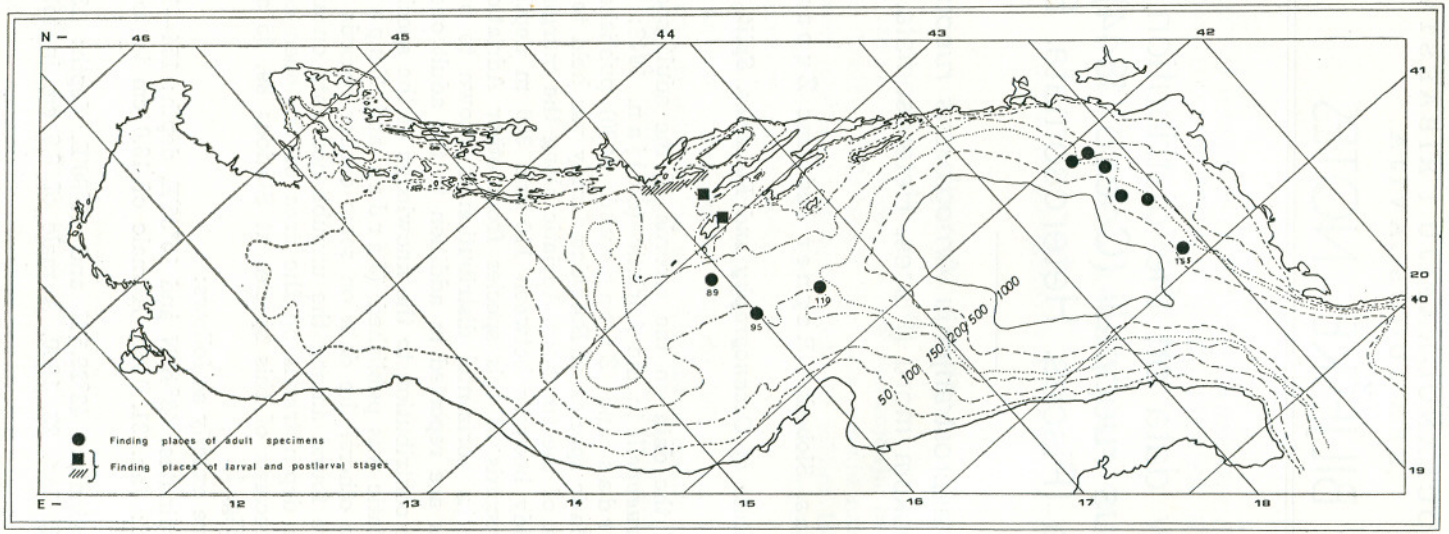

Fig. 1. Finding places of larval, postlarval and adult specimens of the *Arnoglossus rueppelli* in the Adriatic.

Station 110. Coordinates: 42°22'N and 16°32'E, depth: 166—168 m, bottom: sand, date of record: Jan. 20, 1960. Eigth individuals (6 males and 2 females) of total body length range 9.2—12.8 cm were caught.

Data on coordinates, depth and sediment texture at the stations are given after O. Karlovac (1956). They were recorded during »Hvar« Expedition and they were not sampled again during these experimental hauls.

In addition to the *Arnoglossus rueppelli* species, *A. laterna* (Walbaum, 1972) was the only species of fam. *Bothidae* caught at all three stations; thus that 25 specimens were caught from Station 89, 5 from Station 95 and 4 from Station 110. During these samplings as well as during the earlier ones, of the other Heterosomata fishes, there were caught the following (in sequence by numerosity): the species of genus *Lepidorhombus* (*L. whiffiagonis* /Walbaum, 1792/ and *L. boscii* /Risso, 1810/) and *Citharus macrolepidotus* (Bloch, 1787) as almost regular, then *Microchirus variegatus* (Donovan, 1808) and *Arnoglossus thori* Kyle, 1913 as considerably rare.

