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Distribution of the larval stages of Branchiostoma senegalense in the waters of the North West African shelf

by

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The material for this paper was collected during the years 1967 , 1973 on three survey cruises conducted by the m/t "Wieczno" and m/s "Turlejski", each cruise being in a different year,season and region, as shown in Tabel I.

Tabel I.

Year	Period	No.of samples	Area penetrated	Ship
1967	18.6.- 4.8.	47	21°21'N - 07°17'N	m/t "Wieczno"
197o	4.2.- 4.3.	71	24°16'N - 12°49'N	m/t "Wieczno"
1973	12.11.-7.12.	19	31°57'N - 16°04'N	m/s "Turlejski"

The investigations covered the shelf waters outside the territorial waters of the coastal states /Thus usually at ~~xxxxxxxx~~ at depths from 20 to 30 m/, several samples were taken from the continental slope /depth 800 to 3600 m./.

The greatest number of sampels was taken in February 197o from depths of 30 to 120 m. The stretch of shelf covered by the investigation in all 3 cruises, representative for 3 seasons was between 21°21'N and 16°04' N.

The samples were taken by means of a Hensen plankton net /diameter of opening : 75 cm., mesh No. 3xxx/, carrying out vertical hauls from the bottom to the surface, or from loo m. to the surface at the stations where the depth exceeded 15o m.

The Branchiostoma comprise an essential element of the fauna

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on the North West African shelf, both as regards density and the role played as food for fish, in particular those which are periodically or regularly plankton-feeding. For example, they were found in large quantities in the stomachs of mackerel /Scomber colias/ and horsemackerel /K.Wiktor,1967/.

So far, however, the main subject of interest has been the mature stages of the Branchiostomae inhabiting the bottom water layer. The only information concerning the larval stages of pelagic Branchiostoma from this region, was given by Gosselck /1973/.

There are several species which occur along the coast of North West Africa, and which Webb /1956/ divides into two subgroups:
the first includes 4 species, closely related to each other and inhabiting the warm waters of the Guinea Current /Branchiostoma africae, B.nigeriense, B.takoradii and B.leonense/,
the second - is represented by only one species : Branchiostoma senegalense, which occurs in the cold waters of the Canary Current, common along the coast of Senegal.

Gosselck /1973/, when investigating the distribution of both mature and larval stages of the Branchiostomae from the North West African shelf, observed that B.senegalense was the only species occuring aling the whole coast of Senegal and futher north to 26°N. His observations cover,however, the stretch of shelf between Cap Yubi and the River Gambia estuary and are limited to 3 months : September and November 1970 and April 1971. One could expect, nevertheless, to find the larval forms of 2 other species south of Dakar : B.takoradii and B.leonensis, for which there is no data regarding their periods of reproduction, in literature.

The material collected contained almost exclusively, the larvae of only one species: Branchiostoma senegalense. In one additional sample, taken in February 1969, in the region of the River Gambia estuary, a small quantity of pelagic stages of another, unidentified species, was found.

It can be stated from the material collected, that the larvae of B. senegalense inhabit the stretch of shelf from 11°11'N to 23° N throughout almost the whole of the year. The are, however, considerable fluctuations in both numbers and range, depending upon the seadon. During the summer months /June - July/ they only occur in the region of Cap Blanc and south of the mouth of the Gambia River. Their numbers were modest during this period, not exceeding 250 per sq.m.,usually fluctuating between several and a

hundred or so per sq.m. They mainly concentrated at depths of 6o to 9o metres.

In November and December, the larvae of B.senegalense only occurred in two samples from the region of Cap Blanc, in the same depth ranges, the density was greater, however, and amonted to 4oo to 6oo per sq.m. Conducting inverstigations in November 197o, Gosselck also found the greatest concentrations of larvae from this species in this region. He gives the range of distribution as being from 22°N to 17°N. In our material from November 1973, B.senegalense larvae did not occur beyond the region of Cap Balnc.

