

SHORT COMMUNICATIONS

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MIGRATORY SHOREBIRDS ROOSTING ON A ROOF IN PARAÍBA, BRAZIL: RESPONSE TO A NEW HABITAT OR LOSS OF THE NATURAL ONES?

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Aves limícolas migratórias usando telhado como área pouso na Paraíba, Brasil: resposta a um novo hábitat ou perda dos habitats naturais?

Key words: Semipalmated Plover, Semipalmated Sandpiper, artificial roosts, coastal urbanization, habitat degradation, high-tide.

INTRODUCTION

Many shorebird species breed in the Arctic and migrate to the tropics or subtropics for wintering. During the non-breeding season, many species occur in coastal habitats (Hayman *et al.* 1986), where they make local movements in response to changes in tidal levels - resting on beaches at high-tide and feeding on tidal flats at low-tide (Connors *et al.* 1981, Myers 1984, Rose & Nol 2010, Rogers *et al.* 2006).

Hundreds of shorebirds use the coast of Paraíba, northeastern Brazil, as a stopover and wintering site, gathering mainly on the estuary of Paraíba do Norte (Cardoso & Zeppelini 2011, Cardoso *et al.* in press). Here

we report the use of a roof near the estuary as a high-tide roost and discuss potential causes.

RESULTS

From February to April 2013, we observed several flocks of shorebirds roosting on the roof of a warehouse (roof area 11,330 m² of asbestos-cement sheets) during the high-tides (1.7–2.6 m). The warehouse is located in the urban area of Cabedelo county (7°1'42"S, 34°50'19"W), which lies in a peninsula between the estuary and the sea (Fig. 1). The warehouse is 2–2.5 km away from the nearest feeding areas, mudflats on the estuary, and 0.8–1 km from the ocean beaches.

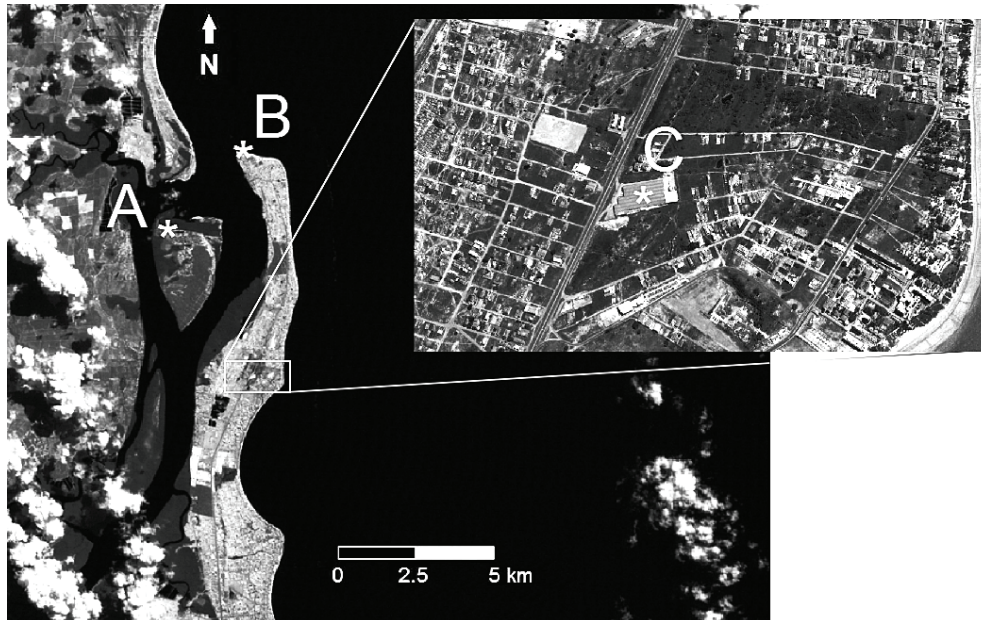


FIG. 1. Estuary of Paraíba do Norte, Paraíba, Brazil. The rectangle shows the warehouse location in the Cabedelo county, the asterisks (*) indicate the location of high tide roosts: (A) natural roost of Semipalmated Sandpipers, (B) natural roost of Semipalmated Plovers, and (C) the warehouse. Black is water, gray is vegetation, and light gray is the urban area.

