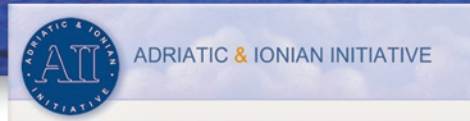


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The Kentish plover (*Charadrius alexandrinus*) and the preservation of the dune environment on the coast of Senigallia and Montemarçiano (Central Italy): activities carried out and future

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Abstract

In the Marche region (Central Italy) the Kentish plover (*Charadrius alexandrinus*) is considered as a breeding, migratory and irregular wintering species. In Senigallia it breeds in three different areas: Cesano e Cesanella (North litoral) and Marzocca (South litoral). Since 2009 is regularly carried out the monitoring of Kentish plover along the coast of Senigallia and Montemarçiano, where since 2011 there are some breeding pairs. In collaboration with local governments over the last four years have taken some conservation strategies for the protection of the breeding population that also affect the dune habitat protection. In the study period there was an increase in the number of breeding pairs and a strong increase in the number of young fledged (96.6%). The trend shows that we moved from 10-12 pairs in 2009 to 21-22 in 2012 and 2013. Compared to 2008 (8 nests) there was an increase of 72.4% of the nests found. In many cases along the coast south of Marzocca, have been selected as a place of deposition, the roofs of bathing.

Key words: *Charadrius alexandrinus*, dune environment, Montemarçiano, preservation, Senigallia.

Introduction

In Marche region (Central Italy) the Kentish plover (*Charadrius alexandrinus*) is considered as a breeding, migratory and irregular wintering species (Giacchini 2003, 2007). Actually it is resident all year around only along the seacoasts of Senigallia and Fermo, where the largest number of pairs breeds (Fusari *et al.*, 2011, Morganti *et al.*, 2009). In Senigallia it breeds in three different areas: Cesano e Cesanella (North litoral) and Marzocca (South litoral), that are characterized by the presence of sparse psammophilous vegetation, materials drift to the beach by sea storms and ditches and remittances of boats (Morganti *et al.* 2009) (Figure 1,2,3). In addition to this area, in 2012 we found breeding pairs also in an abandoned industrial area (called Veco) (Mencarelli *et al.*, 2013).

Materials and methods

Since 2009 is regularly carried out the monitoring of Kentish plover along the coast of Senigallia and Montemarçiano, where since 2011 there are some breeding pairs. The study area includes coasts characterized by formation of herbaceous annual vegetation of drift lines (vegetation terofitica-alonitrofila), as *Cakile maritima* and *Salsola kali* (*Salsola kali*-*Cakiletum maritimae* community) and perennial psammophilous species of embryonic dunes as *Calystegia soldanella*, *Echinophora spinosa*, *Elymus farctus*, *Eryngium ma-*

ritimum, *Medicago marina*, *Pancratium maritimum*, *Spartina versicolor* (*Echinophoro spinosae-Elymetum farcti* community). There are also present *Euphorbia peplis* and *Cutandia maritima*. There are also non-native species *Xanthium italicum*, *Cenchrus incertus*, *Ambrosia coronopifolia* and *Oenothera* sp. pl.. Along the lines more established are found therophytes species as *Silene colorata*, *Vulpia membranacea* and *Lagurus ovatus* (*Sileno coloratae-Vulpietum membranaceae* community). The vegetation of sandy soil with gravel and pebbles, is characterized by the presence of



Fig. 1 - Example of vegetation in the study area.



Fig. 2 - A Kentish plover breeds on the dunes with psammophilous vegetation.



Fig. 3 - Nest with eggs of Kentish plover.

Glaucium flavum and *Raphanus raphanistrum* subsp. *maritimus* (*Raphano maritime-Glaucetum maritime* community) in Marzocca and Marina di Montemarcano coasts (Biondi *et al.*, 1992; Biondi & Baldoni, 1996).

In collaboration with local governments over the last four years have taken some conservation strategies for the protection of the breeding population that also affect the dune habitat protection, summarized as follows: maintenance of vegetation through selective cutting of non-native species and weeds using a brush cutter; raising awareness through permanent billboards in proximity of nests, seminars and educational activities; fencing and protection of nests with cages closed at the top to prevent predation by Hooded Crow (Morici *et al.*, 2010). In 2010 was activated the project about ringing Kentish plover, with the coordination of ISPRA, which allowed to increase the wealth of information on the species and the local population.

Results

In the study period there was an increase in the number of breeding pairs and a strong increase in the number of young fledged (96.6%). The trend shows that

we moved from 10-12 pairs in 2009 to 21-22 in 2012 and 2013. Compared to 2008 (8 nests) there was an increase of 72.4% of the nests found.

