



## On the stomach contents of a Risso's dolphin (*Grampus griseus*) from Chile, Southeast Pacific

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### ARTICLE INFO

<b>Manuscript type</b>	Short Communication
<b>Article history</b>	
Received	01 February 2010
Received in revised form	17 September 2010
Accepted	17 September 2010
Available online	27 January 2014
<b>Responsible Editor:</b> Jorge Urbán-Ramírez	
<b>Citation:</b> Yates, O. and Palavecino-Sepúlveda, P. (2011) On the stomach contents of a Risso's dolphin ( <i>Grampus griseus</i> ) from Chile, Southeast Pacific. <i>Latin American Journal of Aquatic Mammals</i> 9(2): 171-173. <a href="http://dx.doi.org/10.5597/lajam00185">http://dx.doi.org/10.5597/lajam00185</a>	

Current knowledge of the diet of the Risso's dolphin (*Grampus griseus* [Cuvier 1812]) is limited to opportunistic stomach samples collected from rare stranding events (Clarke and Pascoe, 1985; Cockcroft *et al.*, 1993; Clarke, 1996; Blanco *et al.*, 2006; D'Amico and Rivilla, 2006; García-Godos and Cardich, 2010) or from fishery bycatch (Öztürk *et al.*, 2007). The species has been described as teuthophagous, feeding almost exclusively on cephalopods and particularly on squid families associated with the deep sea such as the Ommastrephidae and Histioteuthidae (Clarke and Pascoe, 1985; Würtz *et al.*, 1992; Clarke, 1996; Öztürk *et al.*, 2007) although Blanco *et al.* (2006) describe a greater presence of oceanic octopods of the family Argonautidae. Some fish species and crustaceans have also been recorded in stomach content analysis, albeit in low abundance (Blanco *et al.*, 2006; D'Amico and Rivilla, 2006). Available information from stomach contents reveals prey species that are associated with the reported habitat for Risso's dolphin, the continental slope in depths over 600m (Baumgartner, 1997; Cañadas *et al.*, 2002; Azzellino *et al.*, 2008). Given that recording information from stranded animals relies on opportunistic sampling, there are areas of the species range where little is known about its feeding habits. We describe the stomach contents of a stranded Risso's dolphin from Chile, South East Pacific.

On 29 June 2009, we collected the stomach from a dolphin carcass which washed ashore off Guanaqueros, Coquimbo region (30°11'68"S, 071°25'21"W) on the central coast of Chile. Anatomical measurements were taken where possible but were restricted due to the advanced state of decomposition of the animal. The carcass was 322cm long

and genital slits indicated the animal was female. A necropsy was performed on the beach and the stomach was removed, weighed and its contents itemized and recorded. The intact stomach's total weight was initially 8.0kg and after emptying all contents and rinsing thoroughly, weighed 1.6kg. The stomach contents included pairs of matching upper and lower cephalopod beaks ( $n=8$ ), several incomplete beak fragments, tentacles ( $n=3$ ) and gladii ( $n=8$ ), plus approximately 900g of semi-digested opaque liquid. The majority of items were found to be sections of mantle ( $n=23$ ) but tentacles were the main component by weight (3,210g, 57.9% of total weight). By comparing cephalopod lower beaks following Xavier and Cherel (2009) against species identification guides in Wolff (1984) and with a reference collection held at the Universidad Católica del Norte in Coquimbo, all samples were identified as Humboldt squid (*Dosidicus gigas*).

In the Southeastern Pacific, the Humboldt Current delivers cool nutrient rich waters as far north as the Ecuadorian-Colombian border (UNEP, 2006). Up-welling zones along the coast of Chile create high levels of primary production which have given way to extensive fishery resources such as hake (*Merluccius gayi*) and horse mackerel (*Trachurus murphyi*), plus a large crustacean fishery (Pérez, 2005). In the mid 1990s and in recent years, an increase in the abundance of Humboldt squid has also led to the growth of a fishery targeting this species in the central north of Chile (Rocha and Vega, 2003). The fishery for Humboldt squid has no associated discard. Squid are caught 1-2km from the coast in small (<10m) open artisanal vessels using hand lines with squid lures, on occasion incorporating light sticks. The catch is sold whole to a single processing plant where the squid's

mantle is tubed and frozen, and the tentacles are used for fishmeal. Local fishermen confirm anecdotally that Risso's dolphin, locally known as the *chato* or *tonina* are regularly seen actively feeding in the squid fishing zone, but do not interact with fishing operations. Therefore we propose that the stomach contents from the animal sampled were caught as live prey, rather than from fishery discards.

Olavarría *et al.* (2001) reviewed sightings and records of Risso's dolphin in Chilean waters, detailing a continuous distribution from 20°13'S to 40°S along the South Eastern Pacific coast. Our findings support the suggestion that Risso's dolphin feed over the continental slope (Baumgartner, 1997; Olavarría *et al.*, 2001; Azzellino *et al.*, 2008) on a teuthophagous diet. However, while existing records report Risso's dolphin as feeding on small mesopelagic and demersal cephalopods such as *Elodene cirrhosa* in the North Atlantic (Clarke and Pascoe, 1985), *Loligo vulgaris reynaudu* in southern Africa (Cockroft *et al.*, 1993), and *Argonauta argo*, *Todarodes sagittatus* and *Histioteuthis reversa* amongst others in the Mediterranean (Blanco *et al.*, 2006; Bearzi *et al.*, 2011) our specimen fed on the large mesopelagic Humboldt squid. Larger cetaceans such as the sperm whale (*Physeter macrocephalus*) are known to target Humboldt squid as part of their diet (Clarke *et al.*, 1988; Ruíz-Cooley *et al.*, 2004) and our findings support García-Godos and Cardich (2010) suggestion that this species of squid is important in the diet of Risso's dolphin in the South East Pacific.

#### Acknowledgements

The Chilean NGO *Eutropia* provided information on the stranding. We thank members of the artisanal squid fishery in Coquimbo for sharing details of their fishing techniques and observations of Risso's dolphin at-sea and staff at the Universidad Católica del Norte fisheries laboratory for access to cephalopod beak reference collections. Carlos Olavarría and Antonio Mignucci provided valuable comments to improve the manuscript. This work was conducted as part of a project funded by the Whale and Dolphin Conservation Society, UK.

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