A note on the use of dolphins as bait in the artisanal fisheries off Bahía Solano, Chocó, Colombia

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ABSTRACT

Dolphin hunting for fishing bait in Bahía Solano, Chocó, Colombia, was evaluated during eight months, between July 2005 and April 2006. Interviews were conducted with 122 fishermen (18.2% of the registered fishermen in the zone), who cover at most 890km² when fishing (approximately 2.3% of the Pacific Territorial Sea of Colombia), and data obtained from landings at a fishing company. Only fishermen using longlines (37.3%) confirmed using dolphins as bait. It was not possible to obtain additional information about date, specific location or dolphin species, but the most probable captured species were common bottlenose dolphin and pantropical spotted dolphin. Nine dolphins were killed during the study period (1.1 dolphins/month) and extrapolating these numbers to all fishermen using longlines in the region (250), 24 dolphins might have been taken during the study period (3 dolphins/month). Fish species caught using dolphin bait include Pacific bearded brotula, groupers and smooth-hound.

KEYWORDS: PANTROPICAL SPOTTED DOLPHIN; BOTTLENOSE DOLPHIN; PACIFIC OCEAN; SOUTH AMERICA; DIRECT CAPTURE; FISHERIES; PURSE-SEINES; GILLNETS; TRAWLS

INTRODUCTION

Bahía Solano (06°04'-06°40'N, 77°25'-77°30'W) is a rural municipality that contains about 6,900 people. It is located in the province of Chocó on the north Pacific coast of Colombia, South America and includes the villages of El Valle (06°06'N, 77°25'W), Cupica (06°20'N, 77°25'W) and Ciudad Mutis (06°14'N, 77°24'W); the latter is the main town and a port for cargo boats trading provisions, materials, timber and for passenger transportation. The National Natural Park (PNN) Utría (06°02'N, 77°20''W') is one of the most important marine protected areas on the Pacific coast of Colombia (Fig. 1).

The two most common species of dolphins off Bahía Solano are common bottlenose dolphins (*Tursiops truncatus*) and pantropical spotted dolphins (*Stenella attenuata*), but little is known about their ecology and population status in Colombia (Avila *et al*., 2008; García *et al*., 2006). In the PNN Utría there are small groups of less than 10 common bottlenose dolphins that frequent protected zones, remaining close to shore, while the pantropical spotted dolphins move in larger groups with an average of 45 individuals, usually associated with open areas further offshore (Suárez, 1994). In Cupica Bay, common bottlenose dolphins are usually found within four miles from shore, in groups of 2-200 animals, feeding or travelling. Conversely, pantropical spotted dolphins are frequently seen more than four miles from shore, travelling (Avila *et al*., 2008).

The main economic activities of Bahía Solano include artisanal fisheries, agriculture and timber extraction (Matallana, 1999). There is also much tourism in this region, which is focusing on trekking, sport fishing, diving and humpback whalewatching; there is no focussed dolphin watching. Artisanal fisheries products are purchased by five main fish trading companies in Bahía Solano and then sold to companies in the main inland cities. There are 670 active fishermen, who are registered with the Bahía Solano Port Authority (H.J. Quesada, pers. comm.). These fishermen cover at most 890km² when fishing, approximately 2.3% of the Pacific Territorial Sea of Colombia. Artisanal fishermen here use 15-30ft long fibreglass or wooden boats and six main fishing techniques: (1) hand lines with a weight and one or several baited hooks from boat; (2) trawling behind the boat or canoe, using a line and either bait or artificial lures; (3) gillnets 20-100m long and 3-5m high that are fixed at both ends with a weight and a marking buoy – these nets are usually left in the water for 5-10 hours; (4) harpoons used by divers; (5) cast nets, or circular nets with lead