Arnoglossus rueppelli was recorded from all three bottom types: loam, clay and sand. Up to now, all the individuals have been recorded between 110 and 300 m depths. Tortonese (1975) states that this species mainly inhabits bottoms at 200 m depths. Nielsen (1973) gives in general the 300—500 m depth (questionable). Bini (1968) gives some data in more detail. After this author *Arnoglossus rueppelli* inhabits mainly at 200—500 m depth with the preferential depths of 300—450 m. Dieuzeide *et al.* (1954) state that this species inhabits the trawling bottoms of the continental shelf down to 500 m depth. Our data from the Adriatic show that the upper and lower limits of vertical distribution of this species are somewhat lower than those stated from the other Mediterranean parts.

Up to now, 61 adult specimens were caught in the Adriatic. The material from the Montenegro coastal area of 1961 and this one from the open central Adriatic from 1960 included 15 males and 5 females. This sex ratio (3:1) indicates that this species population might be predominated by males.

The species *Arnoglossus rueppelli* was for a long time, according to Padoa (1931—1956), known only in a postlarval form. The first who described postlarvae of this species by the name of *Peloria rueppelli* was Cocco (1844), after Padoa (1931—1956). Kyle (1913) described the metamorphosing specimens and Fage (1918) the juvenile ones. Finally, only two adult specimens, caught by Dollfus and Bertin were described by Chabanoud (1932) by the name of *Dolfussina rueppelli,* after Padoa (1931—1956).

From the specimens collected by the »Thor« expedition, Kyle (1913) has described the distribution of A. *rueppelli* postlarvae in the Mediterranean. He found them at eleven stations, mostly in the Western Mediterranean and eastward of Sicily, and at one station in the Gulf of Corinth. Although the »Thor« expedition collected material at the two stations in the Adriatic (in the Straight of Otranto and above south Adriatic Pit), Kyle did not find *A. rueppelli* postlarvae there. So, the first who found postlarval forms of this species in the Adriatic was Karlovac (1967). She listed *A. rueppelli* postlarvae among the species found near the eastern coast of the central Adriatic but »seulement pour l'aire des eaux côtières de l'Adriatique moyenne ouvertes vers le large«. She did not give any data on the quantity and length of the found specimens, neither of any precise station where they were found.

M st recently, *A. rueppelli* postlarvae were found in the central Adriatic in the material collected at the transversal profile in the level of Split. Three stati ns were situated at this profile. The first one, Stončica (43°00'N; 16°20'E) lies 4 NM southeasterly from the Cape Stončica of the island of Vis above the depth of 107 m. The second station, Pelegrin (43°12'N; 16°19'E) is in the vicinity of Cape Pelegrin of the island of Hvar, above the depth of 78 m. The third station, Kaštelanski zaljev (43°31'N; 16°22'E) lies in the bay of the same name, above 42 m of depth. Long-term investigations of temperature, salinities, current systems etc., show that Stončica station is mostly affected by the open sea, while Pelegrin is partly under the influence of the open sea and partly of the coastal waters. The station Kaštelanski zaljev is characteristic for the closed coastal areas, affected by immediate mainland, river inflow and underwater springs (B u l j a n and Z o r e - A r m a n d a, 1979).

The plankton at these station was colected once a month from January 1971 to December 1979, by vertical hauls of »Helgoland« planktonic net (mouth area 1.6 m^2; mesh size 0.516 mm; towing speed 1 knot). All ichthyoplankton objects were sorted out, determinated up to the species and the standard length (LS) of all larvae and postlarvae was taken. The key given by P a d o a (1931—1956) has been used to determine the postlarvae of the family *Bothidae*. According to this key, *A. rueppelli* postlarvae have the following specific characters:

I *Postlarval stages before the differentiation of the interspines* (Fig. 2).