Thanks to the application of the selective cutting of vegetation and fencing of nests over the years has increased the number of eggs hatched regularly. As already reported in literature (Pietrelli & Biondi, 2012) even in the monitored sites, it was observed a decrease of depositions replacement: from 16 in 2011 we moved to 6 in 2012 and 7 in 2013.

It is still notable the difference between the number of chicks born and chicks fledged, undoubtedly due to the limits of the protection actions aimed to protecting the nest on the ground and not the chicks. It is notable that in 2012 and 2013 with the increase in the number of chicks born would have expected a higher rate of fledging, instead expectation not found: the causes of the high mortality of chicks are therefore attributable to the strong human disturbance, especially in the north coast of Senigallia, and predation by Hooded Crow and *Larus* sp. (Scarton *et al.*, 2004; Morici *et al.*, Pietrelli & Biondi, 2012). To reduce the vulnerability of chicks should take other measures, more restrictive, while the activities of bathing and recreation in general.

Along the north coast, even if there is an increase in the number of pairs and nests addition to the initiation of protective measures, there is a progressive tendency to abandon in favor of the port area, probably due to of excessive human disturbance. In fact, over the past four years has been a fall in the number of nests in the area of the north coast of Senigallia and an increase in Marzocca: in 2010, 18 nests were counted in Senigallia and 7 in Marzocca, 13 in 2011 against 26 in 2012 8 vs. 26, 5 vs. 17 in 2013 (Table 1).

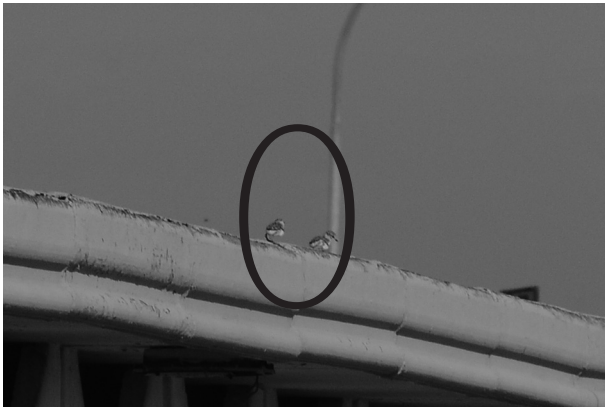
In many cases along the coast south of Marzocca, have been selected as a place of deposition, the roofs of bathing: 6 in 2011, 2 in 2012 and 4 in 2013.

In the current season we were able to observe how the chicks, hatched from nests on the roofs, are able to descend to the ground: just come out from the egg, the parents make many flights from the roof to the ground, emitting a lot of calls, pushing the chicks to come to ground making jumps to 3 meters (Figure 4, 5, 6).

Discussion

The abandonment of the mechanical cleaning of the beach and use the brush cutter for cutting of vegetation, has allowed us to protect all nests present on embryonic dune. This technique, although difficult to implement because it requires wide consultation between public administration and management, has led to excellent results failing to protect both species of dune psammophilous both nests. Signaling of nests through billboards in addition to fences and metal ca-

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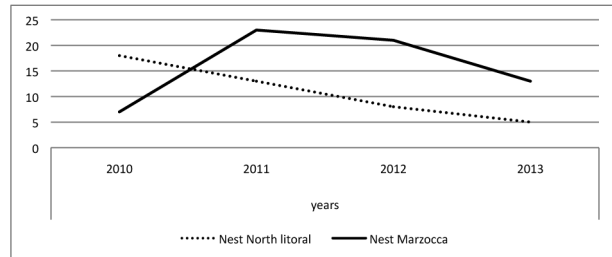
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Figs. 4, 5, 6 - chicks come down on the ground.

ges had a positive impact on the success of hatching. However, many people, curious about the structures present along the beach, tend to get closer to fences disturbing, in this way, individuals in hatching that, in addition to spend a lot of energy in performing the display of distraction, leaving the eggs unattended and exposed to temperatures significantly affecting, in some cases, the embryo development (Amat & Masero, 2004; AlRashidi *et al.*, 2010). Unfortunately, at times, we have witnessed the abandonment of the nest. The spatial distribution of nests seems to indicate a tendency to a progressive abandonment of the nesting area of Cesano-Cesanella, to the areas located to the south (Marzocca and Montemarçiano). This could be

Tab. 1 - Trend in the number of nests in the north coast and Marzocca.



a result of increased human pressure, especially on hot days in April-May. Another possible cause of the abandonment of the site could relate to the height of the dune vegetation going to affect deposition in the period from May to June, when they develop some sort of tall grasses. This element, the subject of future research, might suggest the need to further increase targeted cuts of vegetation along stretches of beach affected by the presence of Kentish plover.

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