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STUDIES ON THE FRESHWATER CRAYFISH (ASTACUS LEPTODACTYLUS ESCH. 1823) IN ANATOLİA

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Summary The export of freshwater crayfish from Turkey to the various countries of Europe increased in recent years (It amounted to 2,5 million dollar in 1975).

A research has not been made exactly yet on the taxonomy, the distribution and the species and subspecies of crayfish in Anatolia. The only species is Astacus leptodactylus Esch. 1823 which is widely distributed in Anatolia.

We are anxious of the decreasing of the production due to over catching, water pollution and agriculturel irrigation.

But we have begun to study on the biology, culture, and plantation of Astacus leptodactylus Esch. in order to increase the production.

Introduction

Freshwater crayfish takes an important place among the water products of Turkey. It has been of great profit to the economy of country, especially as the demands from Europeans countries has been increasing in recent years.

Domestic consumption is very little in Turkey. But it has been consumed very much in European countries, especially in France, Sweeden, Germany, and İtaly. Only 632 tons of it was exported to Sweeden. The amount exported to foreign countries has remarkably increased since 1970 (Fig. 1).

1970: 785 tons 1971: 1347 tons 1972: 1848 tons
1973: 1506 tons 1974: 1360 tons 1975: 1247 tons

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Distribution

Crayfish is naturally and widely distributed in lakes, ponds, and rivers in different parts of Turkey.

The only species is Astacus leptodactylus Esch. 1823, In 1950 BOTT, collected some specimens and identified as Astacus leptodactylus salinus, In 1961 HOLTHUIS, L. B. Astacus colchicus and In 1963 KARAMAN, Astacus leptodactylus leptodactylus. It is seen that the taxonamic characteristics, the distribution and the subspecies of it have not been definitely investigated and identified. The heavily populated areas are central Anatolian's lakes such as Eğridir, Beyşehir, Işıklı; The Marmara region's lakes such as Apollont, Manyas, İznik, Sapanca; The Thrace region's lake such as Terkos lake (Fig. 2).

Studies on crayfish

Only two reports have been published since 1970. ERENÇİN, Z. (1975): Production of crayfish and its importance for Turkey's economy.

GELDİAY, R. (1970): The preliminary report about the taxonomy and distribution of Astacus (Decapoda) of Turkey.

We are really anxious about the decreasing of the production of crayfish. This is due to several reasons such as the inefficiency of prohibition of catching, overfishing, environmental pollution, agricultural irrigations, and the gradual reduction and drying of crayfish habitats. For example; There were only 100 traps in the lake Eğridir, 4 or 5 years ago, at present there are 2000 of them.

Now our studies are on the culture, biology of crayfish and its plantation technique.

Astacus leptodactylus Esch. is not suitable species for culture and plantation. Its meat ratio is lower and when introduced in the water for plantation the growth-rate is very low (4). But we have concentrated our studies on this species. Because it is highly fertile. Our waters is very clear and are free of fish diseases, parasites and crayfish plaque. So we believe that the introduction of Pacifastacus leniusculus Dana species in our waters will be a risky attempts although it may be considered suitable for culture and plantation (1) (Fig. 3).

Restoration and rearing attempts

Our working ground is at the Fishing Research Station at Çifteler which belongs to the faculty of Veterinary of ANKARA.

There is an artificial pond covering an area of one hectar which has been formed by the sources of the river Sakarya. Its outlet continues as the river. There is an hydroelectric center in front and a dam, 8 km below pond , has been constructed for irrigations (Eminekin Dam). The altitude of pond is 900 meters from the sea-level. The deepest point is 3-5 m. The bottom is covered partly with stones and partly by slime. The perimeter of the pond is 1150 meters. The water temperature is moderate. During the winter months the temperature averages 15–16°C and during the summer months it averages 20-23°C. The water is very clear and rich in lime. The total hardness is equal to 35 French hardness. pH; 7, 9, the alcalinity is 350 mg/lt. $CaCO_3$.

The pond is very rich with phitoplanctons and plants. During the spring it is filled with phitoplanctons. Freschwater shrimps, gammarus, frogs and snails are abundant. Carps and minnows forms the main fauna.

The first restoration studies started in April 4, 1975.500 young crayfish were brought from the lake Eğridir and introduced in the pond. Sixty percent of them were female and 6–7 cm in full length. They had no commercial value.

Second group 1400 young crayfish were brought and introduced in the pond in August 8, 1975. In addition to this, at the same time, 60 young crayfish were brought and introduced in a new pond in which carps were present, 25 of them (650 g in weight) were introduced in an another pond in which rainbow trouts were present and 100 young crayfish (2500 g in weight) were put in an another pond in which tilapia and carps (K_2) were present. Three and a half months later all the ponds were emptied. 82 crayfish were captured in the pond in which tilapia and Carps (K_2) were present. They were grown (2850 g in weight) and active and lively. But in the other two ponds only six crayfish were collected. This was a surprise for us. Than we thought that they had escaped.