Most numerous were the larvae of B.senegalense in samples taken during the winter period, when they ~~alsoxthe~~ were also the most widely distributed /from 22°N to 12°N/. At that time, they form the greatest concentrations on the stretch of shelf from Cap Timiris to St.Louis /Fig.1/, where the density reached 2.5oo per sq.m. They were found in waters at depths from 2o to 3.6oo m, the most numerous being at depths from 6o to 12o m. A characteristic feature is that in the northern part of the region, they are most numerous in the shallower waters / 6o to 9o m./, to te south - in deeper waters / 9o to 12o m./. The moving of concentrations of Branchiostomae to the deeper waters further south, is probably related to the thermal differences of the coastal waters - the temperature of surface water increase towards the south.

An interesting feature is the finding of the single larvae in samples taken beyond the continental slope, in waters with depths of 2.ooo to 3.6oo m. For example, in a sample taken 14.2.7o, at 17°11'N, depth 2.2oo m., 1 larva was found, in the sample taken 16.2.7o at 14°51'N depth 3.6oo m. - 4 larvae, in another taken the same day at 14°34'N, depth 298o m. - 1 larva. These larvae were most probably carried by the currents to the open sea, from the place where they hatched. During this period, the larvae of Branchiostoma may be carried from their hatching place by both the Canary Current, the range of which reaches its southernmost limit at that time, and the movement of water due to upwelling.

Mature forms of Branchiostomae usually inhabit the shallow waters, forming numerous concentrations on the sandy shoals. According to Gosselck, the biggest concentrations are formed between 22°N and 26°N, also between 18°N and 2o°N, smaller - in the region of Cap Timiris. It is here that they also hatch. /Fig. 2/. The greatest intensity of reproduction according to the abovementioned author, is during the period April to June for the northern populations, and October

to November for the southern populations. It is therefore probable that the larvae found in June and July 1967 were from the spring reproduction period, and the large concentrations observed in February - from the autumn reproduction period. The difference in the reproduction period between the northern and southern populations, can also explain the fact that no Branchiostoma larvae were found in sampels taken north of 22°N in the autumn and winter. When the samples were taken, the young Branchiostomae had already undergone metamorphosis and taken to inhabiting the bottom.

An analysis of the length frequency distibution of Branchiostoma larvae populations, showed that in June, this frequency was : 0,6o to 0,75 cm /mean: 0,65 cm./; in February: 0,6o to 1,o cm. /mean: 0,85 cm./; in autumn: 0,65 - 0,95 cm /mean: o,8o cm./. /Fig. 3 a -c/. It can thus be seen that the larvae of Branchiostomae taken in February are longer than those taken in June. This difference is due to te fact that the specimens caught in February propably originate from the October - November reproduction period and are therefore older than those caught in June which originate from the April -June reproduction period, It cannot be precluded that due to termal differences / a lower water temperature during the winter/, the pelagic larval stage may also be longer. It has laso been found that in February, the mean length of larvae from the section of the shelf which stretches north from Cap Timiris region is slightly less than the mean length of larvae from the section of the shelf which streches south from Cap Timiris / 0,76 - 0.8o cm and 0,81 - 0,85 cm. respectively/.

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List of illustrations :