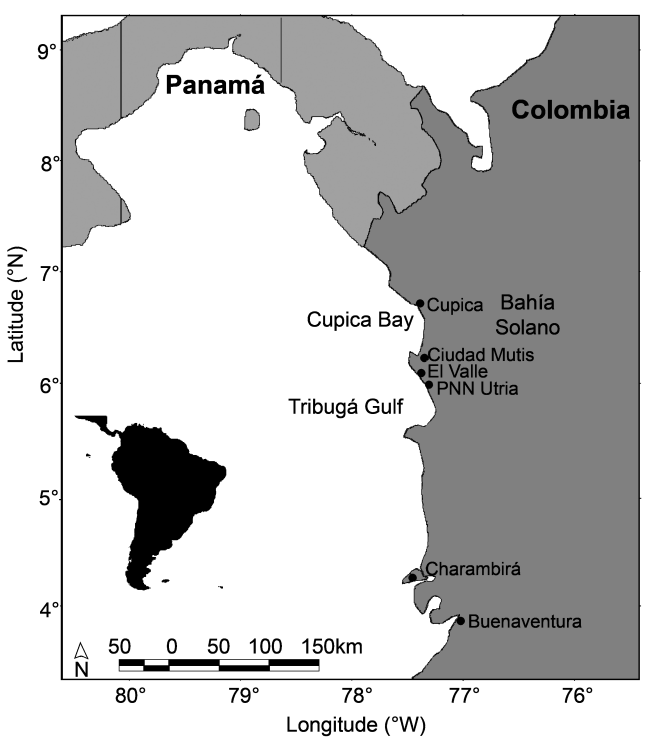

Fig. 1. Study area: Bahía Solano, localised in the northwestern section of Colombia in the department of Chocó, between PNN Utría and Cupica town.

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weights that trap fish in the water column while the net is falling; and (6) bottom longlines, the main line containing 500-3,000 baited hooks that are approximately 1.5m apart. Different baits are used for each fishing technique, including fish, crustaceans, squids and artificial fishing lures (Tobón, 2004), and at times dolphin parts. The government does not prohibit killing dolphins, but a license is required (Presidencia de la República, 1974). However, killing dolphins is not culturally acceptable and the Colombian Institute for Agriculture, ICA (previously the Colombian Institute for Rural Development, INCODER) discourages the practice.

With the objective of evaluating the practice of hunting dolphins for bait off Bahía Solano, Chocó, Colombia, data were collected on 246 days over eight months, 1 July-24 November 2005 and 11 January-19 April 2006. Interviews were conducted and observations made when fishermen unloaded their catch at a fish trade company in Ciudad Mutis. The fish trade company is the second most important company in the region. Identities of the company and fishermen were kept anonymous. Usually, fishermen sell their entire catch to one company. One hundred and twenty two fishermen (18.2% of all registered fishermen in the area) were interviewed. Ninety-four fishermen (37.3%) used longlines, 68 (27.0%) used hand lines, 66 (26.2%) trolling, 15 (5.9%) cast nets, 8 (3.2%) harpoons, and one (0.4%) gillnets. Most fish were caught using hand lines (5,881.0kg of fish) and longlines (2,8790.3kg), following by trolling (4,505.5kg), harpoon (591.0kg), cast net (528.0kg) and gillnet (70.5kg). The species with most significant landings in terms of weight in Bahía Solano were the Pacific bearded brotula (*Brotula clarckae*) (45.0%), groupers (*Epinephelus acanthistius, E. cifuentesi*) (10.3%) and smooth-hound (*Mustelus lunulatus*) (10.1%). Only fishermen using longlines confirmed using dolphins (locally known as 'bufeos') as bait.