Shorebirds were observed using binoculars. They used the roof daily in large flocks. Maximum counts ranged from 566 on neap tides to 876 individuals on spring tides (Fig. 2). Most birds were Semipalmated Plovers (*Charadrius semipalmatus*, about 90%), with smaller numbers of Semipalmated Sandpipers (*Calidris pusilla*, about 10%). The number of birds peaked from 11 to 13 March when spring tides coincided with a high wind period, then declined until late April when flocks disappeared completely.

Birds were mainly observed resting, though they sometimes flushed in huge flocks that returned to roost on the roof or departed from it. In addition, smaller flocks (30–80 individuals) moved to and from the roosting roof frequently, suggesting a high turnover of

individuals, which hindered an accurate estimate of the overall number of shorebirds that used the roof.

DISCUSSION

Records of plovers and sandpipers roosting on roofs have previously been described, though are relatively uncommon. Watson *et al.* (2005) included rooftops among the inland habitats used by Semipalmated Sandpiper and Stilt Sandpiper (*Calidris himantopus*). Pacific Golden Plovers (*Pluvialis fulva*) have been recorded roosting on roofs on various islands in the Pacific Ocean, including Oahu and Samoa (Johnson & Nakamura 1981, Beichle 2001, Johnson 2003). In the United Kingdom, both Golden Plovers (*Pluvialis apricaria*) and Northern Lapwings (*Vanellus*

