

# **LOSS AND ABANDON OF FISHING GEARS IN SOUTHERN BRAZIL AND RISKS OF OCCURRENCE OF GHOST-FISHING**

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## **Introduction**

Abandoned, lost or otherwise discarded fishing gears (ALDFG) constitute one of the insoluble problems associated to fishing activities around the world. Recent data from FAO (Veja.com 2009) estimate in 640,000 ton of ALDFG annually produced. The favorable conditions that they rise for ghost fishing are well known by studies performed in Northern Hemisphere (FAO 2009). In Brazil, however, except by a study concerning marine litter (Oigman-Pszczol and Creed 2007), ALDFG is a subject not yet documented.

Along the coast of Southern Brazil, both professional (small-scale and industrial) and recreational fishing are performed. Professional fishers use several kinds of nets (otter trawl, gillnets, purse seine, cast nets), besides hooks and traps (Robert and Chaves 2006). The recreational ones are anglers that eventually use traps and cast nets also.

This work aims to investigate existence of ALDFG along a transect in the coast of Southern Brazil, evaluating conditions to ghost-fishing existence in this region.

## **Material and Methods**

From March to May 2008 five beaches located in Southern Brazil (25°55'S; 48°40'W) were visited in a monthly frequency. In front of these beaches both small and large-scale fisheries are performed: the former, by fishers inhabiting communities placed close to these study beaches; and the last by industrial boats operating mainly by using two-boats trawling and purse seine nets. In each one, transects from 3 to 5 kilometers on sand in the supralittoral were covered in order to register all gears present there. Each gear or part of it was considered an "event". Each event was analyzed regarding its type, size, localization and possible origin, as well as structures (debris, terrestrial vegetation, invertebrates) associated. In some cases, photographs were taken.

## **Results and Discussion**

Many events of ALDFG were registered in the five study beaches, consisting mainly of buoys, cables, oil containers and parts of gillnets and trawl nets. Gillnets and trawl nets varied in mesh sizes from less than 5 cm to 18 cm opposite knots (Figure 1). The mesh sizes of these gears coincide with those currently used by professional fishers in this region, who aim to catch resources as shrimps (by trawl net, mesh size <5 cm) and, by gillnets, fish Sciaenidae, Pomatomidae (7-12 cm) and flounders (> 14 cm) (Chaves and Robert 2003, Robert and Chaves 2006). In two events crabs were found tangled in gillnets, but it is unknown whether they had been caught before nets have got lost or afterwards.

Concerning structures associated with these events, the most common terrestrial vegetation found with ALDFG were mangrove leafs and tree branches (Figure 2). Tree branches seem to be able to nucleate parts of gillnets of different mesh sizes; we suppose that this phenomenon helps the gillnet parts to be carried out by currents and so arrive at the beach. Also bivalves and barnacles were frequently found in the ALDFG, not only on PVC substrate (buoys and

containers), but on gillnets and trawl nets cables. Admitting that colonization by barnacles have started after losing or abandoning of gears and considering that many of these crustaceans were larger than 2 cm, it is expected that this material have remained submerged during many days. Knowing that, according the literature, barnacles can present growth rates varying from 0.3 to 1.2 mm/day (Skinner et al. 2007), the submerged time of these ALDFG was longer than two weeks.

Many of these buoys were intact, suggesting they had been released from cables. In this case, cables were broken up, however not necessarily nets from which they came were lost.

The long time in which gillnets remain submerged – from 3 to 6 days – increases the risk of natural loss of gears, mainly in case of bad weather (e.g.: Erzini et al. 2008). Bad weather is very common in Southern Brazil, so this is probably one of the two main origins of ALDFG in this region. The other possible origin of loss is the conflict between passive and active gears. Smith (2005) pointed out that the passive gears are more susceptible to be lost than the active ones, and the interactions between them were pointed out by Erzini et al. (2008) as being the main cause of lose of traps in Portugal. In the study region, this cohabitation passive-active gears (respectively gillnets and trawl nets) originates loses mainly because boats do not respect the legal areas for trawling.

In a given time, when we were studying reproductive parameters of snook (*Centropomus parallelus*) in the study region, we found a specimen containing a hook in its stomach. This fact illustrates the accidental consequences that the fish-and-lay practice can promote, since recreational fishers frequently do not arrive to extract line and hook from fish they have caught.

