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First report of egg predation by an unpaired Eurasian Coot, *Fulica atra*, L., 1758 (Aves: Gruiformes) on Black-winged Stilt, *Himantopus himantopus*, L., 1758 (Aves: Charadriiformes): one case from central Italy

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Abstract
The Eurasian Coot, *Fulica atra*, is a gregarious Palearctic rail that only rarely occurs singly. Even if resident birds can present territorial behaviour all through the year, most aggressions are developed during the breeding season, and the scientific literature has reported inter- and intraspecific attacks by Coot breeding pairs. Unpaired individuals do not usually show any territoriality and are often subjected to attacks by breeding pairs. It is, however, possible to observe unpaired Coots defending a territory before pairing, but the typical aggressive behaviour is developed after the beginning of nest building. Egg predation by Coots is reported as a rare phenomenon, exerted only by members of breeding couples. In this note, we report two predation cases exhibited by an unpaired individual against nests and eggs of *Himantopus himantopus*. We discard the hypothesis of competition for food between these two species and suggest that this peculiar behaviour could have been induced by endocrine hormonal secretions, regardless of whether the individual was paired or not.

Keywords: Fulica atra, *territoriality, egg predation, unpaired individual,* Himantopus himantopus

Introduction

The Eurasian Coot, *Fulica atra* L., 1758 (Aves: Gruiformes), is the most gregarious of the Western Palearctic rails (Cramp & Simmons 1980; del Hoyo et al. 1996). In spring, the species forms monogamous pairs that actively defend a territory (Cramp 1947), displaying a ritualized behaviour (Visser 1988; Zhang et al. 2011). Resident populations, as do most of the south-European ones (BirdLife International 2012), can show a fierce territorial behaviour against other conspecific flocks all through the year (Huxley 1934; Kuhk & Schüz 1959; Harrison & Greensmith 1993). Within the same flock, that could include thousands of individuals feeding together, no attacks have been reported and Coots can also feed together with other species (Scortecci 1953; del Hoyo et al. 1996). Eurasian Coots exhibit a more marked territorial behaviour during the breeding season, mostly towards conspecifics but also towards other waterbird species. Both members of the pair are involved in the defense of the area surrounding the nest (del Hoyo et al. 1996; Samraoui & Samraoui 2007). Unpaired Coots usually flock near breeding territories, also during the breeding season. However, single individuals were never observed showing territoriality during the breeding season, even if they can be aggressed by breeding pairs feeding in the same area and belonging to the same flock (Zhang et al. 2011). The typical aggressive behaviour appears when pairs form and install their nest on a territory, although unpaired Coots sometimes gather a territory immediately before pairing (Zhang et al. 2011). Interspecific aggressions begin after pairing and involve essentially three kinds of display: warning, expelling and direct fighting (Zhang et al. 2011). Most attacks are limited to the warning phase. Breeding *F. atra* individuals demonstrate aggressive displays against both conspecifics and other species, such as *Aythya ferina* (L., 1758), *Podiceps cristatus* L., 1758, and *Tachybaptus ruficollis* Pallas, 1764, when nesting within a few

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(1–3) meters from their nests (Glutz von Blotzheim 1994; Zhang et al. 2011).

In Italy, aggressions have been observed against *Gallinula chloropus* (L., 1758) (A. Iannibelli personal communication 2012), *Casmerodius albus* (L., 1758) (L. Giunti personal communication 2012) and *Himantopus himantopus* L., 1758 (L. Petralia personal communication 2012), even if egg predation has never been reported.

Although vegetable matter (algae, seeds, fruits, leaves) seems to constitute the predominant component (Bologna 1990; del Hoyo et al. 1996; Taylor & van Perlo 1998), the diet of the Eurasian Coot is omnivorous. In fact, molluscs, crustaceans, terrestrial invertebrates and small vertebrates (frogs, birds and micromammals) are reported as a minor part of the diet of this species (Urban et al. 1986; Glutz von Blotzheim 1994; del Hoyo et al. 1996; Taylor & van Perlo 1998), and are consumed mostly during the breeding season (spring) when their availability is higher (del Hoyo et al. 1996). In detail, invertebrates are a very important food resource for young chicks (Brinkhof 1997). Egg predation seems to be very unusual (Collinge 1936; Kuhk & Schüz 1959; Glutz von Blotzheim 1994; del Hoyo et al. 1996), and always exerted by breeding couples. Coots have been observed predating eggs laid by *Chroicocephalus ridibundus* L., 1766, *G. chloropus*, *Phasianus colchicus* L., 1758, *Anas plathyrhynchos* L., 1758, and grebes (Glutz von Blotzheim 1994). It has been suggested that this is not related to feeding habits (Glutz von Blotzheim 1994), but it is the expression of a territorial behaviour induced by competition for nesting sites.

Material and methods

In this note, we report two cases of nest and egg destruction of Black-winged Stilts, *H. himantopus*, by an unpaired resident Eurasian Coot. Observations took place on 9 and 12 May 2012, from a bird-watching hut, in the Natural Area of Local Interest (ANPIL) "Podere La Querciola" (Sesto Fiorentino, Florence, Central Italy). This wetland (43.824558° N, 11.172574° E) has an extent of 50 ha and includes four ponds. The facts here reported were observed at "Lago della Querciola" (2.5 ha, depth = 5–100 m), an artificial lake bordered by reed-thicket areas. Some small artificial islets have been created on the lake, differing in dimensions and vegetation cover (Figure 1).