— There are no black pigment spots at the end of the urochord, or they are very small in number and size

— The board postanal black pigment bar is situated between 21st and 25th caudal myomere

— There are no spines at the abdominal edge of the body

II *Postlarval stages after the differentiation of the interspines*

— D. 106—119; A. 84—96; vert. 10 (11) + (33) 34 (35)

The following postlarvae of the family *Bothidae* were found at the profile:

Station:	Stončica	*Bothus podas podas* (Delaroche, 1809)
		Arnoglossus laterna (Walbaum, 1792)
		Arnoglossus thori Kyle, 1913
		Arnoglossus rueppelli (Cocco, 1844)
	Pelegrin	*Arnoglossus laterna* (Walbaum, 1792)
		Arnoglossus thori Kyle, 1913
		Arnoglossus rueppelli (Cocco, 1844)
	Kaštelanski zaljev	*Arnoglossus laterna* (Walbaum, 1792)
		Arnoglossus thori Kyle, 1913

As it can be seen from the given list, *A. rueppelli* postlarvae were found at the stations Stončica and Pelegrin, *i. e.* only at the stations affected by the open sea. This is obviously the consequence of the distribution of adults, which were found at the bottom of the open sea within the depths of 110—300 m. So, postlarvae drifted by currents could be expected at the stations affected by the open sea. It is obvious that the area where we found the postlarvae