The third group of 1500 young crayfish were brought and introduced in the pond in October 1975.

The volume of the water is not important for the plantation works. What is important is the perimeter of pond and it is proposed to be introduced five or ten crayfish at every ten meters (4). The number of crayfish we had introduced in the pond were very high.

We thought that, the abundance of the crayfish was not a disadventage. Because the pond has an outlet and it empties in the river

Sakarya. In November 15, 1975 some traps were employed and crayfish were controlled. Two male crayfish were captured. and the genital organs were examined (The development was satisfactory). No female crayfish entered the traps. In March 26, 1976 once again some traps were employed. But no female was seen. It was told that during January and February in 1976 the fishermen had captured some crayfish in the Sakarya river and in the Eminekin dam. It was considered that, at the time of planting in the pond, the high temperature would be a preventive factor to the crayfish mating. The mating time is November and December. During these two months the temperature of the water must be 11–12°C. But in the ponds the temperature has not been below the 15–16°C.

The fact was that, crayfish might have gone to the dam and the river from the outlet of the pond. During November and December the temperature is about 11°C in the dam and the river, while in April the temperature averages 20°C in the pond and 15°C in the dam. It is possible crayfish would find a suitable temperature for mating.

The studies is still being carried out and crayfish has liked this place as it habitats.

Culture

Six egg-bearing females were brought to the Çifteler Fishing Research Station from the lake Eğridir and were put in the hatchery trough in April 1975. Stones and plastic tubes was placed in the hatchery trough in order to provide hides for the crayfish. The crayfish were fed ground fish and tubifex. In May 15, larvae hatched. The temperature of the water was 20–22°C. The larvae bearing crayfish were collected and introduced in a concrete pond which was one meter deep and covered an area of 48 square meters.

The bottom of the pond was covered with soil and plants, phytoplanktons tadpoles, gammarus and shrimp were abundant in it.

In July 2, 1975 two juveniles were collected. They were 3 or 6 cm in full length. In December 1976 the pond were emptied 28 male and 30 female young crayfish were collected. They were 4–6 cm body length and 480 grams in weight. They were put again in the pond to their mothers. They spent the winter in this pond. They are still here. From time to time traps were employed and the crayfish were controlled. But only some male crayfish were captured, no female was captured.

Besides this natural observation, in the same year in May 4 egg-bearing crayfish were brought from the lake Eğridir to the hatchery trough. In June 16, 1975 these crayfish hatched. The temperature of the water was 20–22°C. After a week 250 larvae were collected and introduced in the fiberglass tank. Sponges were put in the tank to which the newly hatched larvae would hold. Algaes were put in the tank to fed them. Cannibalism was seen. In July 3, 1975 71 of larvae were counted one by one and put in the fiberglass tank stones plastic tubes were placed in the tank in order to provide hides for them. Plants and algae were put in the tank. Besides this they were fed with ground spleen spreaded on the stones three times a day. The stones were changed very often in order to prevent decaying.

In July 1975 crayfish were measured. They were 3–4 cm in full-length. They are still being fed with a mixture of minced fish, dried salmon pellets, ground spleen and tubifex.

In February 2, 1976 they were controlled again that time they were 4–5 cm and two of them were 7 cm in length. One of them was female bearing eggs, but it wasn't mated. As has seen that the development of the crayfish has been most satisfying and our research and studies have been carrying out.

Result

We believe that, this initial studies which we carry on now will be of help to the maintenance of crayfish. Astacus leptodatcylus Esch. production which is of importance in Turkish economy.

Our greatest advantage is the fact that our waters are clear and our products are lively and healthful.

