

Inter- and intraspecific reactions of incubating Dotterel *Charadrius morinellus* in Finland

Erkki Pulliainen & Lennart Saari

Pulliainen, E. & Saari, L. 1995. Inter- and intraspecific reactions of incubating Dotterel *Charadrius morinellus* in Finland. *Wader Study Group Bull.* 78: 36-38.

The inter- and intraspecific reactions of incubating Dotterel *Charadrius morinellus* were studied mainly in 1969-1971 at Värriötunturi (67°44' N, 29°37' E), NE Finland. Dotterel territoriality was very weak, and 'foreign' Dotterel which come even within 5-10 m of the nest were not always expelled. Conflicts were most likely when a foreign pair was prospecting for a nest site close to an incubating male. The incubating bird always won the fights, sooner or later. Male Dotterels reacted to calls of both Golden Plover *Pluvialis apricaria* and Whimbrel *Numenius phaeopus* by becoming more alert and scanning. Other non-predatory birds were usually ignored when more than 1 m from the nest. Few predators were seen during the nest watches, Dotterel usually reacting only to the presence of Ravens *Corvus corax*.

Pulliainen, E., Department of Zoology, University of Oulu, and Värriö Subarctic Research Station, University of Helsinki, Linnanmaa, FIN-90570 Oulu, Finland.

Saari, L., Värriö Subarctic Research Station, Box 27 (Viikki C), FIN-00014 University of Helsinki, Finland.

INTRODUCTION

Comparatively little is known about the inter- and intraspecific reactions of incubating Dotterel *Charadrius morinellus*. Much of the data (often anecdotal) comes from the monograph by Nethersole-Thompson (1973) or the recent handbooks (Glutz von Blotzheim *et al.* 1975; Cramp & Simmons 1983). There is even uncertainty about the territoriality of the Dotterel: the above authors consider it to be territorial, Kålås & Byrkjedal (1984) do not. The most systematic study to date is that by Byrkjedal (1987) on the anti-predator strategies of the Dotterel.

In this report we describe our experiences concerning the inter- and intraspecific behaviour of Dotterel and relate our data to results obtained from elsewhere, especially in relation to the different predation pressures in northern Finland (this study) and southern Norway (Byrkjedal 1987).

MATERIAL AND METHODS

We here present results obtained during intensive nest watches at the Värriötunturi fell (67°44' N, 29°37' E) mainly between 1969-1971. Most of the data comes from nests observed either continuously from a nearby hide for the entire incubation period (two nests in 1971), for parts of it (six nests in 1969, see Pulliainen 1970; Pulliainen & Saari 1994), or by visits every 15 min. to the nests (three nests in 1970, see Pulliainen & Saari 1995). Some data from a total of six nests observed less intensively in 1970, 1971 and 1973 are also included.

Dotterel recorded "close" to the nest were usually within 30 m of it. For other species the distance was more variable.

All wild mammals seen from the hide were recorded as were the observations of all predatory birds seen or heard. The reactions towards other waders on the fell were recorded if within c. 100 m of the nest and if the Dotterel seemed to react to the distant calling of these species. For other birds reactions were noticed if these were within c. 20 m of nest or if the Dotterel clearly reacted to their calls.

RESULTS

Intraspecific reactions

Generally the incubating Dotterel showed little reaction to conspecifics. Usually no attention was paid to distant Dotterel calling. However, sometimes a distant bird (possibly the mate) apparently called the incubating bird off the eggs and both birds disappeared together.

At seven nests in 1969-1971 Dotterel that presumably were foreign came within 3-20 m of the incubating bird without eliciting any response. In 13 instances, however, the incubating bird behaved aggressively, sometimes several times during the same day (seven times towards a pair and six times towards a lonely Dotterel). A pair prospecting for a nest site seemed most likely to be driven away. The incubating birds won all the fights, usually quite rapidly, and incubation was resumed soon after it.

The intraspecific conflicts are summarized below (omitting the conflicts between the polyandrous female and her first

mate described by Pulliainen & Saari 1995). Seven of these involved a pair approaching the incubating bird, sometimes repeatedly. On one occasion the conflict was solved by warning calls, in four cases one attack was enough, in one case two attacks were made, but on one occasion fierce fights ensued (see below). At two nests the trespassing birds tried to evict the incubating bird. The most persistent trespassers were recorded at nest V/70 (the second nest of the polyandrous female, Pulliainen & Saari 1995). On 16 and 21 June they tried to evict the incubating birds but on 15 June they were driven off first themselves.

