

INTERACTION OF COASTAL POPULATIONS OF *TURSIOPS TRUNCATUS* (CETACEA, DELPHINIDAE) WITH THE MULLET ARTISANAL FISHERIES IN SOUTHERN BRAZIL

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RESUMO

Comenta-se sobre as interações de manadas costeiras do boto (*Tursiops truncatus*) com a pesca artesanal de tainhas (*Mugil spp*) no litoral sul do Brasil.

UNITERMOS: *Tursiops truncatus*, pesca cooperativa, Sul do Brasil.

ABSTRACT

Some aspects of the interaction between the schools of inshore bottlenose dolphins (*Tursiops truncatus*) and the mullet (*Mugil spp*) artisanal fisheries in the Southern coast of Brazil, are commented.

KEY WORD: *Tursiops truncatus*, cooperative fishing, Southern Brazil.

Introduction

The different interacting ways between the bottlenose dolphin, *Tursiops truncatus* (Montagu, 1821) and men are listed in Shane et al. (1986). The association of the bottlenose dolphins with the pressure waves created by the boat stern and prow is the most common. It is also considered the apparently spontaneous, direct interactions, that had occurred along the history as in "Shark Bay" in Western Australia, where either a single specimen or groups have made contact with human beings. Habitat alterations, specially petroleum discharge, boat traffic and the capture of specimens for exhibition, are considered destructive interaction forms for these animals. There is also the associations with various fishing types, specially shrimp fishing (Leatherwood, 1975).

Leatherwood and Reeves (1983) suggest that in various areas, *Tursiops* has adapted its feeding strategies to take advantage of human activities, by eating either netted or discarded fishes.

In Busnel (1973) a description is given of a "symbiotic" interaction between *Sousa teuszii* and *Tursiops truncatus* with native fishermen taking mullet at the same time in the coast of Mauritania.

In the present paper some aspects of the association of *Tursiops truncatus* with the artisanal mullet (*Mugil spp*) fishermen in the Southern coast of Brazil, specially in Rio Grande do Sul and Santa Catarina are shown.

Tursiops truncatus Coastal Populations in Southern Brazil

Tursiops truncatus may be considered a relatively common species in shallow waters of the Southwestern Atlantic Ocean, nevertheless nothing or little is known about its oceanic schools. They can be seen along the Southern coast of Brazil in small groups of three or four individuals.

This species frequently enters into the mouth of rivers, lagoons and estuaries as occurs in the littoral of Rio Grande do Sul and Santa Catarina, where we have centered our observations.

There are three shore points in Rio Grande do Sul where this fact was confirmed: the access channel of Patos Lagoon; the mouth of Tramandaí River and the mouth

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of Mampituba River in Torres (inter-state boundary). In Santa Catarina this species appears in the mouth of the Araranguá River and in the connecting channel of Laguna (Fig. 1). In these places they may be seen through out the year, varying, however, in size and composition of schools.

Sometimes they move through interior waters as mentioned by Castello and Pinedo (1977) for the estuarial region of Patos Lagoon (RS), where bottlenose dolphins reach the São Gonzalo channel, which links up this lagoon to Mirim Lagoon. We have observed something similar taking place in Laguna (SC) where these dolphins enter into the Santo Antonio Lagoon, penetrating the Tubarão River (Fig. 2). In the cases they go into very shallow waters, with depth of less than a meter.

Mullet Fishing

Mulletts and 'Paratis' (Pisces, Mugilidae) are a group scarcely studied that still lacks an accurate taxonomical revision. Menezes (1983) mentions three species for the Southern Brazilian waters: *Mugil curema*, *M. gaimardianus* and *M. platanus*. Other authors include *M. lisa* as a very frequent specie in these waters (Chao et al. 1982; Silva, 1982 and J. Frutuoso, personal communication).

From April to August of each year, big schools of mulletts migrate northwards along the coastline. Many aspects of this migration remain unknown, but it seems to be induced by a "thermic trigger".

We are talking here about a mullet fishery that may be considered for subsistence of the local population and it's made craftsmanly. It happens in those few places where the fluvial and lagoon systems contact the sea, specially in the same places already mentioned for the bottlenose dolphin presence (Fig. 1).