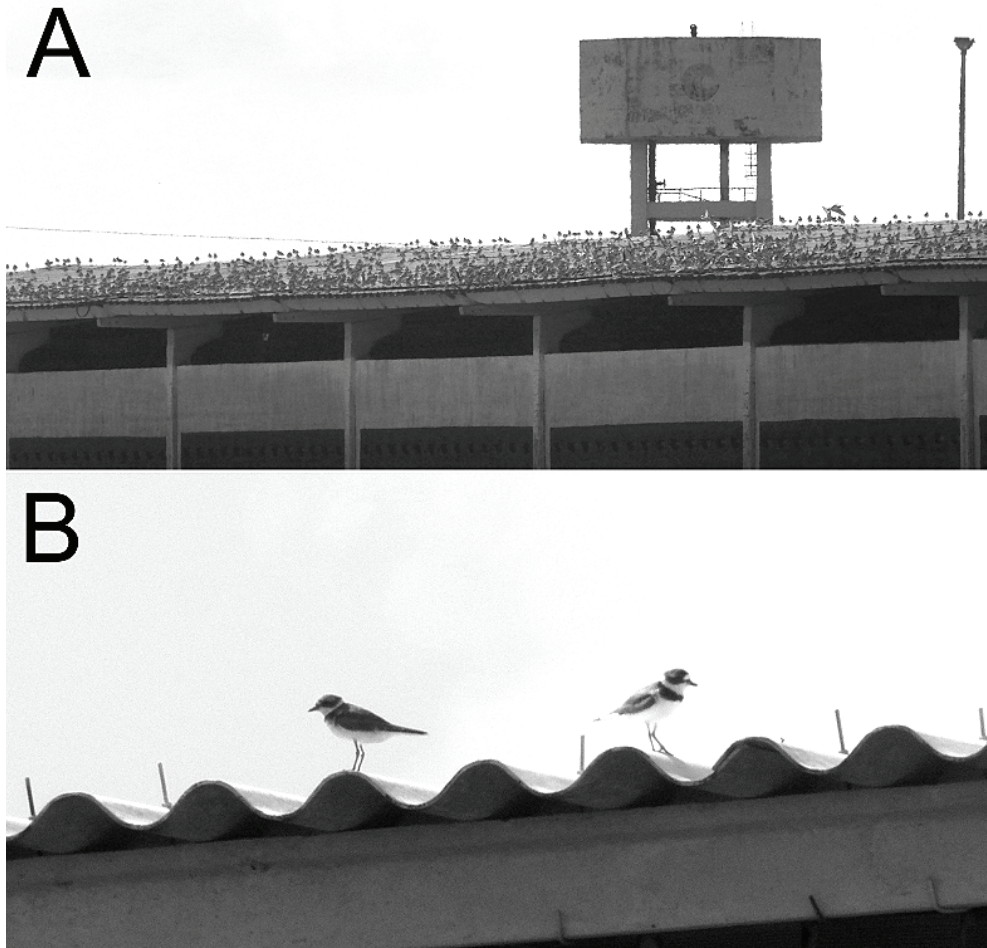


FIG. 2. (A) Flock of Semipalmated Plovers on the roof of a warehouse in Cabedelo, Paraíba, Brazil. (B) Semipalmated Plovers on the roof.

vanellus) have been observed roosting on industrial rooftops (Craven 2013).

Use of roof habitats for nesting by shorebirds appears to be somewhat more widespread. Fisk (1978) reported the nesting of Wilson's Plover (*Charadrius wilsonia*) and Killdeer (*Charadrius vociferus*) on roofs in Florida, USA, during the decades 1960 and 1970. Hayman *et al.* (1986) reported Killdeers nesting on roofs, and European Oystercatchers (*Haematopus ostralegus*) are well known for roosting on

roof tops, with records reported from Scotland, Netherlands, Belgium, Finland, Latvia, Germany, and Norway (see Cyberbirding 2013; available from <http://tjeld.uib.no/about.php>, accessed 1 May 2013).

Two hypotheses may explain the causes for roof-roosting: (i) shorebirds perceive the roof top as a suitable roosting habitat and use it despite the availability of natural roosts; (ii) the loss of natural roosts forces the shorebirds to seek for artificial habitats.

The first hypothesis lies in the possibility that roofs provide safety, good visibility of approaching predators and are relatively free from disturbance. Such benefits are known to influence the choices of roost and feeding sites by migratory shorebirds (Myers 1984, Sitters *et al.* 2001, Piersma *et al.* 2006, Rogers *et al.* 2006).

The second hypothesis assumes that roofs are less suitable than natural habitats, and are used only in the lack of other option. The disadvantages of using roofs are the distance to low tide foraging areas, and the possibility of heat stress caused by the material of the roof. These two disadvantages are also known to influence the habitat choice of shorebirds (Battley *et al.* 2003, Rogers *et al.* 2006).

The peninsula of Cabedelo was previously covered by sandy beaches, dunes, restinga, and mangrove forests, but has suffered drastic urbanization during the last decades (Guedes 2002), both along the ocean beaches (Neves & Neves 2009, 2010) and in mangrove forest, where big condos have settled. Nowadays, the main natural roost for Semipalmated Plovers is a sandy beach at the river mouth, and for Semipalmated Sandpipers it is a swamp on Restinga Island (Fig. 1; Cardoso & Zeppelini 2011, Cardoso *et al.* in press). Both natural roosts are closer to the feeding areas than the warehouse (1.5 and 0.5 km, respectively), which shows a disadvantage in choosing the warehouse as a roosting site.

We suggest that shorebirds in the Paraíba estuary face loss of natural high-tide roost sites, which may be caused by the replacement of supra-tidal habitat by buildings. The effect becomes more visible during spring tides, when fewer natural habitats remain available, and birds are forced to roost on higher habitats, such as flat rooftops.

The use of a roof as high-tide roost also suggests that Semipalmated Plovers and, to a lesser extent, Semipalmated Sandpipers, are fairly flexible in their habitat choice and that

roof-roosting may help lessen the impact of the habitat loss. However, special attention should be given to less flexible species (perhaps those occurring in the region but missing on the roof; see Cardoso & Zeppelini 2011) that may be more affected by such impact.

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