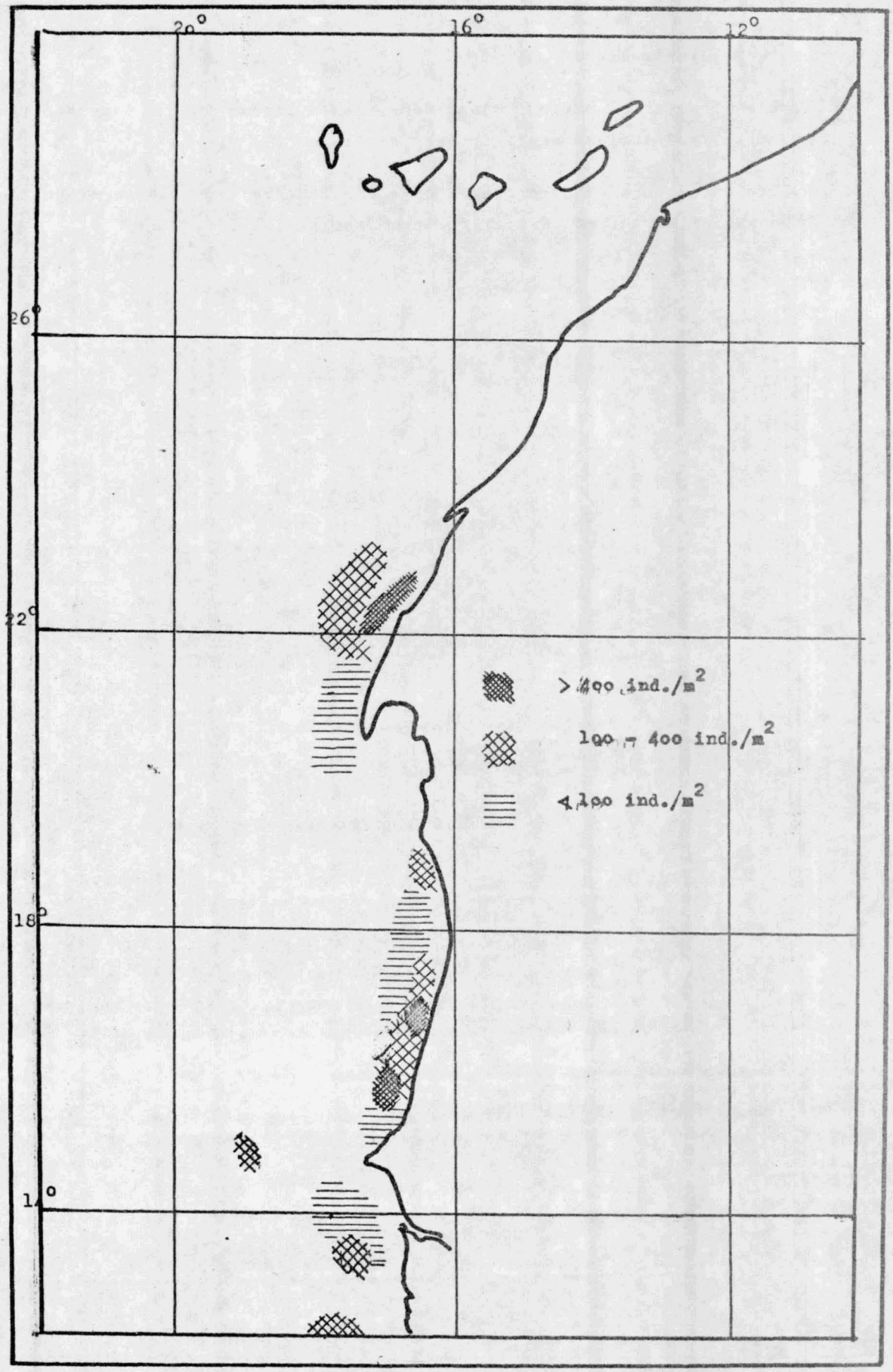


Fig. 1.

