

Nocturnal predation by the Grey Heron *Ardea cinerea* on the European Storm-petrel *Hydrobates pelagicus*

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The European Storm-petrel *Hydrobates pelagicus* colonies located in the Iroise National Nature Reserve, Molène archipelago, western Brittany, are the largest in France with a total of 710–765 apparently occupied sites (AOS) in 2012 (Cadiou *et al.* 2004; Bretagne Vivante 2012). European Storm-petrels nest mainly in cavities under rocks, in former European Rabbit *Oryctolagus cuniculus* burrows or in boulder beaches.

These colonies are visited regularly from late March to late October to search for pellets regurgitated by gulls in order to evaluate the intensity of predation of European Storm-petrels (hereafter 'Storm-petrels'). About 100–400 pellets have been found annually since the mid 1990s (Bretagne Vivante 2012). All pellets were examined to search for possible rings of Storm-petrels, as adults and chicks have been ringed annually since the mid 1970s and 1997 respectively.

In September 2009, an unusually large pellet was found that contained many feathers and three rings from Storm-petrels. The predator could not be identified. In June 2010, two similar pellets, containing one and two Storm-petrel rings, respectively, were found but the predator still could not be identified. In 2011, a further 15 such pellets were reported from June to August, containing a

total of eight Storm-petrel rings (Figure 1). At least two pellets also contained the remains of small shrimp, probably *Palaemon serratus*, and two other pellets contained a small pharyngeal bone of an unidentified wrasse species, and an unidentified periwinkle species (*Littorina* sp.) respectively. Grey Heron *Ardea cinerea* feathers were then found in the same location as some pellets, indicating that the Grey Heron was the predator. In 2012, a Grey Heron was regularly recorded roosting during the day in two areas, away from Storm-petrel nest-sites, and ten pellets were found, containing three rings. Careful examination also revealed a few Storm-petrel bones, but totally soft and elastic as a result of the strong action of gastric juices.

From 2009 to 2012, this (presumed the same) Grey Heron had killed at least 17 ringed birds, previously mist-netted at night (12) or ringed as breeders (3) or as chicks (2) at nest-sites. Amongst them, there was one of the oldest Storm-petrels known from Iroise, a bird mist-netted in July 1983 and killed in August 2011, 28 years since ringing and thus at least 30 years old, since Storm-petrels normally begin to frequent colonies from the age of two, and very rarely at the age of one year (pers. obs.). This Storm-petrel had been controlled at night almost every year during the last decade before its death, and its age was close to the British and Irish record for the species of 32 years between ringing and recapture (Robinson & Clark 2012).

The Grey Heron has been established as breeder in the Molène archipelago since 2002, with nests built on the ground, generally on the foreshore (Cadiou & Le Gall 2006). In 2009–2012, 7–11 pairs bred but none were on islands with breeding Storm-petrels (Bretagne Vivante 2012). It has probably been the same individual Grey Heron which has specialised in this type of nocturnal predation in recent years (see Hall & Kress (2008) about specialisation), but whether it is a local breeder or a non-breeder is unclear. This individual probably



Figure 1. A regurgitated Grey Heron *Ardea cinerea* pellet containing European Storm-petrel *Hydrobates pelagicus* remains, with a ring on the surface (on the left), found in June 2011 in the Molène archipelago. © Bernard Cadiou.

rests on the island, on the lookout for Storm-petrels landing at or leaving their burrows at dusk, at night or at dawn, presumably adopting the 'stand and wait' feeding behaviour (Willard 1977). As with gulls, predation by the heron almost certainly occurred by night in the Molène archipelago, Storm-petrels being inaccessible in their nest-sites by day, and there were no signs of attempts of extraction in the soil at the entrances of the burrows. The nocturnal activity of these predators may probably be sometimes facilitated by ambient light from the moon.

Nocturnal or crepuscular foraging is common in ardeid species such as herons of the genus *Ardea* (Cramp & Simmons 1977; Van Vessem & Draulans 1986; McNeil *et al.* 1993, 1999; Black & Collopy 2002). Herons feed opportunistically on various types of prey (fishes, amphibians, invertebrates, mammals, birds: Cramp & Simmons 1977; Fasola 1994). Amongst seabirds, terns are the group reported most regularly as prey of heron species (e.g. Hunter & Morris 1976; Ramos & del Nevo 1995; Barbour *et al.* 2000; Williams & Ward 2006; Perrow *et al.* 2010). Williams & Ward (2006) found only one reported case of predation of storm-petrels by herons, this being in the Galapagos Islands where Great Blue Heron *Ardea herodias* extracted young Madeiran Storm-petrels *Oceanodroma castro*

from burrows during the day (Harris 1969). However, such predation on storm-petrels may go unnoticed, because it occurs at night and the pellets are regurgitated by herons at places used for roosting, probably sometimes located outside the storm-petrel colonies.

Grey Heron can thus be added to the list of predators of Storm-petrels in Brittany: Great Black-backed *Larus marinus*, Herring *L. argentatus* and Lesser Black-backed Gulls *L. fuscus* (Cadiou *et al.* 2004; Bretagne Vivante 2012), Short-eared Owl *Asio flammeus* (Cadiou 2003), American Mink *Neovison vison* (Cadiou 2008), and Brown *Rattus norvegicus* or Black Rats *R. rattus* (Cadiou 2002) acting on the colonies themselves; and Cats *Felis catus* on neighbouring islands inhabited by humans, such as Molène and Ouessant (Kerbirou & Le Viol 1999; Bretagne Vivante 2012); and Peregrine Falcon *Falco peregrinus* at sea, with three cases recorded at different localities in Brittany in recent years (E. Cozic, Y. Février & B. Dumeau pers. comm.).

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