In Tramandaí (RS) and Laguna (SC) the mullet fishery has become a cultural event and it will be described here, since it is very important in the local culture. Very early in the morning, the fishermen take their places in line, with the water up to their waist, each one with his circular nylon throwing net (called 'Tarrafa'). They preferently choose the small sand beaches that

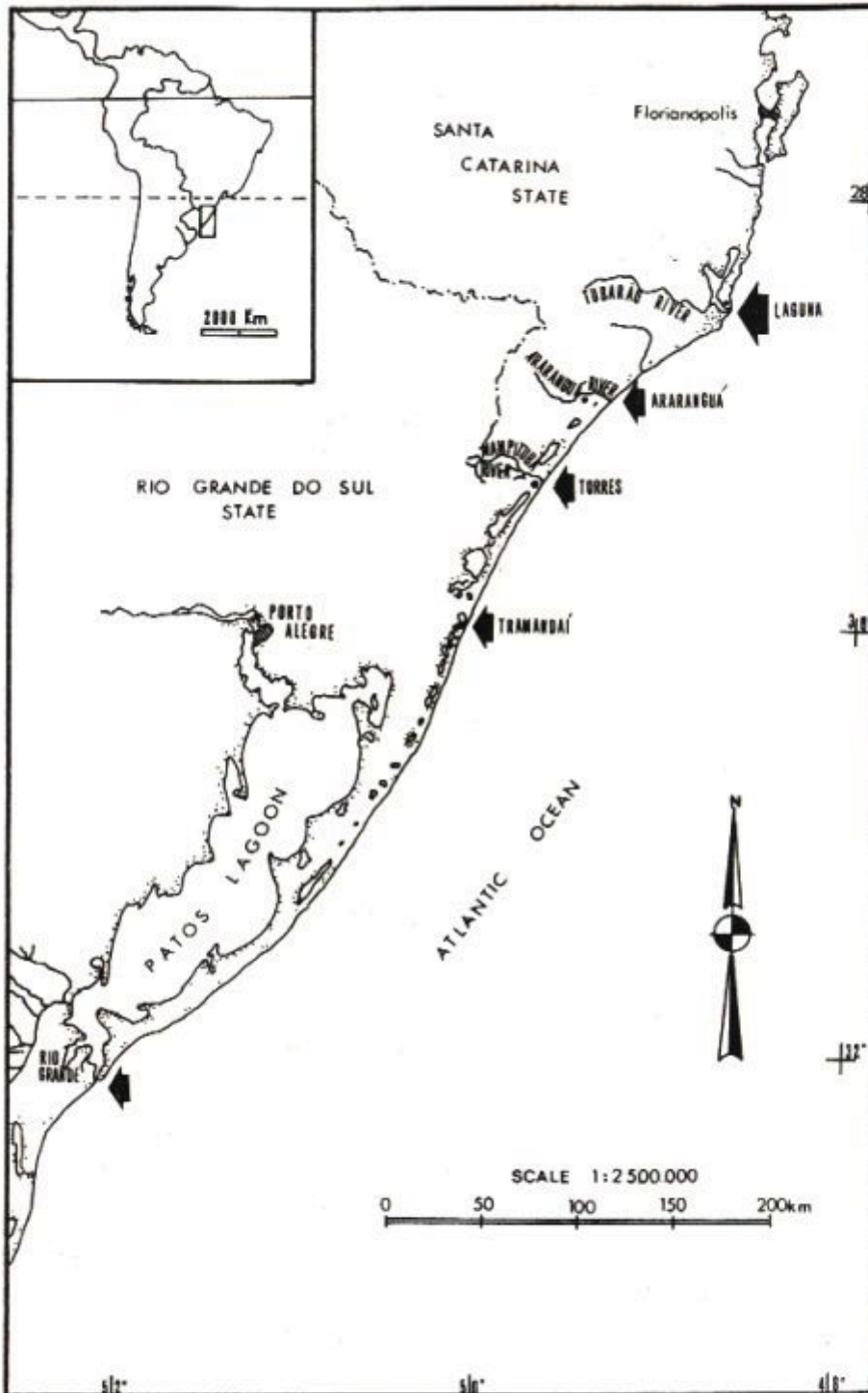


Fig. 1 - *Tursiops truncatus* (Montagu, 1821) coastal populations in Southern Brazil and their interaction with the mullet (*Mugil* spp) fishery.

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are formed by the side jettys. The number of fishermen varies and it mostly depends on the extension of the beaches, the quantity of fish and the number and activity of the dolphins around. One of the most traditional beaches is Tesoura in Laguna (Fig. 2) which may shelter from 10 to 25 fishermen in line. However this number is much larger all along the jetty. The line of fishermen in the beach has its own rules, where each hunter occupies a given place. Every time any of them is successful in the catch, he gives his place to another one. For every place there is one or two fishermen waiting for his opportunity, functioning as a releasing system. This kind of fishing takes place all through the year with emphasis from April to September.