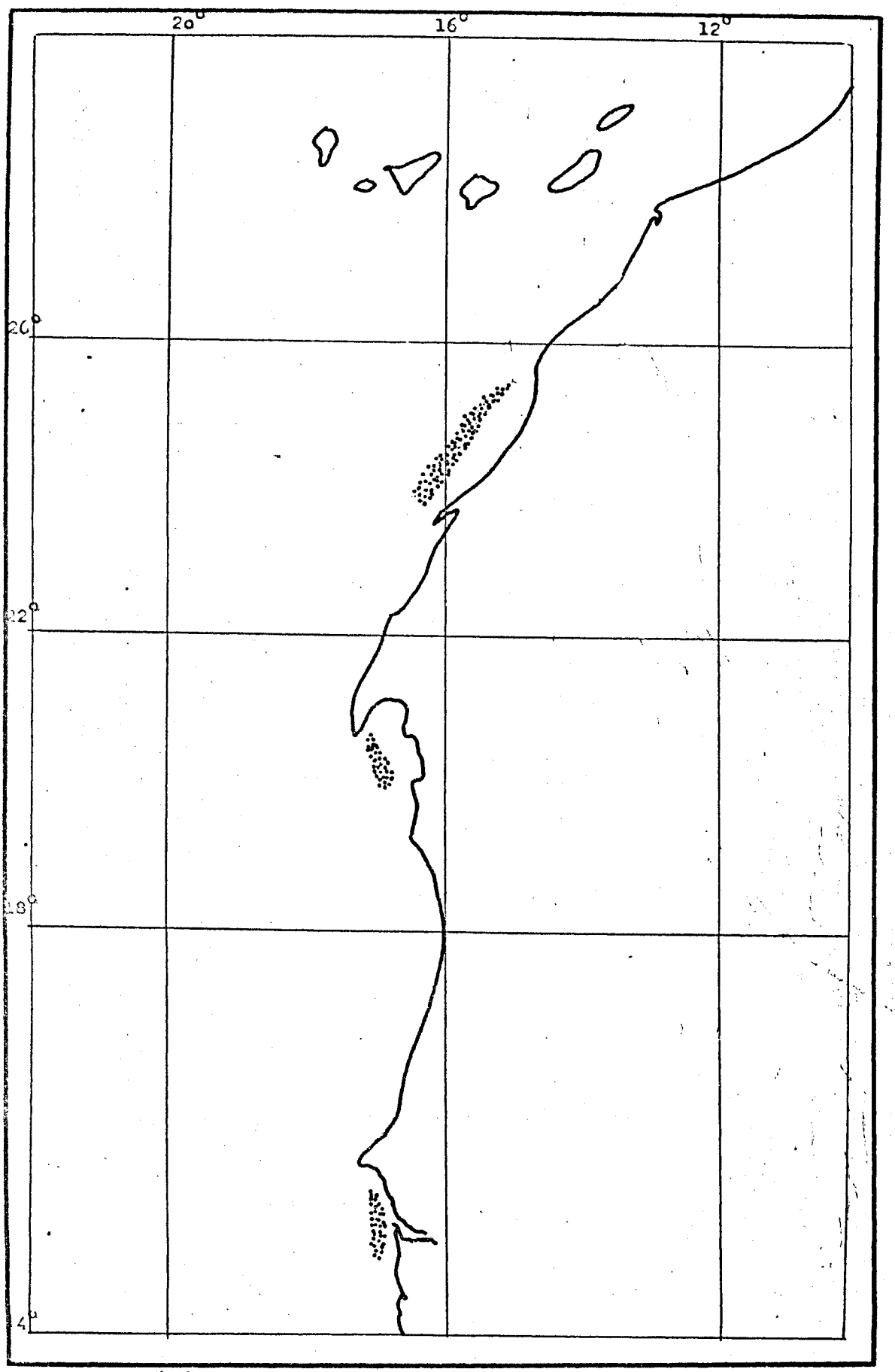


Fig. 2

Fig. 3 a_1

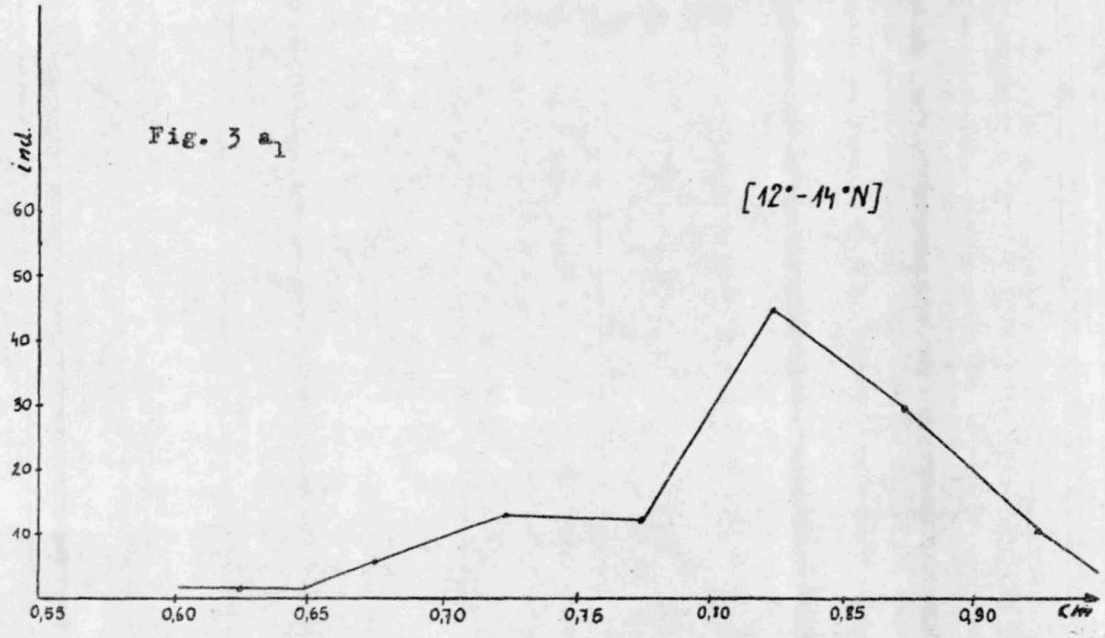


