

THE OLOG'S GULL (*LARUS ATLANTICUS*) ATTENDING HIGH-SEAS TRAWLERS DURING THE BREEDING SEASON

JUAN PABLO SECO PON^{1,2} AND MARCO FAVERO¹

¹Grupo Vertebrados, Instituto de Investigaciones Marinas y Costeras (IIMyC), Consejo Nacional de Investigaciones Científicas y Técnicas–Universidad Nacional de Mar del Plata.

Funes 3250, B7602AYJ Mar del Plata, Buenos Aires, Argentina.

²secopon@mdp.edu.ar

ABSTRACT.— We report sightings of the Olog's Gull (*Larus atlanticus*) obtained during observations of the interaction between commercial high-seas trawl fisheries and seabirds off Argentina. In late spring 2009, up to eight individuals (both adult and sub-adult birds) were noted feeding on fishery discard of an ice-trawler operating in waters relative close to the El Rincón estuary, southeast Buenos Aires Province. This is the first record of Olog's Gull exploiting discards from high-seas fisheries 120 nautical miles off the coastline during the breeding season.

KEY WORDS: *El Rincón estuary, fishery discards, high-seas trawlers, Larus atlanticus, Olog's Gull.*

RESUMEN. LA GAVIOTA CANGREJERA (*LARUS ATLANTICUS*) ASOCIADA A ARRASTREROS DE ALTURA DURANTE LA TEMPORADA REPRODUCTIVA.— En este trabajo se dan a conocer avistajes de la Gaviota Cangrejera (*Larus atlanticus*) obtenidos durante el desarrollo de un proyecto de evaluación de la interacción entre pesquerías de arrastre de altura y aves marinas en aguas argentinas. A fines de la primavera de 2009, ocho individuos (incluyendo aves adultas y subadultas) fueron registrados alimentándose del descarte pesquero de un buque arrastrero fresquero en aguas cercanas al área del frente costero de El Rincón, en el sudeste de la provincia de Buenos Aires. Este es el primer registro de la Gaviota Cangrejera haciendo uso del descarte proveniente de pesquerías de altura a una distancia de 120 millas náuticas de la línea de costa durante la etapa reproductiva.

PALABRAS CLAVE: *arrastreros, descartes, El Rincón, Gaviota Cangrejera, Larus atlanticus.*

Received 17 December 2010, accepted 2 November 2011

The Olog's Gull (*Larus atlanticus*) is a species endemic to the Atlantic coast of Argentina (Olog 1967, Harrison 1983, Yorio et al. 1997). Its breeding range is restricted to only two nesting areas and six breeding colonies along 2500 km of the central Argentinean coast between 39°12'–45°11'S (García Borboroglu and Yorio 2007). The main breeding area of the species is situated in the Bahía Blanca estuary (Delhey and Petracci 2004). The entire breeding population has been estimated in approximately 4000–5000 pairs (BirdLife International 2010). The species is listed as Vulnerable by the International Union for the Conservation of Nature (IUCN) (BirdLife International 2010) and is included in Appendix I of the Convention on Migratory Species given its restricted distributional range, low population size, specialized food requirements, and conservation threats (Yorio and Harris 1992, Yorio et al. 1997, 2005). Hatching occurs in early November and

early December in southern Buenos Aires Province and northern Patagonia, respectively (Yorio et al. 2005). Previous studies of the Olog's Gull diet revealed that breeding individuals feed almost exclusively on grapsid crabs (Olog 1967, Devillers 1977, Delhey et al. 2001, Herrera et al. 2005). Over 70% of the total breeding population is concentrated in the Bahía Blanca estuary, an area subject to intense human pressures from urban development, industry, agriculture, recreation, fishing, pollution and even egging (Yorio et al. 1997, 2005, García Borboroglu and Yorio 2007). Habitat degradation and human activities such as sports fishing were reported to affect individuals in wintering grounds of southern Buenos Aires Province (Berón et al. 2007, Berón 2009). The species is suspected to be experiencing a gradual declining, but no assessment of the trends of the population exists (BirdLife International 2010).

To date there are few records of *Larus atlanticus* interacting with commercial fishing activities in Argentina. Individuals were observed to feed on fishery discards at the mouth of the Mar del Plata harbour and near the unloading area (Martínez et al. 2000). Large numbers of individuals were also reported feeding in association with fish-meal plants within the harbour (Berón et al. 2007, Berón 2009). However, until now the species has not been recorded in association with coastal and high-seas trawl fisheries (González-Zeballos and Yorío 2006, Favero et al. 2011). Here we report for the first time the Olrog's Gull interacting with commercial fishing vessels in offshore Argentinean waters. These observations were part of an ongoing survey aimed to assess seabird-fisheries interactions in the trawl fishery off Argentina.