Popular Belief

The results of direct interviews with local native hunters in Tramandaí and Laguna are given below. When they were asked about the relevance of the bottlenose dolphin in the mullet fisheries, they were all unanimous answering that they actually "help" the fishermen hoarding the fishes toward the line of hunters. Most of the natives think that the dolphins get nothing out of this, but others believe that they also "steal" one or two mullets from the net.

Among Laguna fishermen there is no consensus about the total number of dolphins which enter into the Santo Antonio Lagon access channel. The data obtained there show a large discrepancy, going from 30 to 200 or even 300 animals involved. But they all agree about the number of dolphins that work with the fishermen (the term "work" is used in the sense of "cooperate" or "help"). At the present days, eight or then dolphins "work" in the interior of the channel, but not simultaneously.

The fishermen recognize some of the dolphins by their natural marks, and have named them after these marks, with permanent local names. In Laguna some dolphins are known by their own names, such as "Caroba", "Latina", "Maracanã", "Chinelo", "Bate-cabeça", "Prego", "Maroca", "Jucelino", "Galha-torta", "Marusca", "Lata-grande", and "Miranda" (the last five have already died according to the

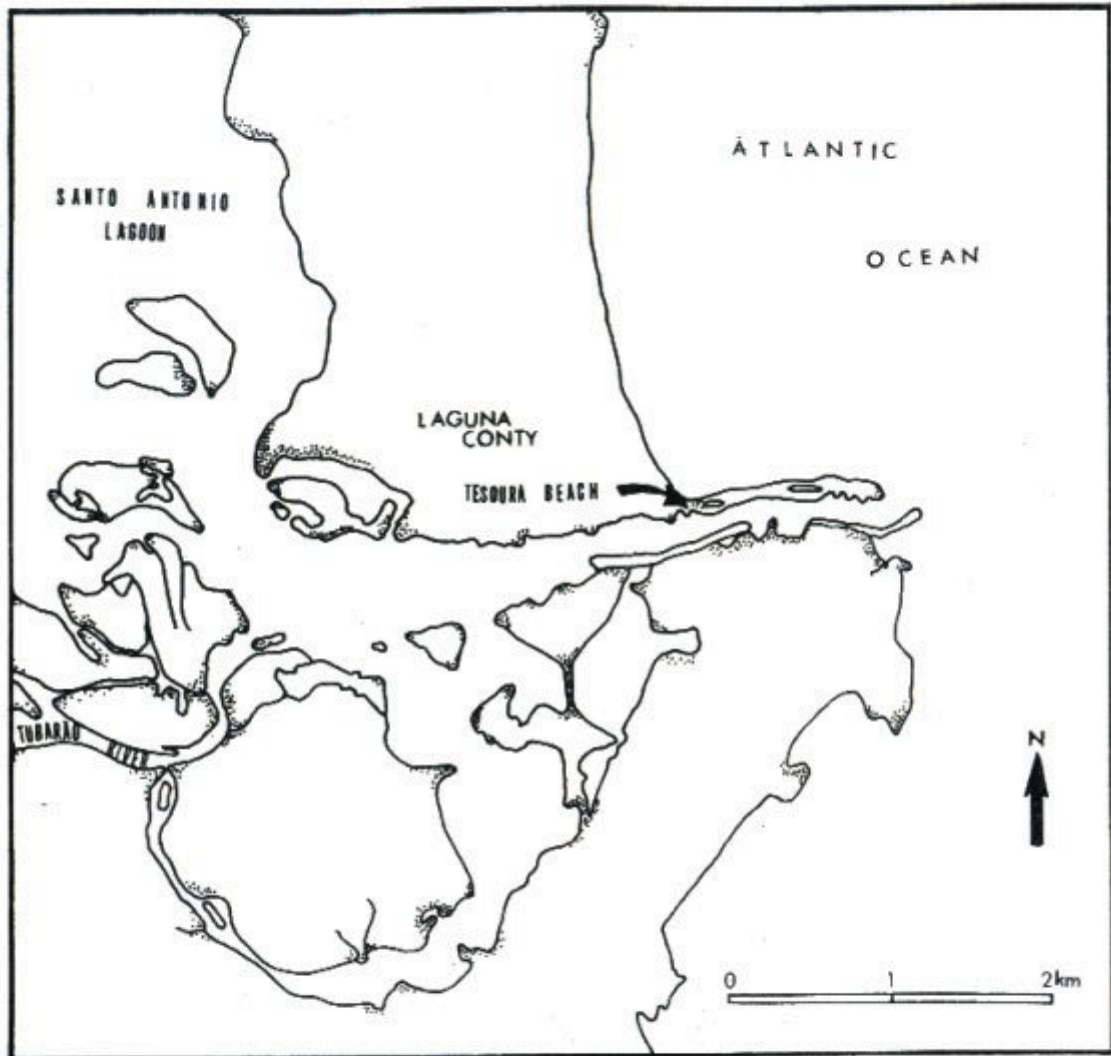


Fig. 2 - Detail of the connecting channel of Laguna, Santa Catarina State, Brazil.