Fig. 3 a_2

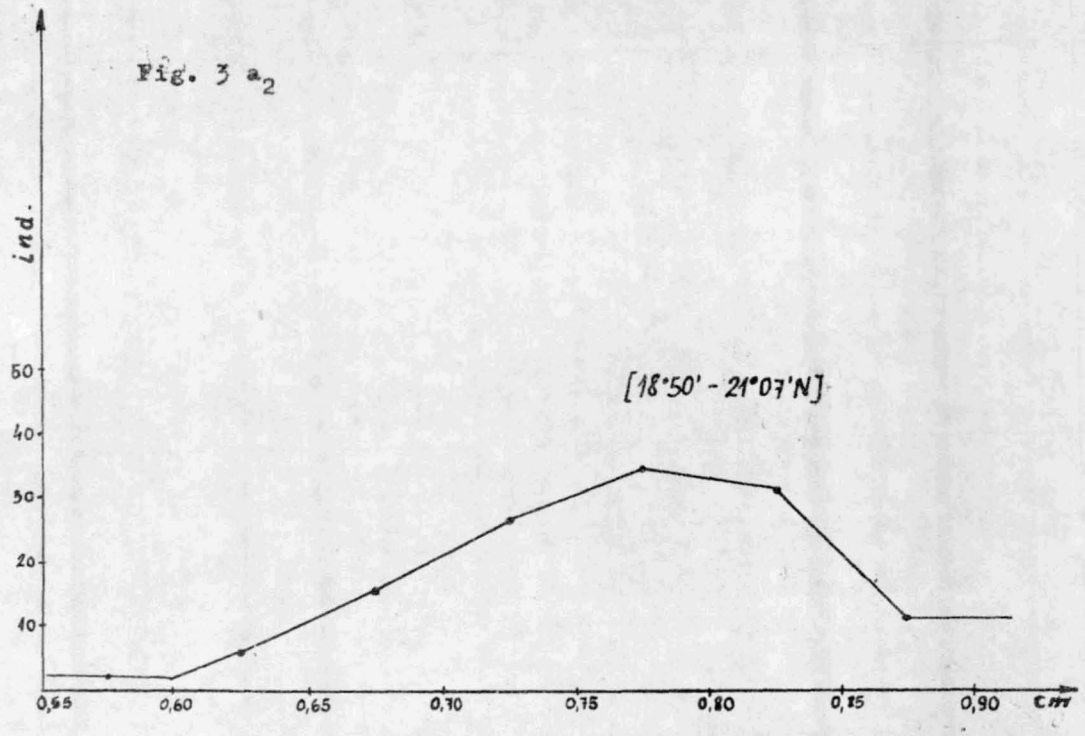


Fig. 3 a

[16°20'-17°50'N]