METHODS

Seabird occurrence and abundance were systematically recorded onboard the *F/V Virgen María*, a commercial high-seas ice-trawler targeting Argentine hake (*Merluccius hubbsi*) and operating chiefly between 40°33'S, 60°00'W and 41°59'S, 61°15'W from 13 October to 8 November 2009. In general terms, fishers do not process the catch onboard and preserve it in ice within plastic cubes, trips last 4–15 days, vessels operate a minimum of 130–150 days per year and performs some 600 hauls per year. Fishing effort is distributed in the Patagonian Shelf and shelf break between 37–48°S, particularly concentrated between 42–46°S (see Favero et al. 2011). Observations were conducted primarily over the continental shelf (<200 m deep). Overall, 51 hauls were monitored in 15 fishing days.

Species composition and abundance estimations were performed during trawl operations during daylight hours. The counts were made from either the port or starboard side astern of the vessel covering a 200 m radius sampling area (200 m astern and 200 m on the starboard and port sides) (Favero et al. 2011). This provided the least obstructed view of the active fishing activity at the stern of the trawler and also minimized disturbance to fishing operations. At each survey we collect data on seabirds' attendance by means of the strip transect method (see Tasker et al. 1984). All seabirds that entered the designated area

(200 m) were counted during 10 min. The 200-m radius was calibrated periodically throughout the day using a range finder.

Autocorrelation between consecutive counts within a species within a day ranged between 0.28–0.63 (all $P < 0.05$). To eliminate this temporal autocorrelation, we calculated the mean count of each species within each haul within each fishing day (where a haul was defined as a complete sequence of trawling followed by haulback and discarding). Although summary tables are based on the complete data set, we used calculated mean values (210 means; without transformation) for analyses that include count data.

The species was identified by its banded bill, the white tail with black sub-terminal band, and the outer primaries that lack the white spots or "mirrors" of those of the Kelp Gull (*Larus dominicanus*) with which it is sometimes confused (see descriptions in Harrison 1983, and Narosky and Yzurieta 2003). For other seabirds, particularly albatrosses (Diomedidae), we followed the revised taxonomy in Robertson and Nunn (1998).

RESULTS

A total of 15 species were identified attending the vessel during the 131 trawl counts sampled. Adult and sub-adult individuals of the Olrog's Gull were sighted on five different occasions (Table 1). The sightings were concentrated between 16 October and 5 November 2009. Three single gulls were seen but on 3 and 4 November three and two birds were noted, respectively. Individuals that were conspicuous because of distinct plumage were seen only on single days, confirming a high turnover of birds.

The mean distance between the closest colony in the Bahía Blanca estuary and gulls sighted attending the vessel was 120 nautical miles (range: 64–133).

Olrog's Gull individuals were sighted mainly in association with other seabirds, being the Black-browed Albatross (*Thalassarche melanophris*) (frequency of occurrence: 100%, median: 150 individuals, range: 1–278), the Southern Giant Petrel (*Macronectes giganteus*) (76%, 3, 0–30), the White-chinned Petrel (*Procellaria aequinoctialis*) (91%, 18, 0–96), the Cape Petrel (*Daption capense*) (91%, 16, 0–90), the South American Tern (*Sterna hirundinacea*)

Table 1. Date, location, and number of adult and sub-adult individuals of Olrog's Gull (*Larus atlanticus*) sighted in association with a high-seas ice-trawler operating within Argentine jurisdictional waters.

Date	Location	Adults	Sub-adults	Total
16 October 2009	41°29'S, 60°00'W	1		1
25 October 2009	40°47'S, 61°05'W		1	1
3 November 2009	41°21'S, 60°04'W	2	1	3
4 November 2009	41°23'S, 60°00'W	1	1	2
5 November 2009	41°56'S, 60°47'W	1		1

(36%, 4, 0–55) and the Kelp Gull (8%, 19, 0–94), the most common species.

All seabirds were attracted by the discards originated by the fishing operations and were seen to feed on the refuse. In general, Olrog's Gull individuals remained either resting in different sections of the vessel (e.g., wire cable, handrail) or landed on the sea surface astern of the vessel in the vicinity of the discarding area. Although these individuals were often observed feeding upon fishery discards, no bird was ever observed interacting (e.g., colliding) with fishing gear or was incidentally captured.

