

Use of dolphins for bait in the artisanal fisheries of Bahía Solano, Chocó, Colombia

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ABSTRACT

We evaluated dolphin hunting for bait in Bahía Solano, Chocó, Colombia, from July 2005 to April 2006. We interviewed 122 fishermen (18.2% of the registered fishermen in the zone) and obtained data from landings at a fishing company. Only fishermen using longlines (n=94; 37.3%) confirmed using dolphins for bait. One adult dolphin was reported to provide enough bait for two fishing bouts, capturing between 75 kg and 152 kg of fish. We could not obtain additional information about date, specific location or dolphin species, but the most probable captured species are *Tursiops truncatus* (common bottlenose dolphin) and *Stenella attenuata* (panropical spotted dolphin), since these are the most commonly encountered species in coastal waters. A minimum of nine dolphins were reported killed during the study period (1 dolphin/month). Extrapolating these numbers to all fishermen using longlines in the region (250), an absolute minimum of 24 dolphins might have been taken during the study period (2.7 dolphins/month). Presumably many fishermen even while they also took dolphins, did not communicate this to the interviewers, considering dolphins are legally protected in Colombia. Fish species captured with dolphin bait include *Brotula clarkae*, *Cephalopholis acanthistius*, *Epinephelus ciferuentesi*, *Mustelus lunulatus* and *Lobotes pacificus*.

INTRODUCTION

Bahía Solano is a municipality in the department of Chocó located in the northwestern Pacific coast of Colombia in the Bahía Cupica bay (between 06°04' and 06°40'N, and 77°25' and 77°30'W). It comprises five town heads: El Valle, Huina, Huaca, Nabugá, Cupica, and the municipal head: Ciudad Mutis (known as Bahía Solano), as well as the National Natural Park (PNN) Utría, one of the most important reserves with a marine influence in Colombia (Figure 1). Because Ciudad Mutis connects the interior of the country with El Valle and PNN Utría, sites significantly attractive to ecotourists (ASOHECO, unpublished data), it is a town of a high touristic interest. It is also a main port for cargo boats trading provisions, materials, timber and for passengers' transportation. Its main economic activities include artisanal fisheries, agriculture, timber extraction (Matallana, 1999), and more recently, the search for cocaine loads discarded at sea, locally known as "white marlin fishing" (pers. obs.).

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

Regarding their conservation status, globally IUCN has classified the bottlenose dolphin as “data deficient” (DD), while spotted dolphins are considered of “low risk of extinction”, but dependent on conservation measures (LR/cd) (www.redlist.org). However, this classification does not take into account that at least four stocks of the coastal spotted dolphins have been distinguished (Escorza-Treviño *et al.*, 2005) and that these may be facing different risks. In Colombia, both species are considered within the “near threatened” category (NT) (Rodríguez-Mahecha *et al.*, 2006). Within this context, it is important to mention that there are no available studies regarding the status of these populations or their risks in the Colombian Pacific. In the Colombian Pacific Economic Exclusive Zone, EEZ (339,500 km²), the population estimated is 3,548-14,493 for *T. truncatus* and 1,755-8,820 for *S. attenuata* (Guerrodete and Palacios, 1996).

The main economic activities in Bahía Solano are agriculture, timber extraction and artisanal fisheries, which are commercialized by five main fish trading companies. In this town there are five main fish trading companies, which commercialise artisanal fisheries landings with the main inland cities. Artisanal fisheries are conducted by 670 active fishermen, registered at the Bahía Solano Port Authority (H. J. Quesada, pers. comm.). Different baits are used for the various fishing arts (hand lines, trolling, gillnets, harpoons, cast nets, longlines), including fish, crustaceans, squids and artificial fishing lures (Tobón, 2004). Killing dolphins is not culturally accepted, and the Colombian Institute for Rural Development (INCODER) discourages that practice (H. J. Quesada, com. pers.). Yet, dolphins are occasionally captured in the area for bait, because of their relative abundance and easy detection. The purpose of this study is to confirm the occurrence of this activity in the region of Bahía Solano, through the analysis of data derived from fishermen interviews and in situ observation.

MATERIALS AND METHODS

Bahía Solano is a rural municipality (between 06°04' and 06°40'N, and 77°25' and 77°30'W) of about 6,900 people, in the department of Chocó, Colombia, South America (Figure 1). Information was gathered during 180 days (9 months), from 1 July - 24 November 2005, and 11 January – 19 April 2006, by conducting interviews and in situ observations when fishermen landed their products in one of the fish trade companies in Ciudad Mutis. The fish trade company is the second most important company in the region. The company and the fishermen are kept anonymous. Usually, fishermen sell their whole capture to a single company. Species captured, weight, name of fishermen and fishing zone were registered. We interviewed 122 fishermen (18.2% of the registered fishermen in the zone). Because of local beliefs related to dolphin mythology and the prohibition of killing dolphins, questions were carefully asked to obtain the information without compromising, or clashing with, the fishermen. Direct observations yielded information on species captured, weight, name of fishermen and fishing zone.

