Nest-sites and nest construction of Little Ringed Plovers *Charadrius dubius* in Bulgaria

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The site and construction of 129 Little Ringed Plover nests is described. All were found on beaches along the Bulgarian Black Sea coast during the breeding seasons of 2000 and 2001. Most nests were located in the upper part of the beach, at the foot of the sand dunes and were built beside or under objects, which afforded them some concealment. Nests varied from complete absence of a scrape to a deep bowl and with varying amounts of building material. Most frequently the building material was well spread on both the bottom and the walls of the scrape. It usually consisted of small shell fragments and twigs, probably collected in the immediate vicinity. Many nests contained garbage and other human-related waste, such as plastic, paper, cigarette-ends, cellophane, and sunflower seeds, left by tourists or washed ashore from the sea.

INTRODUCTION

Although much is known about the breeding biology of the Little Ringed Plover *Charadrius dubius*, there is very little published information on its nests beyond the fact that they are usually close to water and consist of a shallow scrape, either without lining or with variable amounts of small pieces of vegetation or stones (Cramp & Simmons 1983, Iankov 1986). The aim of this study was therefore to gather details on the location, size and construction of a sufficient sample of nests that they might be more fully described. The study was carried out in Bulgaria where, with 500–1,000 pairs, the Little Ringed Plover is the most numerous breeding wader species (Nankinov *et. al.* 1997, Kostadinova 1997). It nests inland along rivers, lakes, dams, marshes and fishing-pools, but is also commonly found along the Black Sea coast.

METHODS

Data were collected during the breeding seasons (April–July) of 2000 and 2001. Regular searches for Little Ringed Plover nests were made at all the beaches and lakes along the Bulgarian Black Sea coast. Each nest-scrape was mapped, measured and thoroughly described. Measurements taken were: the outside diameter of the whole scrape, the diameter of the bowl in which the eggs were laid and the depth of the bottom of the bowl below the surrounding beach. Nests were located by watching the adults, by tracing their footsteps in the sand or by cold-searching suitable habitats. During courtship, the male makes from one to several nest scrapes, but the female lays eggs in only one (Cramp & Simmons 1983). This study therefore relates only to nest scrapes that were actually used; not to the others that were rejected.

RESULTS AND DISCUSSION

Information on the location, type and building material of 129 nests of the Little Ringed Plover was collected and processed.

Most nest scrapes were found in the upper part of the beaches, at the foot of the dunes. Only a few were located between the dunes and usually these occurred only where the dunes were high and there was fresh water behind the beach. All nests were 10–45 m from the shoreline. The location of the 129 nests was classified as follows (Fig. 1):

- **Type A – 38/129 nests (29.5%):** The nest scrape is located in the upper part of the beach in the layer of the waste (twigs, plastic, bottles etc.) washed ashore by the sea. The nest is not built under or beside a particular object, but usually the nest and the brooding bird are well camouflaged and difficult to find.
- **Type B – 50/129 nests (38.8%):** The nest scrape is dug under or beside an object, such as a stone, piece of wood or plant, which shelters and conceals it. It is in an area strewn with many similar objects. This was the most frequent site.
- **Type C – 21/129 nests (16.3%):** The nest is built by an object, usually a single twig or plant, which stands out in the surrounding monotonous landscape.
- **Type D – 20/129 nests (15.5%):** The nest scrape is on an open, flat, monotonous area, such as pure sand or shells. Bleached shells often reflect so much light that the nests are difficult to see.

The 129 nests had an average outside diameter of 11.2 cm (SD: 1.6, range: 7–16), bowl diameter of 7.3 cm (SD: 0.7, range: 4.5–10.0) and depth of 3.0 cm (SD: 0.8, range: 0.5–5). They were classified according to their construction as follows (Fig. 2):

- **Type (a) – 4/129 nests (3.1%):** There is no scrape at all. The nest consists of several shells or small sticks scattered on the ground. This type is comparatively rare. In all other types there is a scrape but the building material within is arranged in different ways. The absence of a scrape cannot be explained on the basis that the ground

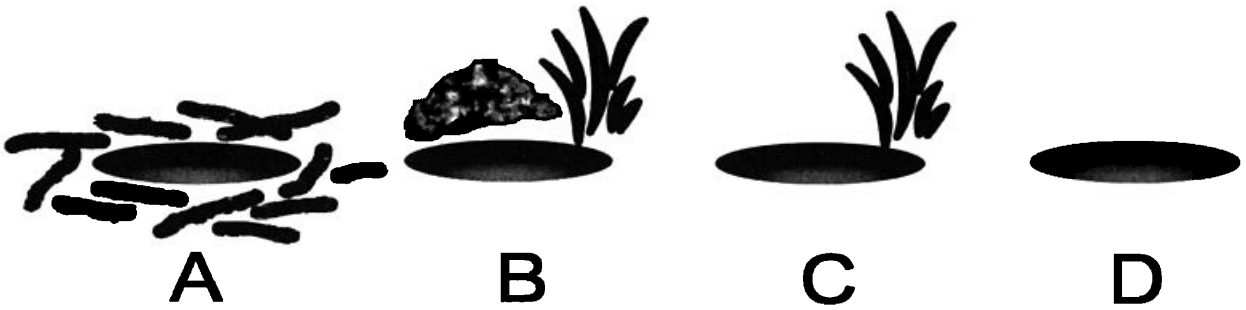

Fig. 1. Classification of Little Ringed Plover nests according to their location.

was too hard for the male to make one because others made scrapes in the same substrate. Possibly these nests were the work of inexperienced birds.