Usually, longlines are set 7-18km off the coast between PNN Utría and Cupica, towns that are separated by 52km. For longline fishing, fibreglass or wood boats and 15-40hp outboard engines are used. The crew consists of 3-5 fishermen and the total load of these boats is 1-2 tons including crew, engine and catch. During a fishing bout, the long line is set an average of one time. The best time and place to set a longline depends on environmental factors such as tide and moon phase. Fish caught with longlines include brotulas (33.3%), groupers (33.3%), smooth-hounds (28.6%) and triple tails (*Lobotes pacificus*) (4.8%). The main bait used for longline fishing is sardine (*Cetengraulis mysticetus*) from March to July, complemented by mullets (*Mugil cephalus*) and bigeye scad (*Selar crumenophthalmus*) during the last quarter of the moon, and occasionally herring (*Opisthonema medirastre*) and squid (*Lolliguncula panamensis*) when trawling boats are in the area. As alternative bait, fishermen use smooth-hounds (*Mustelus lunulatus*) and eels, which can result in a catch of 75-152kg of fish. Although many longline fishermen admitted hunting dolphins, they were reluctant to identify the species or to let us see the dolphin carcasses. For longline fishermen, three (3.2%) stated that they hunted dolphins when possible, 12 (12.8%) hunted dolphins occasionally, when no other bait was available, and 34 (36.2%) stated that they never hunted dolphins. The remaining 45 (47.8%) longline fishermen provided no information on this topic.

Based on information collected during interviews, a minimum of nine dolphins were killed during this study (1.1 dolphin/month). However, this is probably an underestimate due to the unreliability of interview data (Lien *et al*., 1994). If these numbers are used to estimate number of dolphins killed by all 250 longline fishermen in the region, it can be estimated that at least 24 dolphins could have been killed during this study (3 dolphins/month). It was not possible to collect information about the dates and locations of dolphin captures, or the dolphin species involved. Based on fishermen's descriptions and relative abundance (Avila *et al*., 2008; García *et al*., 2006; Suárez, 1994), the most probable species used for bait were common bottlenose dolphins and pantropical spotted dolphins. Fishermen might occasionally harpoon striped dolphins (*S. coeruleoalba*), since Mora and Muñoz (1994) found a specimen that appeared to have marks on it. To hunt a dolphin, fishermen approach a group, or wait until dolphins approach the boat and harpoon them. Fishermen said they sometimes use bait, e.g. yellowfin tuna (*Thunnus albacares*) or sardines (*Cetengraulis mysticetus*), to attract the dolphins. Fishermen stated that the best bait for certain fish species, like smooth-hound, is dolphin.

Mora and Muñoz (1994) found that fishermen prefer to hunt pantropical spotted dolphins, since they are less hardy than common bottlenose dolphins, which may live for up to six hours after harpooning. They also found that fishermen prefer to focus on mother-calf pairs, since they are inseparable even when hunted. By focusing on mother-calf pairs, fishermen can hunt two dolphins simultaneously.

This study provides the first quantitative evidence of the minimum number of dolphins that are used as bait in the Colombian Pacific. The killing of dolphins for use as fishing bait occurs in the Colombian Pacific, in spite of social and governmental disapproval. There is also evidence that this practice occurs in the Colombian Caribbean (C. García, pers. obs.). In the Colombian Pacific, the killing of dolphins for bait appears to have begun around 1970, becoming common probably towards 1990 (Fernández, 1975; Prieto, 1990). In Bahía Solano, dolphin killing appears to mainly occur when traditional bait (i.e. fish and squid) is not available.

It is difficult to extrapolate this study to other regions of the Colombian Pacific coast, since practices and beliefs are not homogeneous. For example, informal dialogue with approximately 15 fishermen in El Valle suggest that dolphin hunts are not common there (J.G. Soler, pers. comm.). Conversely, in Charambirá, Chocó (04°17'N, 77°30'W) dolphin hunts are common and licenses to hunt dolphins have been illegally sold since 1995 (see Figs 2 and 3; V. Puentes, pers. comm.). Mora and Muñoz (1994) conducted a series of interviews between the southern coast of Chocó (Charambirá) and Nariño (La Vigía, 02°37'N and 78°20'W) in 27 communities, and found that dolphins are used as bait for about 3% of longline fishing boats. Mora and Muñoz (1994) found that some industrial longline vessels also hunt dolphins, especially during the first half of the year and in the northern region of the Colombian Pacific. Industrial vessels usually take 10-20 dolphins in one hunt. Staff of the former INPA (National Institute of Fisheries and Aquaculture), confirmed to the authors that in the 1980s, they harpooned dolphins to use as bait in government shark fisheries research cruises.