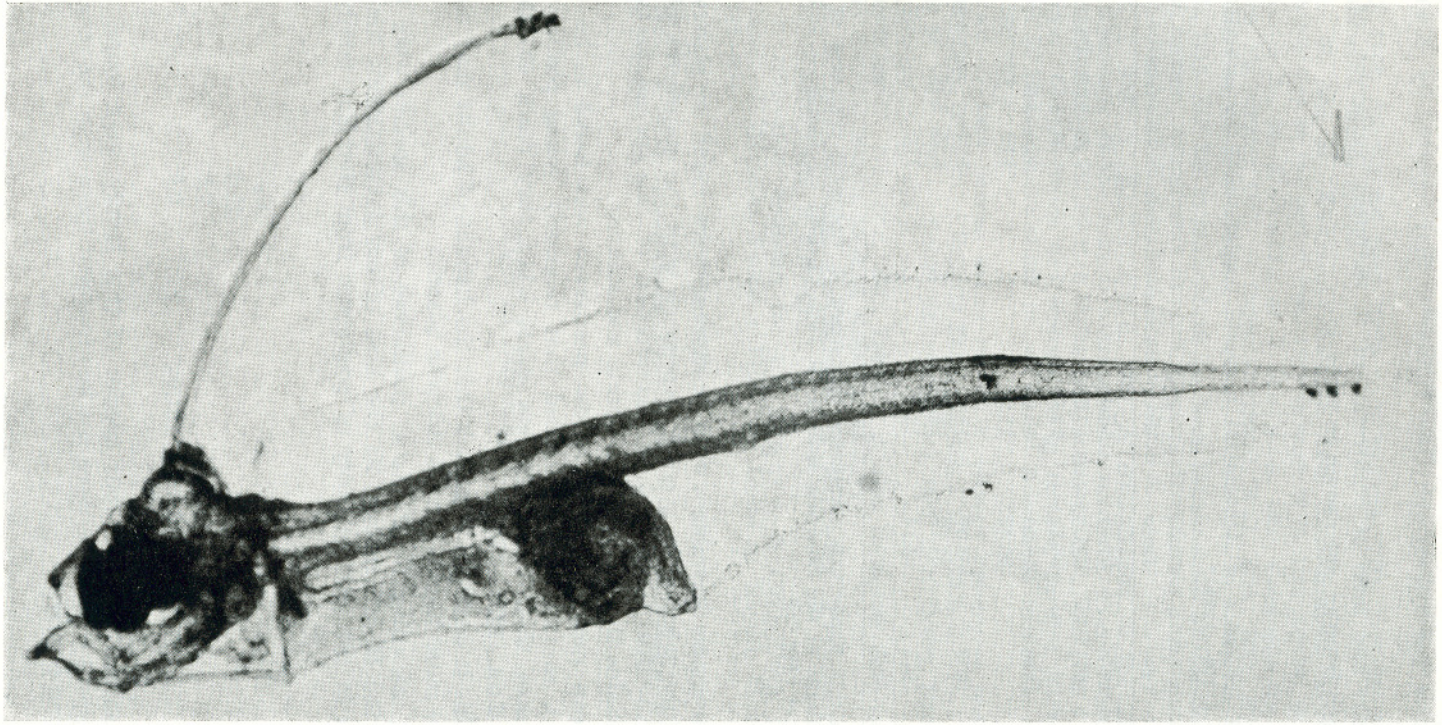

Fig. 2. Postlarva of *Arnoglossus rueppelli* (5.14 mm LS; Stončica, July 25, 1981).
Foto: M. Alajbeg

of this species was hydrographycally similar to that reported by K a r l o v a c (1967).

The place and time of occurrence of *A. rueppelli* postlarvae, as well as their standard lengths, are shown in table 1:

Table 1. The occurence of *Arnoglossus rueppelli* postlarvae at the investigated profile (1971—1980)*

Station	Year	Date	Hour	Nr. of postlarvae	LS (mm)	$\bar{y}$
Stončica:	1973	03.13.	18.00	1	5.25	(5.25)
	1975	03.03.	17.40	3	3.49, 3.56, 3.90	3.65
		06.21.	12.54	2	4.80, 5.63	5.21
	1976	05.20.	09.20	2	3.00, 3.30	3.15
		06.09.	11.00	1	4.88	(4.88)
Pelegrin:	1973	06.07.	13.40	1	3.94	(3.94)
		07.19.	18.25	2	5.25, 5.25	5.25
	1975	04.14.	15.45	1	3.00	(3.00)
			Total	13	Total mean	4.25

* Just when this paper was completed one more *A. rueppelli* postlarva of 5.14 mm LS was caught at the Stončica station on July 25, 1981 by Bongo — 20/0.250 mm plankton net (Fig. 2).

As it is shown in table 1, the postlarvae were found in plankton from March to July, what is in a good accordance with the statements of K y l e and P a d o a that the period of reproduction of this species in the Mediterranean attains the maximum in spring and summer.

The mean standard length of the postlarvae was found to be 4.25 mm LS (Tab. 1.), so it can be concluded that relatively young postlarvae were cought, because their metamorphosis starts when they reach 40—45 mm in length (P a d o a, 1931—1956).

From this it could be supposed that the habitat of adults may not be too far from the outer line of central Adriatic islands.

Finally, according to P a d o a, postlarvae of this species were found to be rare in the Mediterranean. At the area of our investigations the ratio of *A. rueppelli* to the total quantity of postlarvae from *Bothidae* family was as follows:

Station	%
Stončica	25.0
Pelegrin	7.0
Kaštelanski zaljev	0.0

As at station Stončica four species of this family were found, it seems that *A. rueppelli* postlarvae were not less frequent there than the other species from the same family.

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NOVI PODACI O RASPROSTRANJENJU *ARNOGLOSSUS RUEPPELLI* (COCCO, 1844) U JADRANSKOM MORU (PISCES, HETEROSOMATA, BOTHIDAE)

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KRATAK SADRŽAJ

U radu se iznose novi podaci o rasprostranjenju plosnatice *Arnoglossus rueppelli* (Cocco, 1844) u Jadranskom moru na temelju nalaza larvalnih stadija na transverzalnom profilu u srednjem Jadranu tokom 1971—1980. i adultnih primjeraka na postajama 89, 95 i 110 »Hvar« ekspedicije na kočarskim dnima u srednjem otvorenom Jadranu tokom 1960.

Vrsta *Arnoglossus rueppelli* nađena je do sada u Jadranu (ukupno 61 adultni primjerak) na dubinama od 110 do 300 m na ilovastim, glinastim i pjeskovitim dnima. S obzirom na sve dosadašnje nalaze ove vrste u Jadranu izgleda da naseljava samo njegov središnji i južni dio (južnije od kotline Jabuke).

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