- **Type (b) – 13/129 nests (10.0%):** There is no building material in the scrape or it consists of just 2–3 shells in the bottom.
- **Type (c) – 18/129 nests (14.0%):** Building material, usually small bits of shells and sticks, is arranged on the bottom of a well-formed scrape. The amount of material varies from several pieces to a half-full scrape.
- **Type (d) – 28/129 nests (21.7%):** Building material fills the scrape and is usually very varied, e.g. shells, snails, sticks, seeds, granules of polythene, and small balls of Styrofoam. This is one of the most common arrangements.
- **Type (e) – 4/129 nests (3.1%):** Building material is arranged on the bottom and the edges of the scrape. This is comparatively rare.
- **Type (f) – 29/129 nests (22.5%):** Building material is uniformly distributed on the bottom and on the sides of the scrape. This arrangement was the most common.
- **Type (g) – 27/129 nests (20.9%):** An empty scrape without any building material; just shells arranged around the edges. This was another common type.
- **Type (h) – 6/129 nests (4.7%):** Building material is placed only on the walls of the scrape.

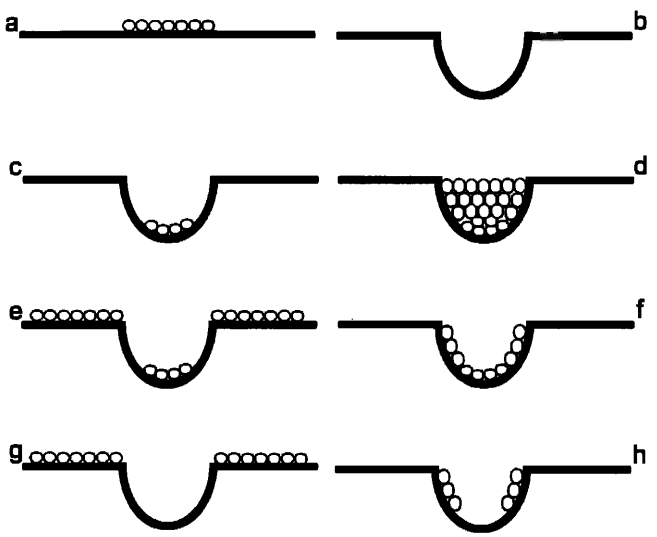

Fig. 2. Classification of Little Ringed Plover nests according to their construction.

The building material in each nest was very similar to what was available nearby, so it is likely that birds had collected it in the immediate vicinity. 127 nests were studied and described in detail. Altogether, these contained 38 different types of material, of which 23 occurred naturally and 15 were human-related waste (Table 1). The latter consisted partly of garbage left by tourists and partly of items washed ashore by the sea. The amount of the different types of building material in each nest varied according to the location of the nest and the availability of materials on each beach.

Naturally occurring building materials

- **Shell fragments:** These were of different sizes, from 0.5 to 2 cm. They are abundant on the beaches in the vicinity of the nests. Most were the shells of *Donax julianae*, *Venus gallina* and *Cardium edule*; less common were *Mytilaster lineatus* and *Pecten ponticus* and the genus *Telina*. The quantity of shells per nest varied from 1–2 to scrapes full to the edges. Shells are very effective in concealing the nests and eggs, especially when they are in an area that is covered with shells. Shell fragments are the main building material in the nests of the Little Ringed Plover on the beaches of Bulgarian Black Sea coast.
- **Twigs:** These varied in size. Larger ones were used for concealing nests. Smaller ones, 1–2 cm long, collected close to the nest were used for the nest-platform.
- ***Mytilus galloprovincialis*:** Larger shells, 3–5 cm long, were arranged around the nests and it appeared that their main purpose was to help with nest concealment, especially in areas covered with shells. Occasionally fragments of these shells were found in the scrapes.
- **Seaweed:** Usually this amounted to small dry pieces that had been washed ashore by the sea. They were very light and would be dispersed across the beaches by the wind.
- **Seeds of various plant species:** These are mainly from plants that grow in the dunes or on the edge of the beaches. Sometimes they can be washed ashore by the sea; for example, ash seeds were found in six nests. Because of their small size the seeds can be easily deposited in the nests. Their number varied from 1–2 to dozens of different species.
- **Snail shells:** These were usually from *Helicella candicans, Martha filimargo, Cochlodina laminata* and *Chondrula microtraga*. Their existence in the nests depends on the location of the scrapes. They are found more frequently in nests near the end of the beach, where there are a variety of different plants. Occasionally several snail shells were found in a single nest.