Short Communications

Eurasian Oystercatcher feeding on sea squirts

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The Eurasian Oystercatcher *Haematopus ostralegus* is adapted to feeding on hard shelled bivalves (e.g. common cockles *Cerastoderma edule*, blue mussels *Mytilus edulis* and clams *Scrobicularia plana*), gastropods (e.g. limpets *Patella vulgata* and periwinkle *Littorina littorea*) and crabs. However, it also maintains the dietary and behavioural flexibility to take advantage of a range of soft-bodied prey such as polychaetes (e.g. lugworm *Arenicola marina*) and oligochaetes (e.g. earthworms such as *Lumbricus terrestris* when feeding in fields). Both its tendency to specialise on individual prey types at specific sites and its dietary flexibility between different sites has resulted in oystercatchers being the focus of many studies on diet and foraging behaviour (e.g. Drinan 1957, Hulscher 1996). Since the 1970s, many such studies have been motivated by a need to understand the potential for negative impacts of commercial harvesting of bivalves on species such as the Eurasian Oystercatcher; especially where these bivalves represent significant components of the birds' diet (e.g. Goss-Custard *et al.* 2004).

Dundalk Bay, Co. Louth, Ireland supports both a large wintering Eurasian Oystercatcher population and a commercial fishery for common cockle. It is designated as a Special Protection Area for birds (SPA 004026); Eurasian Oystercatcher is listed as a "qualifying interest" of the site. Crowe (2005) listed Dundalk as the most important site nationally for Eurasian Oystercatcher.

The common cockle fishery has been subject to an Appropriate Assessment under Article 6(3) of the EU Habitats Directive (92/43/EEC; as amended). As part of this assessment, in the winter of 2011/2012 we undertook a study (a) to obtain data on the diet of oystercatchers and their dependency on common cockles and (b) to monitor numbers and spatial distribution of oystercatchers in Dundalk Bay.

As part of the study, we carried out monthly, or bimonthly, series of focal observations of feeding oystercatchers. We completed a total of 785 focal observations across nine visits, between Sep 2011 and Mar 2012. Each focal observation lasted for five minutes, except when the bird flew off, or stopped feeding. Focal birds were usually observed at distances of 100–300 m, through 20–60 × 80 telescopes.

We observed oystercatchers successfully feeding on sea squirts (Tunicata: Phlebobranchia: Ascidiidae) during focal observations on three separate visits, while unsuccessful predation attempts on sea squirts were also observed on a fourth visit (Table 1). Predation on sea squirts occurred most frequently in early Nov 2011 following storms that had washed up considerable quantities of debris onto the sandflats. Sea squirt predation attempts were usually on, or close to the tideline. Oystercatchers would initially attack a sea squirt by making short hammering or stabbing actions, presumably to puncture the skin, before extracting and eating internal body parts. Successful handling times of oystercatchers feeding on sea squirts ranged from 3 to 158 seconds, with a mean of 25.7 seconds, and most of the handling time comprised extracting food and ingesting it (i.e., the initial stabbing/hammering and opening of the skin only took a few seconds). The handling times of unsuccessful feeding attempts ranged from 2 to 37 seconds, with a mean of 7.3 seconds. An example of the remains of a depredated sea squirt is shown in Fig. 1.

The sea squirt species was identified as *Ascidiella aspersa* (O F Müller, 1776), using the key in Fish & Fish (2011). *A. spersa* is described as usually occupying "*shallow sheltered sites, harbours, sea loughs, etc., attached to shells or pebbles on mud or on silty rock if this is present*" and is common around the northeast coast of Ireland (Picton & Morrow 2010). The degree to which sea squirts are regularly washed up on the sandflats at Dundalk is not known; nor is the degree to which they normally contribute to the diet of Eurasian

Table 1. Summary of sea squirt predation by Eurasian Oystercatchers during 5-minute focal observations of oystercatchers foraging in Dundalk Bay, Ireland, during the winter of 2011/12.

	4–5 Nov 2011	20–21 Nov 2011	18–19 Jan 2012	16–17 Feb 2012
Number of focal observations[1]	97	77	105	104
% focal observations with successful sea squirt predation	20%	6%	2%	0%
% focal observations with unsuccessful sea squirt predation	12%	3%	2%	3%
Number of prey items successfully depredated[2]	217	192	194	207
% prey items that were sea squirts	35%	8%	1%	0%
% sea squirt predation attempts that were successful	73%	80%	67%	0%

[1] Each focal observation lasted five minutes, except when the bird flew off, or stopped feeding.

[2] Excluding small prey items that were presumed to be small surface-active shrimps, such as *Bathyporeia* and *Gammarus*.

Oystercatchers (or whether other shorebirds also feed on them, although we did not observe any such instances). We can only say that sea squirts were a significant component of the diet of oystercatchers during one visit we made in early Nov 2011 when large numbers had been washed in following storms; on other occasions they were only a minor component of the birds' diets. The behaviour of the birds and the pattern of damage to depredated sea squirts indicated that the birds were feeding either on their internal organs or their stomach contents; the jelly-like test that surrounds the body presumably has little nutritional content. Unsuccessful predation attempts may have involved sea squirts that had empty stomachs, or which had already been depredated.

Sea squirts do not appear to have been previously reported as a prey item of the Eurasian Oystercatcher. However, the American Oystercatcher *H. palliatus* has been recorded feeding on both attached and wave-dislodged ascidians or sea squirts (*Pyura praeputialis*) in the Bay of Antofagasta, Chile (Pacheco & Castilla 2001), while the Sooty Oystercatcher *H. fulignosus* is also recorded as feeding on sea squirts in Australia (Chafer, 1992; quoted by Pacheco & Castilla (2001)).

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Fig. 1. Remains of a sea squirt that has been depredated by a Eurasian Oystercatcher in Dundalk Bay, Ireland (photo: Breffni Martin).

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Locating Arctic tundra-nesting shorebirds using thermal imaging cameras

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Finding Arctic tundra-nesting shorebird nests can be extremely challenging. To avoid discovery by predators (e.g., foxes *Vulpes* spp., jaegers *Stercorarius* spp., gulls *Larus* spp., and Common Ravens *Corvus corax*), shorebirds rely on crypsis of eggs and plumage. Furthermore, adults exhibit a range of behaviors to minimize discovery of nests, such as flushing at a distance as predators approach, remaining immobile on the nest, and displaying distraction behaviors. Cryptic plumage, remaining immobile while in the presence of predators, and distraction displays of attending adults can also make locating chicks difficult.

Studies that aim to enumerate nest density and demographic parameters such as nest and brood survival rely on finding nests and chicks. Depending on the species, habitat, predator avoidance behaviors, and density, locating nests and broods of shorebirds typically entails considerable search effort. Observer activity and resultant disturbance to vegetation and increased scent surrounding nesting birds or broods may heighten the risk of abandonment and predation. Prolonged disturbance of incubating adults may also adversely influence development and viability of eggs. Furthermore, intensive search efforts equate to increased person hours and salary costs. Clearly, the ability to more rapidly locate nests and chicks would be beneficial to shorebirds and researchers.

Thermal imagery has been used successfully for several decades to survey wildlife including large ungulates (Garner *et al.* 1995), Pacific walrus *Odobenus rosmarus* (Burn *et al.*