DISCUSSION

According to our observations, both adult and sub-adult individuals of the Olrog's Gull appear to attend trawlers and exploit fishery discards over 100 nautical miles (or 185 km) away from their colony off the Argentine coastline during the breeding season. This is novel information considering that literature generally refers the species as nearshore and coastal forager during the breeding season. However, Olrog's Gull was seen only infrequently in comparison with other (mostly pelagic) seabird species sighted around the vessel. These low densities may be the result of the small population, but it is also possible that the species could be showing during recent times a shift in its foraging behaviour, taking advantage of an abundant and spatio-temporal predictable food resource such as fishery discards. Currently there is few data with regard to the offshore distribution of the Olrog's Gull, with the only record consisting of a small number of birds observed 10 nautical miles off the Mar del Plata harbour during

winter (Olrog 1958). All individuals observed in our study were concentrated in a restricted marine region of the South West Atlantic Ocean (waters close to El Rincón estuary, see Acha et al. 2004), suggesting that at least some individuals may concentrate in this area during the breeding season. Although it has been referred as a seabird specialized in the consumption of crabs, recent observations in line with this study suggest that the Olrog's Gull regularly attend coastal fisheries in wintering grounds of southeast Buenos Aires Province. Between May 2007 and May 2008 Olrog's Gull was the second most frequent and abundant top predator associated with the coastal fleet fishing within 25 nautical miles of Mar del Plata harbour, with up to 78 gulls attending the vessels (Seco Pon, unpublished data).

Several authors suggested that individuals breeding in estuarine habitats feed primarily on crabs (Olrog 1967, Devillers 1977, Delhey et al. 2001, Herrera et al. 2005). Moreover, breeding birds were observed to forage over a very restricted area located within 2–4 nautical miles of the colony in intertidal habitats where they feed on grapsid crabs (Yorio et al. 2004). Thus, the foraging range of breeding gulls could be defined by the spatial extension of these intertidal habitats at least in Patagonia (Yorio et al. 2004). Accordingly, this seems to be one of the few species of gulls with relatively specialized feeding habits in its breeding grounds (Burger and Gochfeld 1996, Yorio et al. 2005). Previous diet studies conducted in wintering grounds of southern Buenos Aires Province also reinforce the relatively high feeding specialization of the Olrog's Gull outside the breeding season (Spivak and Sánchez 1992, Copello and Favero 2001, Berón

2003, 2009, Berón and Favero 2010). However, gulls are not limited to estuarine habitats in winter. During the non-breeding season, the species appears to be a more generalist forager, at least in Buenos Aires Province, than during the breeding season. Previous studies have pointed mussels (*Mytilus* spp.) (Escalante 1966), fish (Olrog 1967, Spivak and Sánchez 1992, Berón et al. 2007), insects (Spivak and Sánchez 1992), grains (Pettracci et al. 2007), sewage (Martínez et al. 2000), and fishery-related items such as discarded offal from fishing vessels (Martínez et al. 2000) and factories, and bait abandoned by sport fishermen (Berón 2009) as occasional prey. Hence, the species may show certain ecological plasticity in its wintering grounds, placing the Olrog's Gull closer to the generalist pattern of the majority of larids (Pettracci et al. 2007).

In general, the interactions between marine wildlife and fisheries have been classified into direct or indirect and either positive or negative (Tasker et al. 2000, Montevecchi 2002). The provision of food in the form of fishery waste and discards by commercial harbours and other fishing-related activities (Bertellotti et al. 2001, Giaccardi and Yorio 2004, Gandini et al. 2008) can be regarded as a direct positive effect of fisheries on local seabirds. For instance, several colonies of another larid, the Kelp Gull, have grown considerably in Argentina in the last few decades, at least partly as a result of increased human food resources provided by coastal fisheries and urban and fishery waste tips (Yorio and Giaccardi 2002, Yorio and Caille 2004, Giaccardi and Yorio 2004, Yorio et al. 2005). Discards of the Argentine commercial high-seas fleet directed to the hake fishery varied annually 15 563–46 113 tonnes during the 1990–1997 period (Dato et al. 2003). Fishers do not process the catch onboard, hence the bulk of the discards are comprised by whole fish of unwanted commercial size (in the case of the target species) or non targeted species (by-catch fraction). Although such use of discards could be understood as beneficial for the conservation prospects of the Olrog's Gull (Martínez et al. 2000), changes in the population size have not been noted among the species. Besides the increase of risk of mortality due to collisions and entanglements, species such as the Olrog's Gull could also be affected by the expansion in the population of larger and more aggressive species such as

the Kelp Gull (Yorio et al. 2005). Moreover, the Olrog's Gull has been reported to exploit sport fishing by-products with detrimental outcomes as the ingestion of fishing discards and baits containing hooks or severe entanglement with fishing lines which leads to an increase in adult mortality that is unsustainable (Berón et al. 2007). It is concerning that the Olrog's Gull could be regularly attending high-seas fisheries, since this vulnerable species may be affected by fishing operations during the sensitive period of chick rearing. Further studies that monitor and give more precisions about these interactions with coastal and high-seas fishing vessels should be encouraged, along with further training programmes to upgrade the skills of fisheries' observers for the identification and the estimation of abundance of seabirds attending trawlers in Argentine waters.