The longest conflict was recorded on 16 June between 18.00 and 18.30 hrs. At 18.00 hrs an unringed pair was a few metres from the nest and they copulated in front of the incubating female, who had previously tried to chase them away. After this the foreign male chased the incubating female from the nest, who flew 10 m and tried to return but was hindered by this male. Between 18.05 and 18.22 hrs the female tried to return ten times, but at most it was able to sit on the eggs for 1 min. before being chased away. After expelling the incubating female, the male returned to his mate who seemed close to laying. This female did not participate in the conflict but stayed c. 20 m from the nest.

At 18.27 hrs the male of the nest arrived and was allowed to sit on the eggs. The foreign male watched and then attacked at 18.30 hrs. The incubating male made a pre-emptive counter-attack when the other male 1 m from the nest. After a fierce fight the foreign male was beaten and returned, calling, to his female, 30 m from the nest. The incubating male returned to his nest, making a murmuring call. The foreign pair remained in the area, and they soon began nest-scraping and copulating. On the following days presumably the same pair was seen several times around this nest but no fights were recorded. Two conflicts were, however, recorded on 21 June.

Six fights were recorded with an incubating male and a lonely trespasser. Three of these were recorded between incubating males from known nests. In one of these both males chased each other c. 2 m on the ground, jumped in the air and flew in small circles c. 40 m above the ground level. After separation they started feeding without any aggression, though sometimes only 10 m apart.

Interspecific reactions: non-predatory birds

Waders were most frequently recorded during the nest watches, with Golden Plover *Pluvialis apricaria* and Whimbrel *Numenius phaeopus* seen on 39 and 25 occasions, respectively. The usual reaction of Dotterel to the calls of both these species was to become alert and scan. They were rarely attacked even when within 10 m of the nest: we never recorded Whimbrels being attacked and Golden Plovers were attacked on only three occasions, twice when within 5 m, and once when c. 100 m of a nest.

There was no perceptible reaction to the few other species seen during the nest watches, if more than 1 m

from the nest (and no reaction to a Mistle Thrush *Turdus viscivorus* even when 1 m from the nest). Only three birds were attacked: a White Wagtail *Motacilla alba* when the chicks were about to hatch, a Wheatear *Oenanthe oenanthe* just after these chicks had left the nest, and a Brambling *Fringilla montifringilla* 70 cm from another nest. The other species recorded were Willow Grouse *Lagopus lagopus*, an unidentified wader *Tringa* sp., Cuckoo *Cuculus canorus*, Bluethroat *Luscinia svecica*, Redwing *Turdus iliacus* and Waxwing *Bombycilla garrulus*.

Predators

Avian predators were seldom recorded during the nest-watches (more than 100,000 min, see Pulliainen & Saari 1994), the most common being Raven *Corvus corax* (nine records, an egg predator). Incubating Dotterel's reaction to Ravens varied from complete indifference through mild alarm to running away from the nest. Sometimes the Dotterel was absent when Ravens were nearby. Ravens were suspected of taking two clutches in this study (n = 119 clutches; Pulliainen & Saari 1992a).

Of predators of adult birds a Gyrfalcon *Falco rusticolus* was seen once, a Rough-legged Buzzard *Buteo lagopus* once and a small, unidentified bird of prey three times. Gyrfalcons do not seem to be major predators of Dotterel, since out of 499 prey items during six breeding seasons in 1973-1991 only one Dotterel was recorded (but 30 Golden Plovers and 66 Whimbrels, K. Huhtala *et al.* unpubl.).

Interspecific reactions: mammals

Five free-living mammal species were seen during the nest-watches: Reindeer *Rangifer tarandus* (seven times), Mountain Hare *Lepus timidus* (four times), Red fox *Vulpes vulpes* (once), Stoat *Mustela erminea* (once) and an unidentified vole (once). Only the Reindeers elicited any perceptible response: one male attacked (without contact) a Reindeer once but was later forced to move when the Reindeer came closer. However, it returned immediately to incubate. At another nest the Dotterel left when the Reindeer came within 0.5 m of the nest. Casualties probably occur since a nest with trampled eggs has been found (out of 119; Pulliainen & Saari 1992a).

On one occasion a Dotterel was flushed from its nest by a dog that after spotting the bird, started to search for the nest and trampled two of the eggs. Incubating Dotterel reacted to distant humans by crouching low on the nest. Dotterel usually only left the nest when the human was very close, then usually injury feigning or attacking without contact. One of the males often rushed to cover the eggs if absent when humans approached the nest.