RESULTS

The area covered by the fishermen is 890 km². The species with most significant landings were the Pacific bearded brotula (*Brotula clarkae*) (45.0%), groupers (*Cephalopholis acanthistius*, *Epinephelus cifuentesii*) (10.3%) and smooth-hound (*Mustelus lunulatus*) (10.1%). In the area, artisanal fishermen use six main fishing gears: 1) Hand lines with a weight and one or several baited hooks. 2) Trolling a trailing line behind the boat or canoe, using either bait or artificial lures. 3) Gillnets nets between 20m and 100m long, and three to five m width; it is fixed by both ends with a weight, and a marking buoy; it is usually left soaking for five for ten hours. 4) Harpoons used by divers. 5) Cast nets, which are circular nets with lead weights, which trap fish in the water

column while it is falling. 6) Bottom longlines: main line with 500 to 3,000 baited hooks approximately 1.5m apart.

Usually, longlines are set within seven and 18km off the coast between the limits of PNN Utría and Cupica (52km between these two points). For these fishing bouts, fibreglass or wood boats and 15-40hp engines are used; the crew consists of three to five fishermen, and the total load of these boats is between one and two tons (including crew, engine and catch). In average, during a fishing bout the long line is set only once. This activity depends on environmental factors, such as tide and moon phase. The main bait used is sardine (*Cetengraulis mysticetus*) between March and July, complemented by mullets (*Mugil cephalus*), 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. If the most common bait is scarce, fishermen use smooth hounds (*Mustelus lunulatus*) or eels (*Ophichthidae* and *Muraenidae*).

Overall, 122 fishermen were interviewed (18.2% of all registered fishermen in the area). Ninety four of them (37.3%) used longlines, 68 (27.0%) used hand lines, 66 (26.2%) trolling, 15 (6.0%) used cast nets, eight (3.2%) used harpoons, and one (0.4%) used gillnets. Most landings, in kg of fish, were supplied by hand lines and longlines (Table 1). Of the six fishing methods, only fishermen using longlines confirmed using dolphins (locally known as “buefos”) as bait. One dolphin may bait two fishing bouts (1,000 to 6,000 hooks), depending on the species and size.

Although many fishermen acknowledged killing dolphins, they were reluctant to identify the species or let us see the dolphins. From 94 interviewed longline fishermen, 3.2% (3 fishermen) indicated that they hunted dolphins whenever it was possible, 12.8% (12) hunted dolphins only occasionally, when there is no other bait available, 36.2% (34) supposedly never hunt dolphins, and the other 47.8% (45 fishermen) did not offer information on the issue. Unfortunately, it was not possible to gather more detailed information about the date and location of capture, or dolphin species involved. Based on a few descriptions, and relative abundance (Suárez, 1994; García *et al.*, 2006; Avila *et al.*, in press), the most probable species used for bait are *Tursiops truncatus* and *Stenella attenuata*. They might also occasionally harpoon striped dolphins (*Stenella coeruleoalba*), as Mora and Muñoz (1994) found a specimen with evidence of this kind of interaction. To hunt a dolphin, fishermen approach a dolphin herd or wait until dolphins approach the boat themselves. Fishermen say that sometimes they use bait, such as yellowfin tuna (*Thunnus albacares*) or sardines (*Cetengraulis mysticetus*) to attract the dolphins and harpoon them. Fishermen indicated that the best bait for certain fish species is dolphin meat.

Directly from the information obtained from fishermen, it was possible to determine that a minimum of nine dolphins were sacrificed during this study (1 dolphin/month). Extrapolating these numbers to all fishermen using longlines in the region (250), an absolute minimum of 24 dolphins might have been taken during the study period (2.7 dolphins/month). Fish taken with dolphin meat bait include brotulas (*B. clarkae*) (33.3%), groupers (*C. acanthistius*, *E. cifuentesi*) (33.3%), smooth-hounds (*M. lunulatus*) (28.6%) and triple tails (*Lobotes pacificus*) (4.8%) (Table 1).

DISCUSSION

This is the first quantitative evidence of the problem of dolphins being used as bait in the Colombian Pacific, even without detailed information about this activity. Dolphin killing for fishing is a reality in the Colombia Pacific, in spite of social and government disapproval. Based on mortality found of dolphins used as bait, we could calculate the extent of the problem for the whole Pacific coast of Colombia, but practices and beliefs are not homogeneous along this coast, which makes a generalization impossible. Informal dialogues with approximately 15 fishermen in El Valle, Chocó (Figure 1) suggest that in this town dolphin hunts are not common and this activity cannot be generalized for the whole region. Mora and Muñoz (1994) made a series of interviews between the southern coast of Chocó (Charambirá, 04° 17' N and 77° 30'W) and Nariño (La Vigía, 02° 37' N and 78° 20'W) in 27 communities, and found that the use of dolphins as bait for longlines is around 3%. However, these interactions were not homogeneous along the coast, as while in some communities (Charambirá, for example) it is a common practice; in other communities it was rare.