ACKNOWLEDGEMENTS

We thank Paula Berón (CONICET, Argentina) for improving a draft of the manuscript and Gabriel Blanco (INIDEP, Argentina) for logistic assistance. Two anonymous referees greatly improved an early version of the manuscript. JPSP was supported by a doctoral scholarship by CONICET (Argentina).

LITERATURE CITED

- ACHA EM, MIANZAN HW, GUERRERO RA, FAVERO M AND BAVA J (2004) Marine fronts at the continental shelves of austral South America: physical and ecological processes. *Journal of Marine Systems* 24:83–105
- BERÓN MP (2003) Dieta de juveniles de Gaviota Cangrejera (*Larus atlanticus*) en estuarios de la provincia de Buenos Aires. *Hornero* 18:113–117
- BERÓN MP (2009) *Ecología trófica de la Gaviota de Olrog (Larus atlanticus) en ambientes naturales y antropizados del este y sudeste bonaerense*. Doctoral thesis, Universidad Nacional de Mar del Plata, Mar del Plata
- BERÓN MP AND FAVERO M (2010) Monitoreo de la dieta de la Gaviota de Olrog (*Larus atlanticus*) en la Laguna Mar Chiquita (Buenos Aires, Argentina) durante el período no reproductivo. *Ornitología Neotropical* 21:215–224
- BERÓN MP, FAVERO M AND GÓMEZ-LAICH A (2007) Use of natural and anthropogenic resources by the Olrog's Gull *Larus atlanticus*: implications for the conservation of the species in nonbreeding habitats. *Bird Conservation International* 17:351–357
- BTELLOTTI M, YORIO P, BLANCO G AND GIACCARDI M (2001) Use of tips by nesting Kelp gulls at a growing colony in Patagonia. *Journal of Field Ornithology* 72:338–348