The IUCN (International Union for the Conservation of Nature) has classified the common bottlenose dolphin and pantropical spotted dolphin as 'Least Concern'[1]. However, these classifications are for the species worldwide and do not take into account that at least four stocks of the coastal

[1] *www.redlist.org*.

Figs 2 and 3. Killing a dolphin for bait in Charambirá, Chocó (04°17'N, 77°30'W), in 1995.

pantropical spotted dolphins have been identified in the Eastern Tropical Pacific (Escorza-Treviño *et al*., 2005). These stocks may face different risks. In Colombia, both species are considered to be in the 'Near Threatened' category (Rodríguez-Mahecha *et al*., 2006). In the Colombian Pacific Exclusive Economic Zone (EEZ) (329,492km^2), the estimated population sizes are 3,548-14,493 common bottlenose dolphins and 1,755-8,820 pantropical spotted dolphins, the latter for the oceanic and coastal populations combined (Gerrodette and Palacios, 1996). However, there are no studies available regarding the status of coastal pantropical spotted dolphin populations, or their risks in the Colombian Pacific.

It is not possible at this time to estimate how dolphin hunting (minimum 1.1 dolphin/month) might affect long-term population viability, since population parameters for dolphins in this region are unknown. The preference for hunting mother-calf pairs could potentially influence the reproductive success of dolphins and alter their social structures.

Further research is necessary, including a determination of direct takes of dolphins in other fishing communities along the Pacific coast of Colombia, and other causes of mortality such as bycatch. The use of methods such as onboard observers on fishing boats would allow the identification of dolphin species. It would also allow for the collection of reliable data on interactions between fisheries and marine mammals. Research on the population dynamics and abundance of common bottlenose and pantropical spotted dolphins is also needed. Abundance data would allow a baseline to be established from which the possible effects of fisheries interactions could be estimated. It would also allow monitoring of their populations over the long term. Information from interviews is not completely reliable and thus the data in this note represent minimum numbers of direct takes of dolphins. However, these numbers provide an important starting point for further research.

The use of dolphins as bait, and in some cases for human consumption, is widespread (e.g. Alfaro-Shigueto *et al*., 2008; Crespo *et al*., 1994; Félix and Samaniego, 1994; Goodall *et al*., 1988; IWC, 1994; Northridge, 1984; Reeves and Leatherwood, 1994; Romero *et al*., 1997; Sánchez-Criollo *et al*., 2007; Vidal, 1992; Zavala-González *et al*., 1994). In some places fisheries that occasional hunted dolphins in the past have rapidly increased their take due to the perceived effectiveness of using dolphins for bait (e.g. Alfaro-Shigueto *et al*., 2008; Sánchez-Criollo *et al*., 2007; Trujillo and Gómez, 2005). Even if the current dolphin take does not have population level impacts, it has the potential to increase, as fishing resources diminish through overexploitation. Thus, we suggest that mariculture techniques to produce bait be explored, to supply bait for fishermen demand. We also recommend implementing an environmental education programme. Finally, sustainable tourism, including dolphin-watching, may have a lesser impact and would facilitate conservation on a regional level.

ACKNOWLEDGEMENTS

We thank the following: Bahía Solano community, especially the fishermen and the fish trade company staff, and Héctor Julio Quesada (INCODER) for the valuable information and Juan Gabriel Soler for the casual dialogues in El Valle. Vladimir Puentes provided pictures and information from Charambirá dolphin hunts; Julio César Herrera and Alexander Tobón identified some of the fish images. Francisco Javier Álvarez, Alan Giraldo, Gustavo Kattan, Carolina Murcia and Dario Correa commented on an early draft of this note; Koen Van Waerebeek, Robin Vaughn and an anonymous reviewer provided constructive and supportive corrections on a later version of the manuscript.

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Date received: September 2008
Date accepted: October 2008