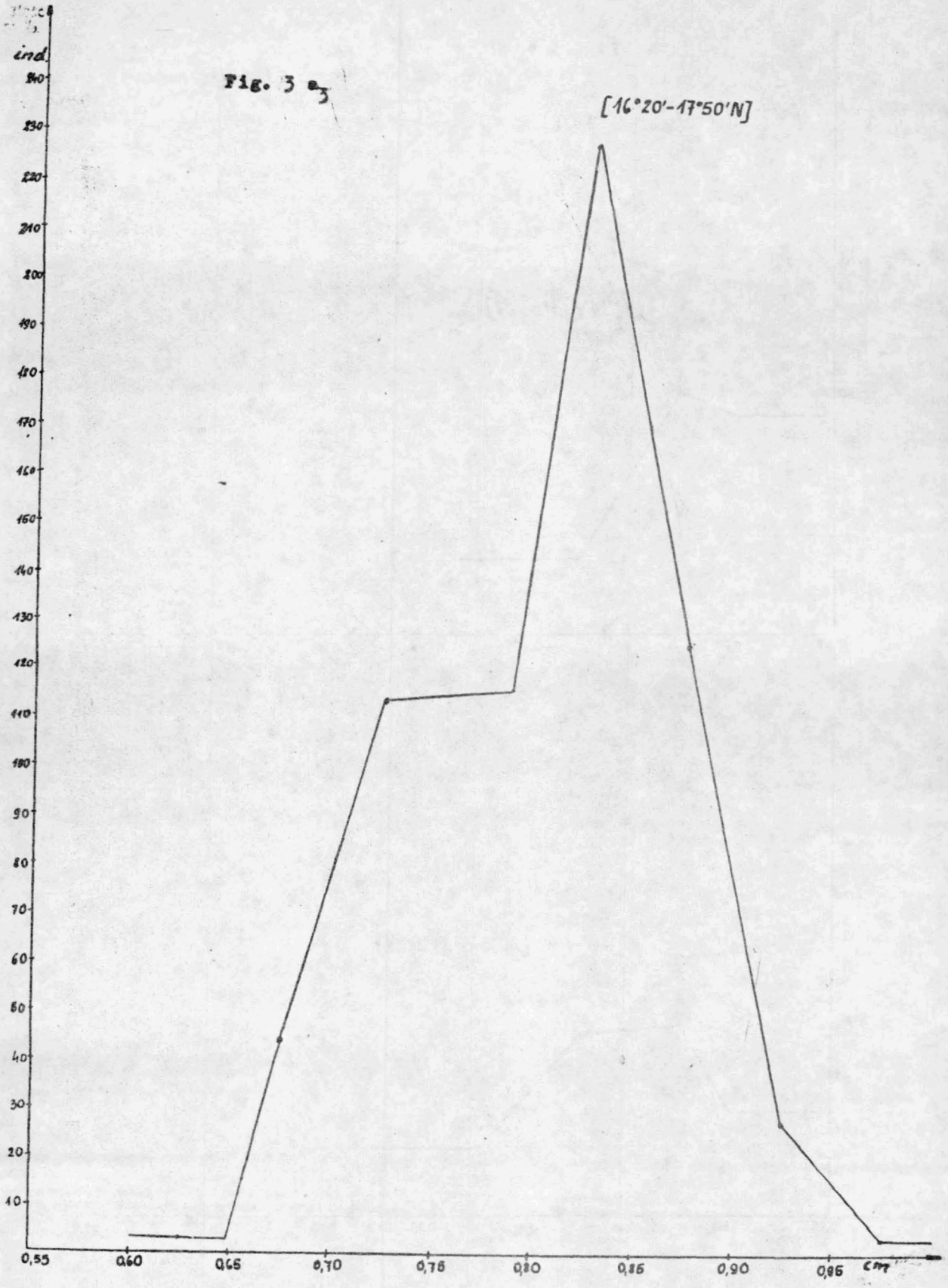


Fig. 3 b_1

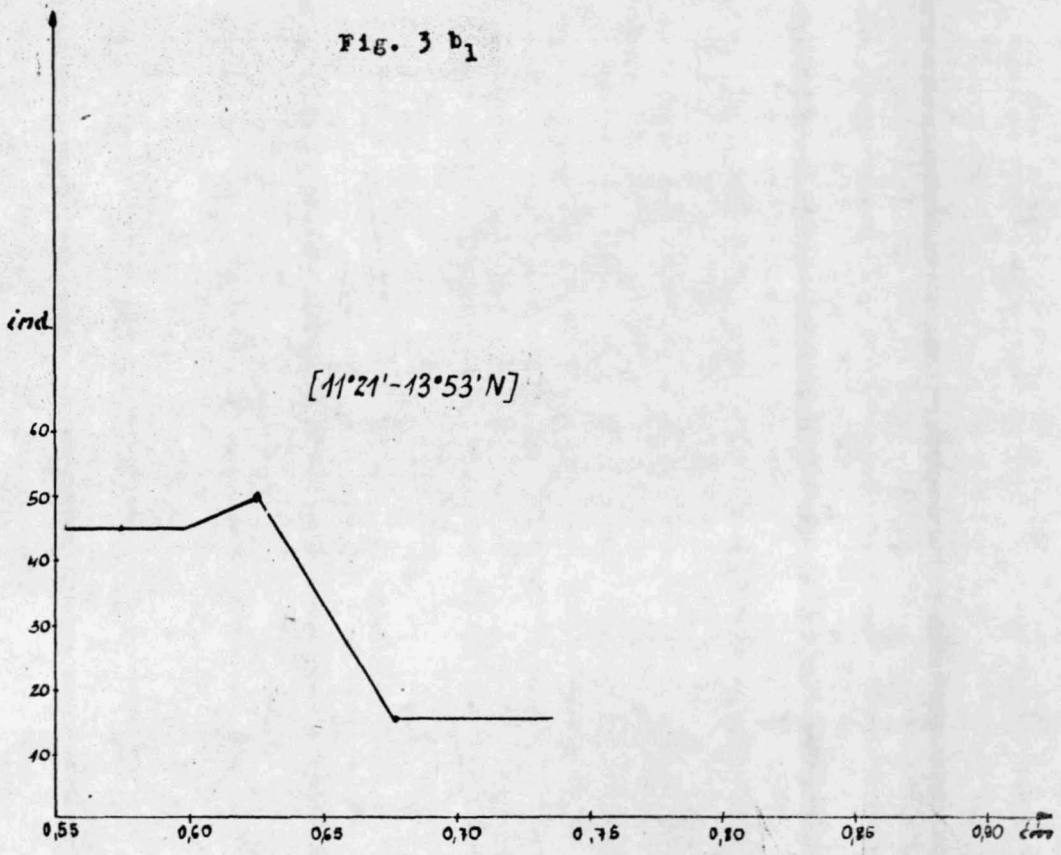