- BIRDLIFE INTERNATIONAL (2010) *Species factsheet: Larus atlanticus*. BirdLife International, Cambridge (URL: <http://www.birdlife.org/>)
- BURGER J AND GOCHFELD M (1996) Family Laridae (gulls). Pp. 572–623 in: DEL HOYO J, ELLIOTT A AND SARTAGAL J (eds) *Handbook of the birds of the world. Volume 3. Hoatzin to auks*. Lynx Edicions, Barcelona
- COPELLO S AND FAVERO M (2001) Foraging ecology of Olrog's Gull *Larus atlanticus* in Mar Chiquita Lagoon (Buenos Aires, Argentina): are there age-related differences? *Bird Conservation International* 11:175–188
- DATO CV, VILLARINO MF AND CAÑETE GR (2003) El descarte en la flota comercial argentina dirigida a la pesquería de merluza. Período 1990-1997. *INIDEP Informe Técnico* 51:97–110
- DELHEY JKV, CARRETE M AND MARTÍNEZ M (2001) Diet and feeding behaviour of Olrog's Gull *Larus atlanticus* in Bahía Blanca, Argentina. *Ardea* 89:319–329
- DELHEY JKV AND PETRACCI P (2004) Aves marinas y costeras del estuario de Bahía Blanca. Pp. 203–220 in: PÍCCOLO MC AND HOFFMEYER MS (eds) *El ecosistema del estuario de Bahía Blanca*. Instituto Argentino de Oceanografía, Bahía Blanca
- DEVILLERS P (1977) Observations at a breeding colony of *Larus (belcheri) atlanticus*. *Gerfaut* 67:22–43
- ESCALANTE R (1966) Notes on the Uruguayan population of *Larus belcheri*. *Condor* 68:507–510
- FAVERO M, BLANCO G, GARCÍA G, COPELLO S, SECO PON JP, FRERE E, QUINTANA F, YORIO P, RABUFFETTI F, CAÑETE G AND GANDINI P (2011) Seabird mortality associated to ice trawlers in the Patagonian Shelf: effect of discards in the occurrence of interactions with fishing gear. *Animal Conservation* 14:131–139
- GANDINI P, SECO PON JP AND FRERE E (2008) Composición de la dieta de la Gaviota Austral (*Larus scoresbii*) en Patagonia, Argentina. *Ornitología Neotropical* 19:109–116
- GARCÍA BORBOROGLU P AND YORIO P (2007) Breeding habitat requirements and selection by the threatened Olrog's Gull *Larus atlanticus*. *Auk* 124:1201–1212
- GIACCARDI M AND YORIO P (2004) Temporal patterns of abundance and waste use by Kelp Gulls at an urban and fishery waste tip in northern coastal Patagonia, Argentina. *Ornitología Neotropical* 15:93–102
- GONZÁLEZ-ZEBALLOS D AND YORIO P (2006) Seabird use of discards and incidental captures at the Argentine hake trawl fishery in the Golfo San Jorge, Argentina. *Marine Ecology Progress Series* 316:175–183
- HARRISON P (1983) *Seabirds: an identification guide*. Houghton Mifflin, Boston
- HERRERA G, PUNTA G AND YORIO P (2005) Diet specialization of the threatened Olrog's gull *Larus atlanticus* during the breeding season at Golfo San Jorge, Argentina. *Bird Conservation International* 15:89–97
- MARTÍNEZ MM, ISAACH JP AND ROJAS M (2000) Olrog's Gull *Larus atlanticus*: specialist or generalist? *Bird Conservation International* 10:89–92
- MONTEVECCHI WA (2002) Interactions between fisheries and seabirds. Pp. 527–557 in: SCHREIBER EA AND BURGER J (eds) *Biology of marine birds*. CRC Press, Boca Raton
- NAROSKY T AND YZURIETA D (2003) *Guía para la identificación de las aves de Argentina y Uruguay*. Edición de oro. Vazquez Mazzini Editores, Buenos Aires
- OLROG CC (1958) Notas ornitológicas sobre la colección del Instituto Miguel Lillo, Tucumán. *Acta Zoológica Lilloana* 15:5–18
- PETRACCI P, DELHEY JKV AND SOTELO M (2007) Hábitos granívoros en la Gaviota Cangrejera (*Larus atlanticus*): implicancias sobre su estatus de especialista. *Hornero* 22:51–54
- ROBERTSON CJR AND NUNN GB (1998) Towards a new taxonomy for albatrosses. Pp. 13–19 in: ROBERTSON G AND GALES R (eds) *Albatross: biology and conservation*. Surrey Beatty and Sons, Chipping Norton
- SPIVAK E AND SÁNCHEZ N (1992) Prey selection by *Larus belcheri atlanticus* in Mar Chiquita lagoon, Buenos Aires, Argentina: a possible explanation for its discontinuous distribution. *Revista Chilena de Historia Natural* 65:209–220
- TASKER ML, CAMPHUYSEN CJ, COOPER J, GARTHE S, MONTEVECCHI WA AND BLABER SJM (2000) The impacts of fishing on marine birds. *ICES Journal of Marine Science* 57:531–547
- TASKER ML, HOPE JONES P, DIXON T AND BLAKE BF (1984) Counting seabirds at sea from ships: a review of methods employed and a suggestion for a standardized approach. *Auk* 101:567–577
- YORIO P, BERTELLOTTI M AND GARCÍA BORBOROGLU P (2005) Estado poblacional y de conservación de gaviotas que se reproducen en el litoral marítimo argentino. *Hornero* 20:53–74
- YORIO P AND CAILLE G (2004) Fish waste as an alternative resource for gulls along the Patagonian coast: availability, use, and potential consequences. *Marine Pollution Bulletin* 43:778–783
- YORIO P AND GIACCARDI M (2002) Urban and fishery waste tips as food sources for birds in northern coastal Patagonia, Argentina. *Ornitología Neotropical* 13:283–292
- YORIO P AND HARRIS G (1992) Actualización de la distribución reproductiva, estado poblacional y de conservación de la Gaviota de Olrog (*Larus atlanticus*). *Hornero* 13:200–202
- YORIO P, PUNTA G, RÁBANO D, RABUFFETTI F, HERRERA G, SARAVIA J AND FRIEDRICH P (1997) Newly discovered breeding sites of Olrog's Gull *Larus atlanticus* in Argentina. *Bird Conservation International* 7:161–165
- YORIO P, QUINTANA F, GATTO A, LISNIZER N AND SUÁREZ N (2004) Foraging patterns of breeding Olrog's Gull at Golfo San Jorge, Argentina. *Waterbirds* 27:193–199