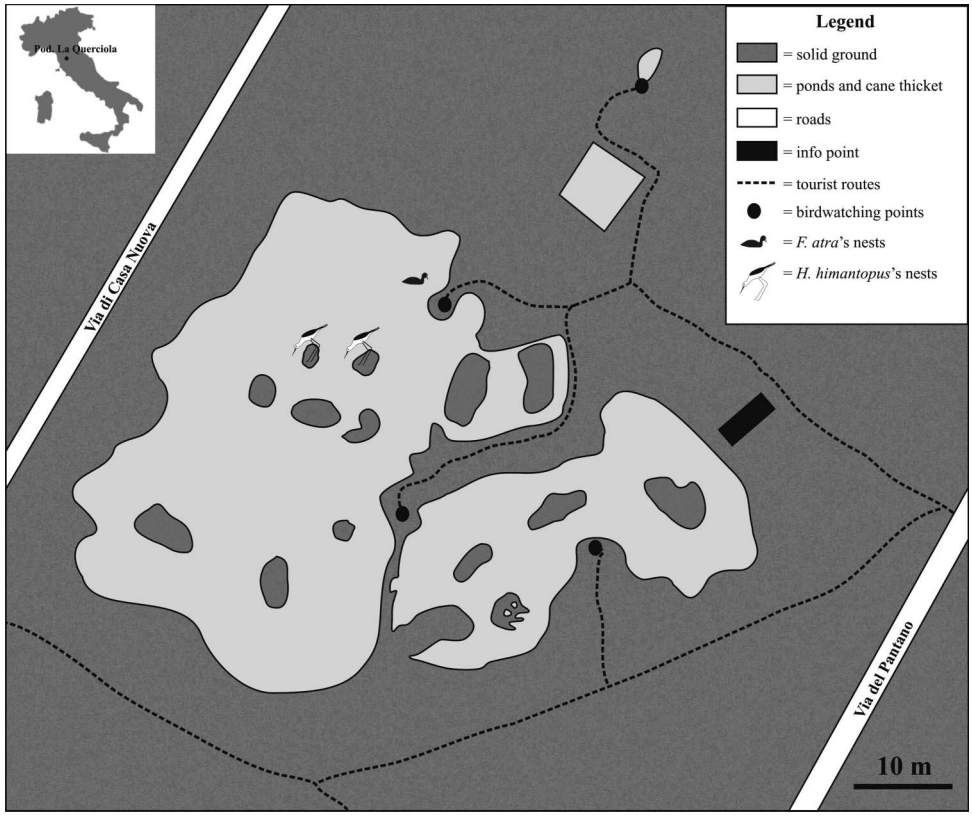

Figure 1. Map of the wetland with islets [Natural Area of Local Interest (ANPIL) "Podere la Querciola"]. Coot nesting sites and locations of the destroyed Stilt nests are represented.

Results

In 2012, nine couples of Black-winged Stilt nested on five islets. Three couples of Eurasian Coots and an unpaired individual occurred at the lake: this last was responsible for both aggression episodes described in this note. The individual was easily recognized because it stayed always a bit segregated from conspecific couples, during both feeding and roosting activities. A breeding pair of *P. cristatus* was also present in the immediate surroundings of the Coots' nests, but aggressive interactions between these two species were never observed in this area.

The first predation episode exerted by the solitary Coot took place on 9 May 2012 between 10:18 and 10:25 am. The Stilts tried to drive back the attacks before moving and leaving the Coot free to catch the eggs from the nest. The Coot, floating a few meters away from the nest, ate all the eggs, then came back to the islet and destroyed the nest (Figure 2).

The second predation episode displayed by the same Coot was observed on 12 May 2012, early in the morning, on a proximate close islet. The Coot wandered flying around the islet and then came back to the reeds, alerting the Stilts. Then it came out of the reed-thicket and flew straight to the islet. Three Stilts, members of two breeding pairs, got there and stopped it twice as soon as it reached the ground, pushing it towards the shore. The Coot went straight to the uncovered nest and caught an egg into its beak, flying back to the canes. After 1 hour and 40 minutes, the Coot tried to catch an egg again from the Stilts' nest, but two of them attacked it in the lake before it reached the islet, so it went away again (Figure 2).

Discussion

Even if during the breeding period Coots need more food resources, eggs are thought to be unrelated to feeding habits of this species (Collinge 1936; Glutz von Blotzheim 1994), so we may exclude that this individual was getting a different food source. Even if a correlation between this factor and the increasing aggressiveness of the pairs has been not yet demonstrated, unpaired individuals might be stimulated to attack other individuals to self-preserve (Amat & Obeso 1991), and to defend feeding sites. In other words, the Coot might exhibit territorial behaviour independently from the breeding/non-breeding period and from being paired or not (Amat & Obeso 1991). However, published data have never reported direct predations against other birds or nests, but only warning and loud displays (Urban et al. 1986; del Hoyo et al. 1996); so, we discard the hypothesis that the Coot destroyed the Stilt's eggs for food competition.

A plethora of published studies reports that territorial aggression behaviour in birds is regulated by steroid hormones, during the breeding period, and androgen precursors during the rest of the year (Balthazart 1983; Nelson 2000; Meddle et al.

Figure 2. Predation of the Eurasian Coot on nests and eggs of Black-winged Stilt (photos: S. Guiducci and G. Santini).

2002; Hau et al. 2004). Attacks were reported on islets located in the vicinity of three Coot's nests in the same lake (Figure 1). This leads us to suggest that the unpaired individual showed such aggressive behaviour while looking for a possible nesting site for the next breeding season, moved by endocrine secretions, and started to defend it (expelling competitors), in expectation of a potential partner. To conclude, even if a correct interpretation has not yet been identified, we believe that this observation is likely to reflect a hormone-induced territorial behaviour, that does not take into account whether the individual is paired or not.

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