A synthesis of the facts, consequences and risks of ALDFG can be proposed as stated in Table 1. It is suggested that the seasonality of events depends not yet of the intensity of loses and abandons, but also of the availability in the environment of nuclear agents that can work carrying out the gears to beaches.

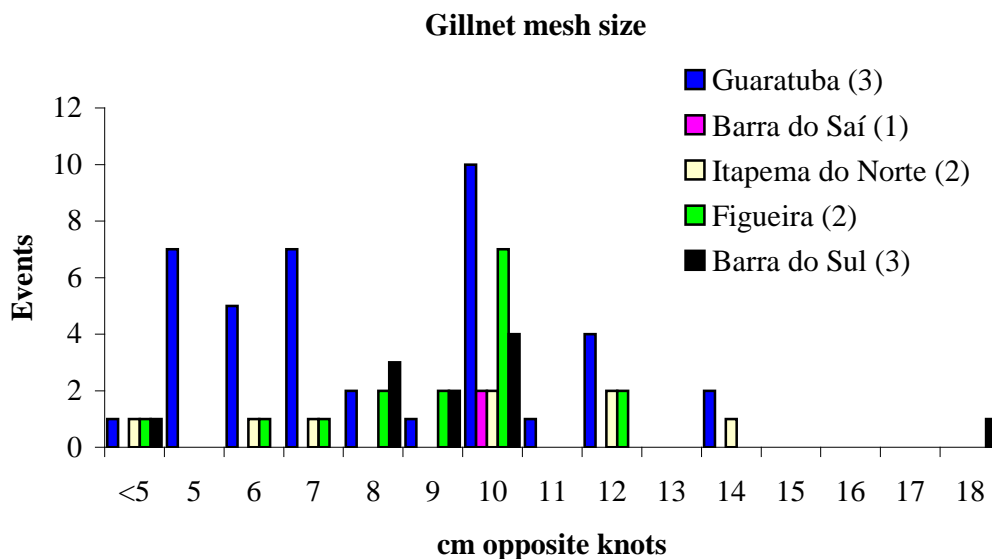


Figure 1 Frequency (events) in which gillnets were found along the five study beaches, according to the mesh size of each one. Brackets: number of months surveyed in each beach

### Terrestrial vegetation associated to gillnets

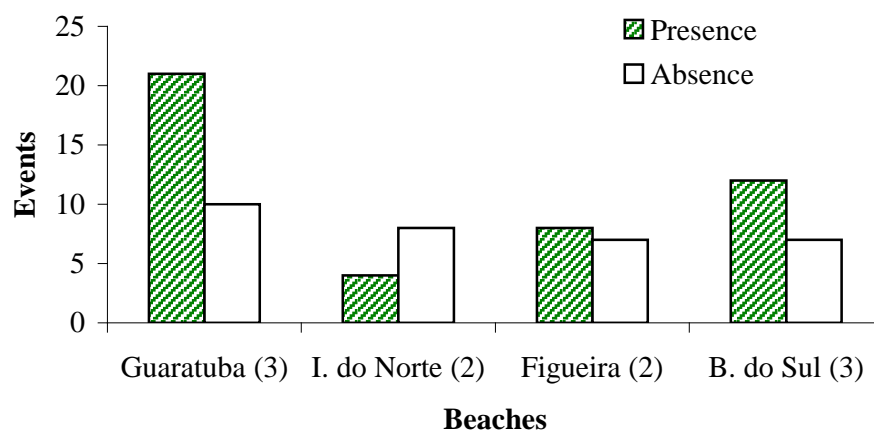


Figure 2 Frequency (events) in which gillnets were found with (presence) or without (absence) terrestrial vegetation associated to them, in four of the studied beaches. Brackets: number of months surveyed in each beach

Table 1 Facts concerning fishing activities in the coastal region and the risks they rise

Fact	Consequence	Risks
Long time of exposition	Gillnets remaining up to 6 days submerged	Loss of gillnets carried out by bad weather
Infringement of rules	Trawlers operating close to shallow waters	Lose of gillnets carried out by boats
Fish-and-lay practice	Recreational fishers not always arrive to extract hook and line from fish	Presence of hooks inside digestive tract
Professional vs. recreational fishers conflicts	Recreational fishers use to cut out cables of gill nets fixed in forbidden places	Lose of gill nets
Searching for demersal or pelagic fish, successively	Floater cut to be moved out from cables and later attached again to them	Lose of floaters

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