Mora and Muñoz (1994) revealed that these dolphin hunts are not exclusive of artisanal fisheries, but that some industrial vessels also hunt dolphins, especially during the first half of the year and in the northern region of the Colombian Pacific; during these fishing bouts, they usually take between 10-20 dolphins. This fact was confirmed to the authors by staff of the former INPA (National Institute of Fisheries and Aquaculture), who explained how, in the 1980's, following the common practice, this institute harpooned dolphins to be used as bait in government shark fisheries research cruises.

As information about population parameters of dolphins in the region is not available, it is impossible to estimate the effect that the mortality inflicted by the direct takes (1 dolphin/month) might have on the population long term viability. Based on the population estimated in the Colombian Pacific EEZ (Gerrodette and Palacios 1996), this number is high with respect to the potential dolphin population in Bahía Solano. Mora and Muñoz (1994) describe that fishermen, apart from preferring to hunt spotted dolphins (these are less resistant than common bottlenose dolphins, which may stay alive up to six hours after being harpooned), focus on mother-calf pairs, because they will not abandon their mother/calf, even under mortal threat. In this way, they can hunt at least two dolphins during a hunting bout. This preference can affect populations in a more significant way than a random hunt, altering their social and reproductive structure.

For these reasons, it is necessary to continue this investigation, include other fishing communities along the Pacific coast of Colombia and use more reliable methodologies that allow the identification of species involved, and to measure the interactions between fisheries and marine mammals, both for direct takes and incidental catches, as well as for industrial and artisanal fisheries. It is also necessary to initiate a study to understand the population dynamics and estimate the abundance of bottlenose and spotted dolphins, to set a baseline, calculate the possible effect of fisheries interactions and to monitor their populations in the long term. Unfortunately information from interviews is not trustworthy and the data in this note correspond to minimum numbers, assuming that most fishermen won't easily

The use of dolphins as bait, and in some cases for human consumption, is widespread (e.g. Northridge, 1984; Goodall *et al.*, 1988; Vidal, 1992; Félix and Samaniego, 1994; IWC, 1994; Reeves and Leatherwood, 1994; Romero *et al.*, 1997; López *et al.*, 2003; Baker *et al.*, 2006), but in some places an occasional take has rapidly become a common practice, due to the supposed efficiency of dolphin meat as bait (e.g.; Trujillo and Gómez, 2005). If the current number of dolphins taken from the population were not significant at the moment, it can still develop into a popular practice, as fishing resources start to diminish through a generalized overexploitation, even in regions of Colombia where it is still uncommon. For this reason, we suggest that sea culture techniques to produce bait should be explored, to supply bait for fishermen demand. We also recommend starting an environmental education process, as well as a sustainable tourism planning, including dolphins within the main attractions, and promoting thus a non extractive use of these animals and their regional conservation.