Fig. 3 b_2

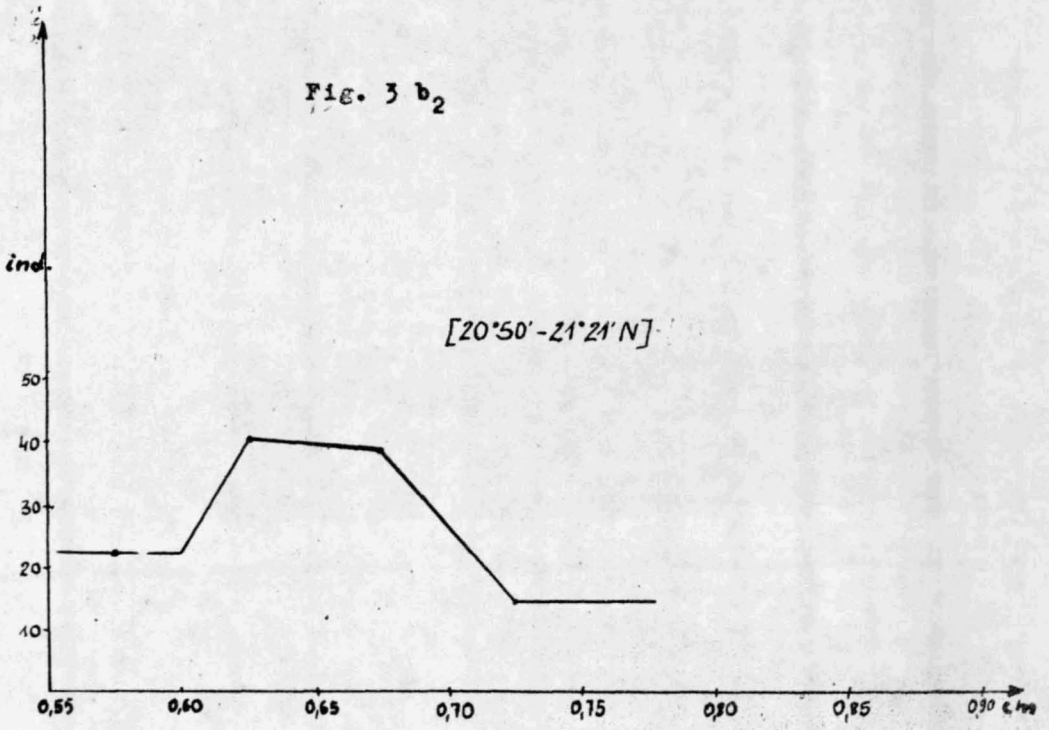
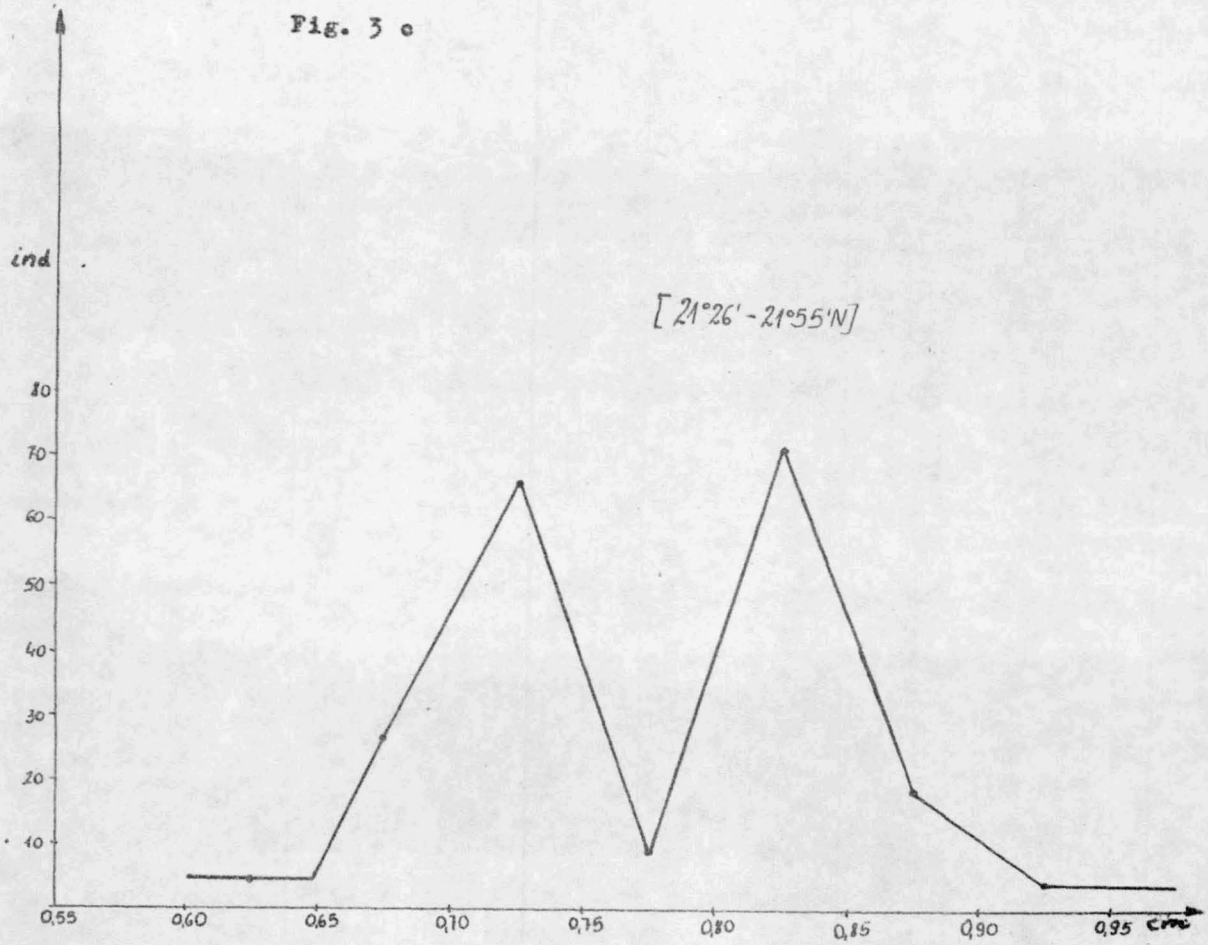


Fig. 3 c


ind.
[21°26' - 21°55'N]
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