DISCUSSION

Our results point to very weak Dotterel territoriality during the incubation period. 'Foreign' Dotterel coming even within 5-10 metres of the nest were not always expelled. The uniparental Dotterel breeding system (e.g. Byrkjedal 1987) does not facilitate territorial behaviour, as the costs (e.g. energetical) of expelling intruders may be greater than the benefits. The incubating males at Värriö are in poor physical condition at the end of the incubation period (Pulliainen & Saari 1992b) and any unnecessary costs during incubation should be avoided. Only in cases when a foreign pair seems to be ready to lay close to an incubating Dotterel are conflicts more probable. Indeed, these conflicts were sometimes initiated by the foreign pair.

As the incubating Dotterel makes short feeding trips around the nest (see Pulliainen & Saari 1994) some spacing out of nests seems beneficial in order to have an adequate supply of food around each nest. Laying in Dotterel nests is quite synchronous for the whole population and usually spacing out of nests seems to take place by fights when two pairs roaming on the fell meet (E. Pulliainen & L. Saari, unpubl.). Late clutch commencements are fairly rare and thus also are conflicts between the incubating male and a foreign pair. Perhaps significantly most of the fights were recorded at nest V/70 where both parents shared the incubation duties and could therefore afford to fight, since pairs with both birds incubating were heavier and had a higher incubation constancy (see Pulliainen & Saari 1992b, 1995).

Responses of incubating Dotterel to Ravens were similar to those described by Byrkjedal (1987) except that "tail-flagging" was not recorded, though this may have been missed since only few cases were seen and the Dotterel being absent on several visits with Ravens nearby. These absences were sometimes interpreted as being due to Ravens, the Dotterel being unwilling to reveal the nest site to the predator and relying on the cryptic colouration of the eggs themselves (which at least for humans are extremely difficult to find if the Dotterel is not seen at the nest).

Mammalian predators were rarely seen on the alpine heath and the incubating birds were not recorded as reacting to these.

Reactions towards humans were not studied systematically as we did not wish to cause additional disturbance by flushing the birds during the repeated visits or the systematic nest watches, but our impression was

that they flushed at smaller distances than those at Hardangervidda, where nearly half of birds flushed when the human was more than 11 m away (see Byrkjedal 1987). At least in the latter part of the incubation period the Dotterel allowed the observer within less than 1 m, though some birds flushed at greater distances (particularly if they had been captured previous at the nest; E. Pulliainen & L. Saari, unpubl.). The apparently greater confidence of Dotterel in Lapland may be the consequence of lower predation pressure and an adaptation to the local environment.

ACKNOWLEDGEMENTS

Paavo S. Tunkkari and an anonymous referee commented upon this paper. Erja Vaarala typed the manuscript. The paper constitutes Report No. 230 from the Värriö Subarctic Research Station of the University of Helsinki.

REFERENCES

- Byrkjedal, I. 1987. Antipredator behavior and breeding success in Greater Golden-Plover and Eurasian Dotterel. *Condor* 89: 40-47.
- Cramp, S. & Simmons, K.E.L. (eds) 1983. *The birds of the western Palearctic*. Vol. 3. Oxford University Press, Oxford. 913 pp.
- Glutz von Blotzheim, U.N., Bauer, K.M. & Bezzel, E. 1975. *Handbuch der Vögel Mitteleuropas*. Band 6. Akademische Verlagsgesellschaft, Wiesbaden. 840 pp.
- Kálás, J.A. & Byrkjedal, I. 1984. Breeding chronology and mating system of the Eurasian Dotterel (*Charadrius morinellus*). *Auk* 101: 838-847.
- Nethersole-Thompson, D. 1973. *The Dotterel*. Collins, London. 288 pp.
- Pulliainen, E. 1970. On the breeding biology of the Dotterel *Charadrius morinellus*. *Ornis Fennica* 47: 69-73.
- Pulliainen, E. & Saari, L. 1992a. Breeding biology of the Dotterel, *Charadrius morinellus*, in eastern Finnish Lapland. *Ornis Fennica* 69: 101-107.
- Pulliainen, E. & Saari, L. 1992b. Body mass and physical condition of breeding Dotterels *Charadrius morinellus* in Finland. *Oecologia Montana* 1: 1-4.
- Pulliainen, E. & Saari, L. 1994. Incubation behaviour of the Dotterel *Charadrius morinellus* in Finland. *Oecologia Montana* 3: 27-34.
- Pulliainen, E. & Saari, L. 1995. Breeding behaviour of polyandrous Dotterel *Charadrius morinellus* in Finland. *Ardea* (submitted).