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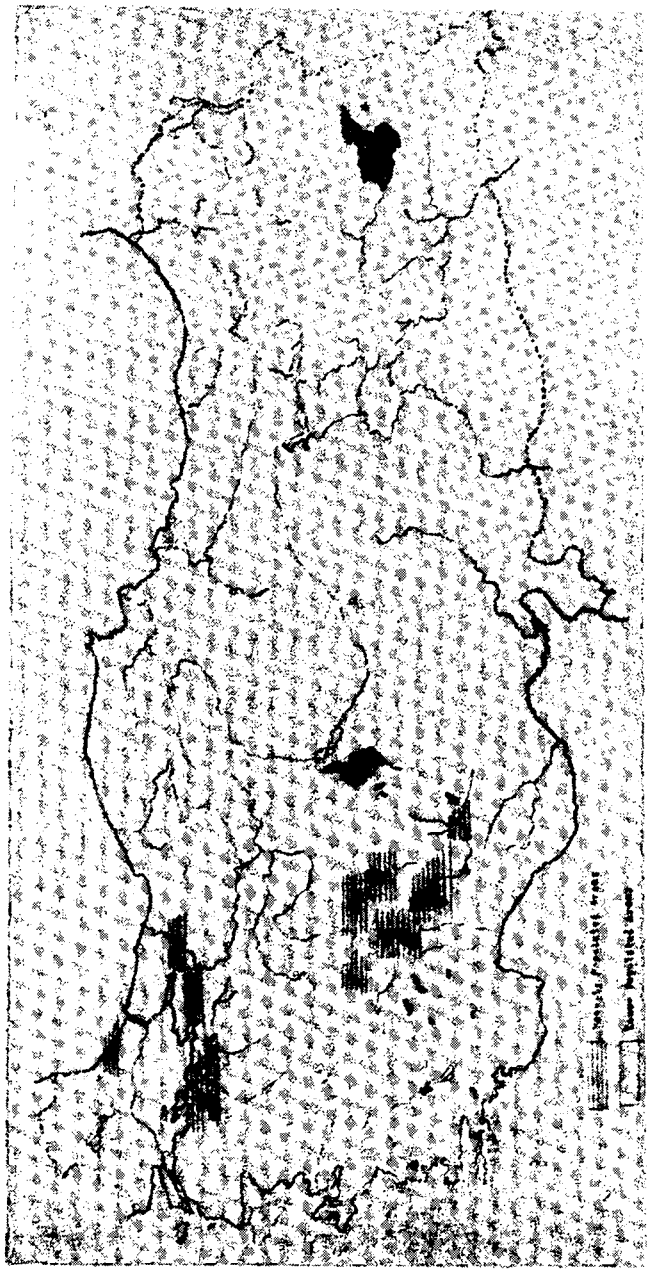

Fig: 1 L. Crayfish Production Areas in Turkey

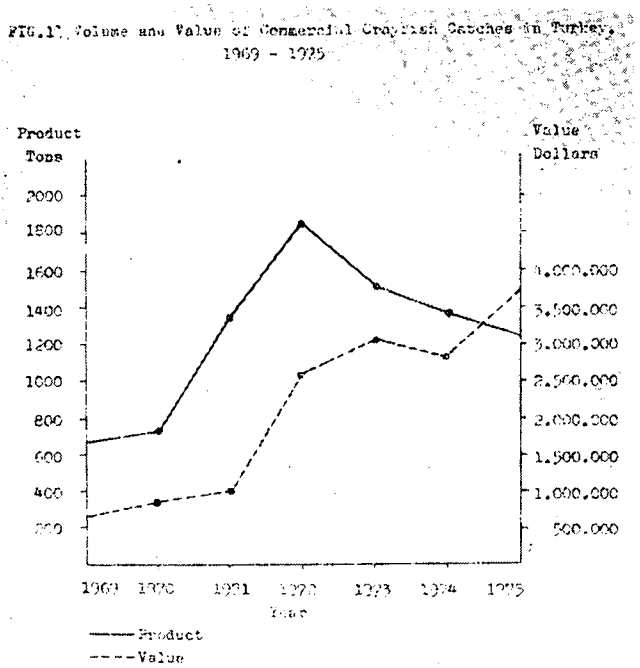

Fig: II. Volume and Value of Commercial Crayfish Catches in Turkey

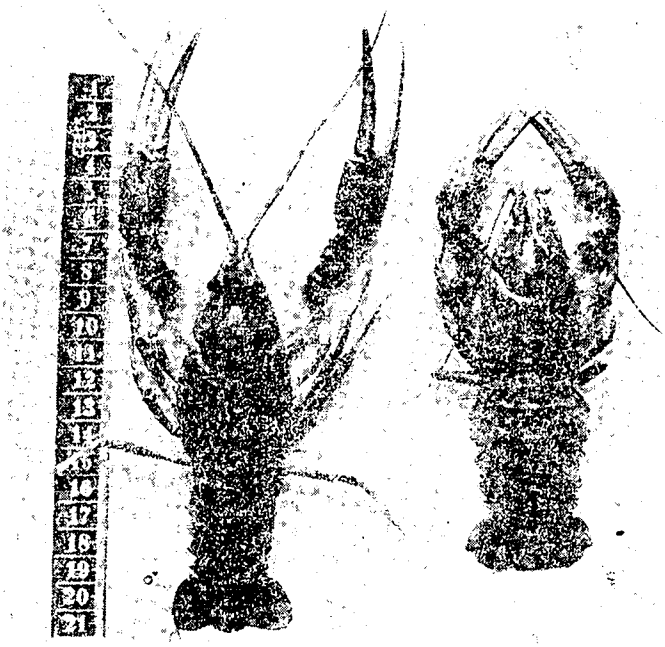

Fig: III. Astacus leptodactylus Esch. 1823. Species