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fishermen). In Tramandaí, the most famous dolphin is called "Barata", and in the Araranguá River mouth, was "Areada" (which died in an open sea fishery). These nick-names are given the first time the dolphin is seen and remain all throughout his lifetime. Some of them, as "Caroba", are known because of their efficiency at "work"; others as "Maracanã" never participated of the cooperative fishing.

The fishermen don't know whether the animals are males or females, except when the females swim with their calves. For this reason sometimes the dolphin is kept with the changed name; it happened with "Chinelo", which actually is a "female dolphin".

The popular culture from this region has a lot of comparisons between dolphins and men. They frequently say things like: "... the dolphins are like people, most of them come, but just a few work..." or even "... while some of them work, the others steal..." The age of the dolphins is compared to the age of the oldest fisherman, being "Chinelo" probably the oldest dolphin still alive in this region. Its age is estimated somewhere between the 64 and the 80 years. For these native hunters "Chinelo" has already had several calves, but lately it has appeared alone. This fact originated another genuine comparison between dolphin and men "... dolphin might be like woman, after some time it doesn't give birth anymore..."

Dolphin/Human Interactions

Just *Tursiops truncatus* has been observed interacting with the mullet fishing in Southern Brazil. In all the already mentioned points similar facts occur, where schools of bottlenose dolphins enter into the mouth of rivers and lagoons searching for mullets. The local fishermen are always attentive to the dolphin movements, and they very seldom venture throwing the net without their participation. In Tesoura Beach, in Laguna, a 20 men group in line was observed, which remained for more than an hour without making any throwing. They just shouted, at times to the dolphins: "Let's work".

Dolphin participation usually brings about great agitation among the fishermen. Lonely specimens or couple of them rapidly approach to the channel gathering the school of mullets. This approach is done in either a perpendicular or oblique way to the fishing line. Just once we observed two individuals (mother and calf) crossing parallel to the fishermen.

This event reaches its climax when the dolphin puts its head and part of body out of the water, beating with its throat on the surface (Fig. 3). At this time several nets are thrown and immediately groups of mullets are caught in each of them.

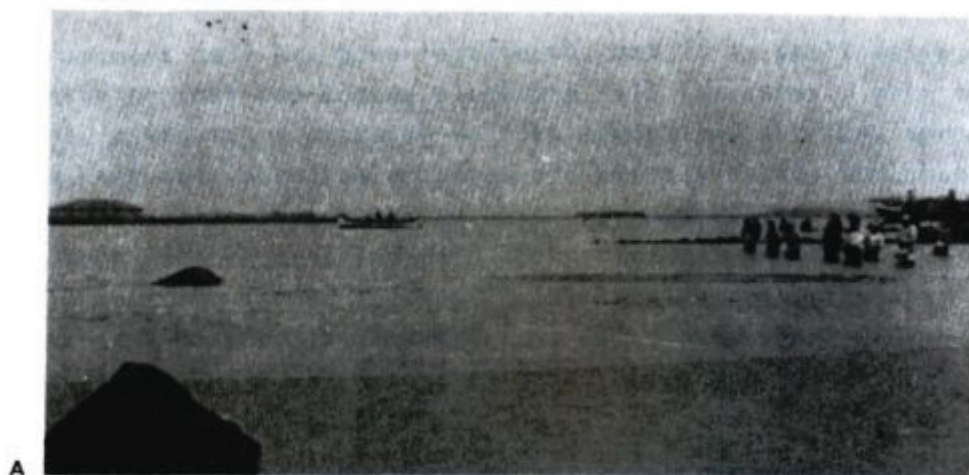
This behavior is called "head knock" and has some local variations, being more notorious in Tramandaí than in Laguna. Its meaning is not totally known, but it may be interpreted as a way of "announcing" or "indicating" the presence of mullet schools near the fishing line in the dark channel waters.

Usually one or more mullets are found either half eaten or wounded at one side, showing the clear parallel cuts made by a bottlenose dolphin teeth (Fig. 4). This evidence proves categorically that *Tursiops truncatus* and men try to capture simultaneously the same prey. It seems that even though both species are able to capture mullets by themselves, their association might enlarge their effectiveness in the harvest, which corroborates the cooperative fishery hypothesis.