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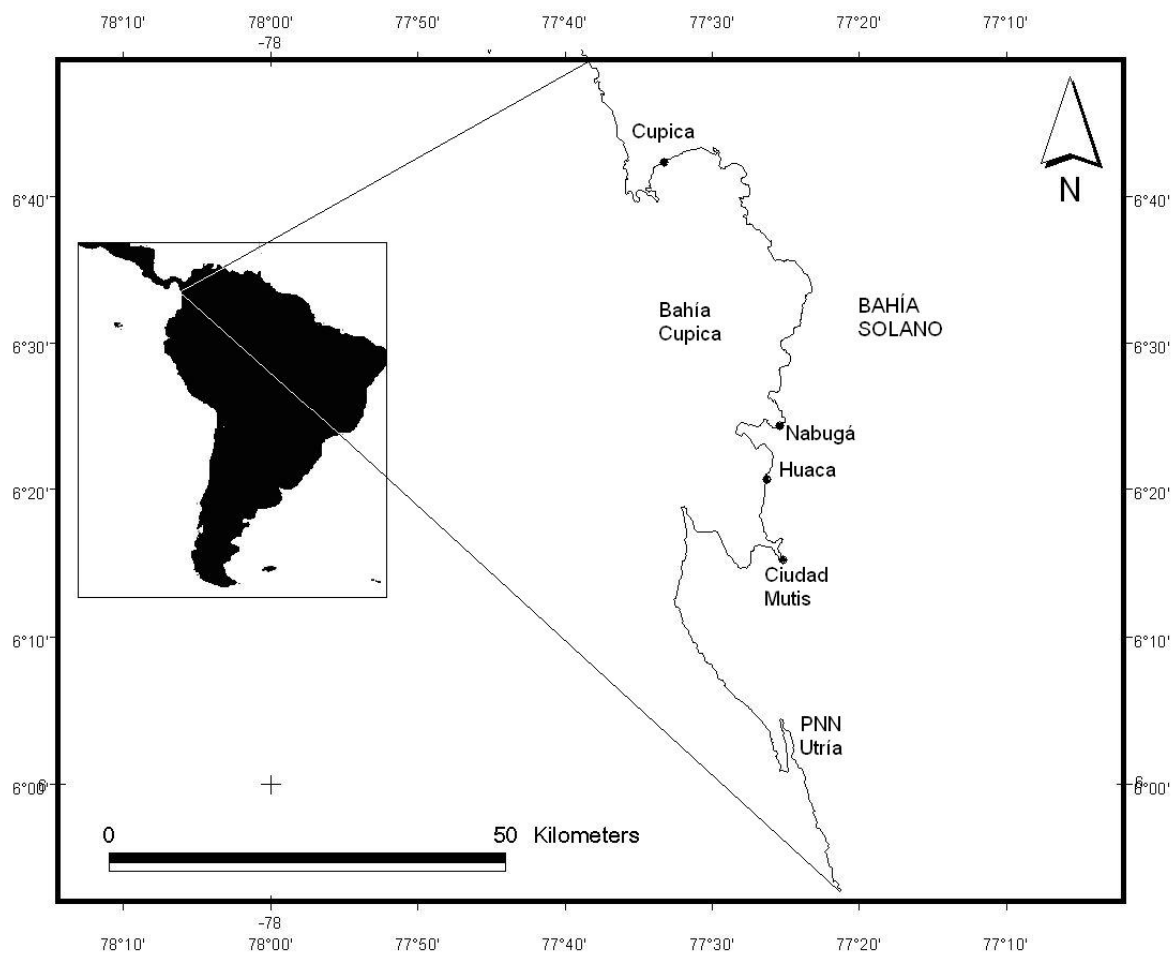


Figure 1. Study area: Bahía Solano, localized in the north western section of Colombia in the department of Chocó, in the Bahía Cupica bay, between PNN Utría and Cupica town head.

Table 1: Fishing arts used by interviewed fishermen, fish species captured landings total weight (kg) during the study period and bait used.

Fishing art	Fish species captured	kg of total landings	Species of bait used
Hand line	<i>Lutjanus novemfasciatus</i> , <i>Lutjanus guttatus</i> , <i>Lutjanus peru</i> , <i>Hoplopagrus guentherii</i> , <i>Lutjanus colorado</i> , <i>Seriola lalandi</i> , <i>Tylosurus</i> sp., <i>Trachinotus</i> sp., <i>Istiophorus platypterus</i> , <i>Caranx</i> sp., <i>Ephinephelus itajara</i> , <i>Megalops atlanticus</i> , <i>Seriola peruana</i>	58881.0	<i>Cetengraulis mysticetus</i> , <i>Selar crumenophthalmus</i> , <i>Mugil cephalus</i> , <i>Opisthonema medirastre</i> , <i>Guerres cinerus</i> , <i>Lolliguncula panamensis</i> , <i>Pennaeus</i> sp.
Longline	<i>Cephalopholis acanthistius</i> , <i>Ephinephelus cifuentesi</i> , <i>Brotula clarkae</i> , <i>Mustelus lunulatus</i> , <i>Sphyrna</i> sp., <i>Carcharinus</i> sp., <i>Lobotes pacificus</i> , <i>Paralabrax</i> sp., <i>Mycteroperca rosacea</i> , <i>Achirus scutum</i> , <i>Caulolatilus affinis</i>	28790.3	<i>Cetengraulis mysticetus</i> , <i>Selar crumenophthalmus</i> , <i>Mugil cephalus</i> , <i>Opisthonema medirastre</i> , <i>Mustelus lunulatus</i> , <i>Ophichthidae</i> , <i>Muraenidae</i> , <i>Lolliguncula panamensis</i> , <i>Stenella attenuata</i> , <i>Tursiops truncatus</i>
Trolling	<i>Thunnus albacares</i> , <i>Coryphaena equiselis</i> , <i>Coryphaena hippurus</i> , <i>Scomberomorus sierra</i> , <i>Acanthocybium solandri</i>	4505.5	<i>Cetengraulis mysticetus</i> , <i>Lolliguncula panamensis</i> , artificial fishing lures
Harpoon	<i>Ephinephelus itajara</i>	591.0	None
Cast net	<i>Centropomus armatus</i> , <i>Centropomus unionensis</i>	528.0	None
Gillnet	<i>Scomberomorus sierra</i>	70.5	None