

## **Common dolphin prey species in the eastern Ionian Sea: Insight from fish scales sampled during surface foraging**

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### **INTRODUCTION**

A short-beaked common dolphin (*Delphinus delphis*) community has been the subject of a long-term study conducted in eastern Ionian Sea coastal waters since 1993 (see Bruno *et al.* and Politi and Bearzi, this volume). In this area, common dolphins engage in activities involving feeding rushes and high-speed fish pursuing at the water-air interface for approximately 5% of their total time budget (based on >12,500 behavioural 3-min samples collected in 1996-2000).

Evidence of actual feeding other than surface "events" (*sensu* Bearzi *et al.* 1999) performed by the dolphins included observations of dolphins biting or carrying prey in their mouths, fish scales drifting in the water following surface feeding events, and frantic gathering of marine birds in the area. When visible from the surface, prey targets were mostly schooling fish 5-15cm long, which taxa could not be visually identified. To gain insight into common dolphin feeding ecology, this study focused on drifting scales collected immediately after individual predatory events.

### **MATERIALS AND METHODS**

The field work was carried out between 1997-2000, from May to October. The study area is located in the eastern Ionian Sea, in the waters surrounding the island of Kalamos, Greece. Observations were conducted from 4.7m inflatable craft with fibreglass keels powered by outboard engines. The scales lost by fish during predatory events were sampled by means of a snare (mesh size=0.4mm, diameter=20cm) mounted on top of a 1.5m wooden pole.

The snare was handled from aboard the boat, in sampling spots where surface feeding events were observed ("feeding spots"). Drifting fish scales could be visually detected up to a depth of a few meters, due to their reflective properties in the sunlight. Due to the slow sinking of the scales, their recovery from aboard the boat was only possible soon after a predatory event occurred in a feeding spot. The scales collected with the snare were preserved in ethanol 80% and stored into labelled vials.

A total of 57 fish scale "catches", each catch relating to one predatory event in a given feeding spot, were collected in 35 different days across the 4-year study period (Table 1). Fish scales were stored in separate vials (one vial per catch). The number of scales included in a vial ranged between 1-20 (mean=5.6, SD=4.67, N=57).

One scale was randomly extracted from a vial for fish species identification. Scales were hydrated with distilled water for approximately 5h, placed in a 10% potassium hydroxide solution for 30min, gently brushed, then mounted between two micro slides and photographed with a Leica DM RB polarised-light microscope (x1.6 lens).

The photographs of scales sampled following common dolphin feeding events were then compared with an atlas of scale photographs obtained from known local fish species. As morphological variability exists among scales from different body parts of the same individual, the atlas included photographs of scales collected from four different body parts, for fishes of various sizes.

## **RESULTS**

The analysis showed that all the scales sampled following common dolphin feeding events were of Clupeiformes (Table 2). In particular, 50.9% (N=29) were found to be scales from either sardines (*Sardina pilchardus*) or gilt sardines (*Sardinella aurita*). These species could not be reliably discriminated based on photos included in the atlas (Fig. 1). The remaining 49.1% (N=28) were anchovy scales (*Engraulis encrasicolus*).

## **DISCUSSION**

This study suggested that:

- 1) Clupeiformes were the main prey target of surface-feeding common dolphins in the area;
- 2) The collection and analysis of drifting fish scales represents a useful tool to gain insight into the poorly-known food habits of Mediterranean common dolphins.

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## REFERENCES

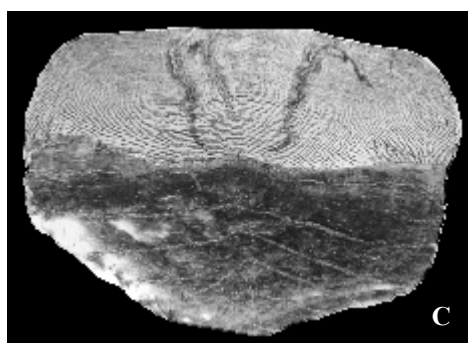
Bearzi, G., Politi, E and Notarbartolo di Sciara, G. 1999. Diurnal behavior of free-ranging bottlenose dolphins in the Kvarneric (northern Adriatic Sea). *Mar. Mamm. Sci.* 15(4):1065-1097.

Year	N of "catches"	N of scales
1997	10	59
1998	32	190
1999	3	15
2000	12	57
Total	57	321

**Table 1.** Number of fish scale "catches" and individual scales sampled during this study.

Year	<i>Sardina pilchardus</i> <i>Sardinella aurita</i>		<i>Engraulis encrasicolus</i>	
	N	%	N	%
1997	5	50.0	5	50.0
1998	12	37.5	20	62.5
1999	1	33.3	2	66.6
2000	11	91.6	1	8.3
Total	29	50.9	28	49.1

**Table 2.** Number and proportion of sampled scales of gilt sardines and sardines (combined), and anchovies.



**Fig. 1** Scales of sardine (A), gilt sardine (B), and anchovy (C).