Final Considerations

The interactions of bottlenose dolphins, fishermen and mullets in Southern Brazil are in many ways comparable to those mentioned by Busnel (1973) for the Mauritanian coast. In both cases, the association of dolphins and men is motivated by the capture of a common prey, the migrating mullet. As much in Mauritania as in Brazil the migration of the *Mugil* species takes place in the Fall/Winter period, following the shore line toward more temperate zones. In both regions the mullet is captured in a craftsmanship way, through different fishing skills. In the locality of El-Memghar, in Mauritania, the Imraguens call the dolphins through acoustic signals, beating with sticks on the sea surface. In the Brazilian waters,

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A



B



C

Fig. 3 - A) Bottlenose Dolphin (*Tursiops truncatus*) showing the presence of mullet (*Mugil* spp) in the Tesoura beach, Laguna conty (SC); B) Detail of the "head-knock"; C) Fishermen throwing the net.

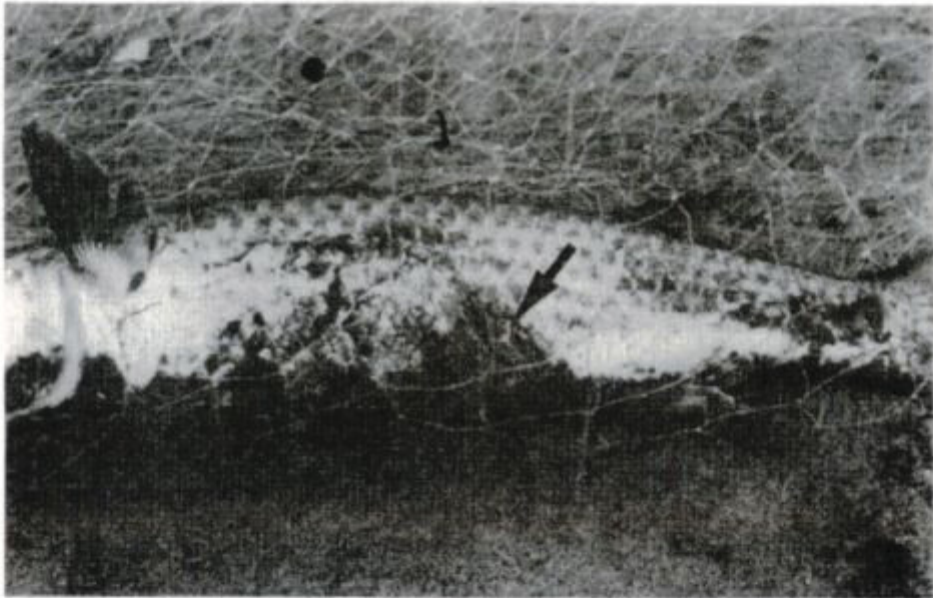


Fig. 4 - Bottlenose teeth wounding in mullet (*Mugil* spp) taken in the Laguna connecting channel (SC).

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no prominent call has been registered, but it is still valid, emphasizing that the Laguna fishermen call the animals with their voices, using the expression — "let's work" — but they very seldom do so, and only when the dolphins are already inside the channel. Busnel (1973) mentions that at least *S. teuszii* and *T. truncatus* have been seen interacting with the native fishermen, while in Brazil just the second species is involved in this practice. The cooperative fishery in El-Memghar is relatively short (20 to 30 minutes), while in our waters it takes place during the whole day and throughout all the year.

It is possible that the bottlenose dolphin population in question, or at least some individuals, dwell in this part of the littoral (Fig. 1), being in this way used to the fishermen and vice-versa. We have already started an identification work, with the intention of verifying our hypothesis, taking as reference the natural marks of the dolphins, which will lead us not only to know their real moves but also to assess their intra and interspecific interactions. The photographic identification will also help us to corroborate the truth about the local fishermen nominal recognition of the dolphins.

The "status" of this coastal population of *T. truncatus* is apparently assured by the cultural and touristic importance that the mullet fishery has reached. On the other hand the marine catfish fishery (Fam. Arridae), from December to May, has killed and unknown number of dolphins by entanglement in Laguna.

The "Global Conference on non-lethal use of the cetacean resources", that took place from 7th to 11th June 1983 in the "New England Aquarium" in Boston, Massachusetts, suggested that a special "status" should be granted for the interaction regions between cetaceans and men. We believe that the obedience to this recommendation in the above mentioned cases would be of extreme value, allowing the total preservation of this incomparable Nature Heritage.

This event, here debated, come to be added to the rare cases along the history in which, free-ranging cetaceans share the same prey with men, without striving for it.

Acknowledgments

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