Adult lagokefalos specimen.

Lagokefalos (Scientific name: *Lagocephalus sceleratus*, English name: silver-cheeked toadfish) is a fish species, member of the Tetraodontidae family, which includes 121 species from 19 genera. The name Tetraodontidae is associated with the characteristic dentition of the family members, where each jaw´s teeth are joined, but separated by a central seam, resulting in the appearance of 4 teeth. Lagokefalos is a wide-spread species in the tropical Pacific and Indian Oceans, the Red Sea and the Eastern Mediterranean Sea during the last years as a lessepsian immigrant (via the Suez Canal).

Lagokefalos is one of the largest members of the Tetraodontidae family, exceeding 110 cm in length and 7 kg in weight. Its body is elongated and

Lagokefalos has the ability to significantly inflate its body by absorbing water or air.

to some extent laterally flattened. It has a green-brown back with black equally sized and regularly arranged spots, a silver band from the mouth to the tip of tail, white belly and a silver spot in front of each eye. Instead of scales, it has numerous small fleshy spines on the back and the belly. Its jaws consist of 4 very strong teeth, 2 on the upper and 2 on the lower jaw, which join to form a kind of beak. Lagokefalos has the ability to significantly inflate its body by absorbing water or air, as a way to repel its predators. When the body is inflating, a characteristic loud noise is produced from the friction between the upper and lower teeth.

Lagokefalos is typically carnivorous, feeding on cephalopods (octopus, squid and cuttlefish), crustaceans (especially crabs) and fish, including

Half-eaten fish from the nets of fishermen, a result of attacks by lagokefalos. Notice the tail of a smaller lagokefalos, an indication of cannibalistic behavior.

smaller individuals of its own species. Compared to other fish species it seems to be relatively sluggish. When idle it seems to hover almost motionless, moving only its pectoral fins. Nonetheless, lagokefalos is able to move with surprising speed when threatened or hunting. Lagokefalos often demonstrates a very aggressive behavior and seems ready to grab any bait offered. However, at least for the Mediterranean populations, there have been no official reports of aggressive behavior toward humans.

Lagokefalos´s tissues contain a powerful neurotoxin, the tetrodotoxin, which if ingested, can cause food poisoning with a high mortality rate. The toxicity increases gradually before the breeding season and decreases rapidly after breeding. The gonads, particularly in females, are more toxic than other organs. Tetrodotoxin can cause death through muscular paralysis, respiratory failure and collapse of the circulatory system. Consumption of about 25 mg of tetrodotoxin can kill a person weighing 75 kg. The corresponding injected quantity is much smaller, about 0.6 mg for the same person. So far there is no known antidote to tetrodotoxin. Treatment is supportive and based on symptoms, in order to keep the patient alive until the potency of the toxin weakens.

Several members of the Tetraodontidae family, including lagokefalos, hold a unique position regarding fisheries, since they are discarded in some countries and highly prized in others, particularly in Japan and Korea. In Japan, prices of these fish, called fugu, are higher than those of most other edible fish. The name fugu is used for the fish and the dish itself. Lagokefalos is called sen-nin fugu. The skin and guts are removed carefully by licensed expert chefs and the product of this procedure is considered safe for human consumption. Nevertheless, many people die every year from consuming these fish. The trading of lagokefalos is prohibited in European countries.

Lagokefalos started appearing in Cyprus waters at least since 2000, while in 2006 there was a rapid increase and spread of its population. According to official Department of Fisheries and Marine Research (DFMR) data, the landings of the species reached around 4% of the total landings of the Cyprus inshore fisheries in 2009 and 2010. Today in Cyprus lagokefalos is known with the common names kouneli (rabbit) and kounelopsaro (rabbitfish).

A recent study conducted by the DFMR (2009-2010), showed that lagokefalos has adapted perfectly to the conditions of the area and is now breeding freely in Cyprus waters. According to the study, the successful settlement of lagokefalos in Cyprus and the Eastern Mediterranean in general, is probably due to its very fast body growth, especially during the warm months of the year, the early first reproduction, which takes place just in the second year of its life and its great adaptability, particularly in its feeding habits. Furthermore, lagokefalos is not a target species for the coastal fisheries, due to its toxicity and the related marketing prohibitions and it probably does not have competitors or predators in the area.

The rapid increase of its population resulted in the increasingly frequent recordings of damages caused by lagokefalos, using its sharp teeth, to the gear and the catch of inshore fishery. Today lagokefalos is very well known to everyone engaged in fishing in Cyprus, mainly due to these damages, and is considered by many as the greatest problem the Cyprus coastal fishery is facing today.

Lagokefalos is also well known to the general public in Cyprus, mainly because of the timely information provided by the DFMR concerning the potential dangers posed by its consumption. The toxicity of the species,

which has also been proven for the Mediterranean populations, did not appear to cause any particular problems in our country, mainly because of this information, but also because of the unique morphology of lagokefalos, which differentiates it from other edible species. In any case, the DFMR continues to warn the public about the potential dangers that exist and fortunately, no unpleasant incidents have been reported so far.

The DFMR has studied several possible solutions to the problems caused by the presence of lagokefalos in Cyprus, like the possibility of exportation to countries where it has high commercial value or the intense fishing pressure on its populations. In the first case, although there has been interest from commercial companies in Cyprus and abroad, some problems emerged, concerning regulations in these countries that restrict the importation of lagokefalos from distant regions like the Mediterranean. In the second case the DFMR study showed that this solution would be costly and not permanent, as controlling the population of any species is extremely difficult, especially in the marine environment.

Fishermen and the public need to realize that lagokefalos, like other invasive species, has settled in the waters of Cyprus and should be now considered as part of the marine fauna, with all its implications. The best solution to these kind of problems is usually the adaptation to new conditions, which in this case is translated into an adjustment of fishing effort (i.e. fishing hours, seasons, depth, gear etc) in such a way that will minimize the adverse impact of lagokefalos on fisheries.

These problems are certainly not limited to Cyprus but throughout the Levantine Basin and slowly but steadily seem to extend further to the west. The fact that lagokefalos specimens were found in the North

A piece of fishing net in the stomach of lagokefalos. Lagokefalos can easily cut through large pieces of netting, even ropes, in the attempt to steal fish from the nets of fishermen.

Aegean, with significantly lower water temperatures than those in Cyprus, suggests that temperature is not a prohibitive factor to the spread of the species. A future spread throughout the Mediterranean is the most likely scenario and the problems caused may need to be addressed on a European level. In any case, limiting this spread appears to be extremely difficult, if not impossible.

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Lagokefalos is today one of the most abundant fish species in our waters and one of the most common catches of the coastal fisheries, especially during summer months.

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Lagokefalos in the waters of Cyprus

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Lagokefalos's sharp teeth with which it causes damages to the gear and catch of inshore fishery.