The distribution and conservation of the Kentish Plover *Charadrius alexandrinus* in Catalonia

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Recent changes in the size and distribution of breeding populations of the Kentish Plover *Charadrius alexandrinus* in Catalonia are analysed. The overall breeding population is probably over 1650 pairs, mostly concentrated at the Ebro Delta. The Llobregat Delta, the Aiguamolls de l'Empordà, and Torredembarra-Creixell also hold important populations. However, most of the localities are used irregularly, by a very few pairs. The intensive tourist use of beaches, as well as the destruction of dune vegetation, are the main problems facing the conservation of the species in Catalonia. Predation comes mostly from gulls and magpies, while feral dogs and cats can be important sources of disturbance in some areas. Outside the Ebro Delta, the conservation of the species depends on the successful management of beaches to make conservation compatible with human activities. The use of successful management techniques to other localities, and the accurate determination of population trends at the Ebro Delta are the most important measures that can be adopted for the conservation of the species in Catalonia.

Key words: Kentish Plover, *Charadrius alexandrinus*, conservation, distribution, waders, population trends, habitat conservation.

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The Kentish Plover is a cosmopolitan wader, which breeds along coastal beaches, shorelines, and saline lakes across America, Europe, Asia and Africa (Cramp & Simmons 1983). The species is in recession in many areas. The European population is currently estimated at 22,000-35,000 breeding pairs (BirdLife International 2004), with negative population trends in most of Europe (Tucker & Heath 1994), and the species has recently become extinct in the British Isles and Norway, and nearly so in Sweden. The situation is no more positive for the populations in USA, where the west coast population is listed as threatened (Miller 1993), and the inland populations are listed as threatened or endangered in at least five states (Gorman & Haig 2002). Negative trends are also recorded in Asia, while no information is available on the population dynamics of other parts of its distribution.

This global population decline has been attributed mainly to human activities, in particular disturbance caused by beach use for leasure activities and loss of breeding habitats to exotic plants (Warriner *et al.* 1986, Miller 1993, Figuerola & Cerdà 1998, Lafferty 2001). Predation by both natural and/or naturalised animals also seems to affect the viability of some populations locally (Figuerola & Cerdà 1998).

The species is abundant in Spain, with an estimate of more than 2500 breeding pairs (Figuerola & Amat 2003). It has recently been listed on Annex I of the Directive 79/409/EEC, and classified as vulnerable in the Spanish red data list (Figuerola *et al.* 2004). The breeding

population in Catalonia was estimated at more than 1000 pairs by the end of the 1980's (Martínez-Vilalta 1985). In this paper we analyse the current distribution of the species in Catalonia, as well as the population changes registered at the different breeding localities over recent decades. All these data have been complemented with information on the possible factors affecting the productivity and viability of the different populations, in order to identify the factors that limit the population of this species in Catalonia.

Material and methods

Data on the distribution of the species were extracted from the information compiled for the new edition of the atlas of breeding birds in Catalonia (Estrada *et al.* 2004). This information has been complemented with data from the Ornithological Reports of Catalonia from between 1996 and 2001 (Copete 1998, Copete 2000, Martínez-Vilalta 2002, and Aymí & Herrando 2003), and unpublished observations from the files of the ICO (Catalan Ornithological Institute). Abbreviations in the present text refer to observers from the Ornithological Reports, and are listed in the Appendix. Relevant responses of ornithologists who regularly visit areas suitable for the species were also considered in the results. For each locality, all the information available on breeding population size, population trends, and reasons for breeding failure, up to year 2002, were compiled. Obviously, the quality of the data differs greatly among localities. Complete monitoring studies have only been conducted in the main breeding areas, and for different years, in contrast with anecdotal or less intense monitoring in others. The compilation of all these data offers an idea of the current situation of the species at its known breeding localities in Catalonia. These were classified according to forms of breeding evidence into: regular if the species breeds every year; irregular if only breeds in some years; extinct if no breeding has been recorded in recent years, in spite of continuous monitoring; and unknown if status cannot be evaluated due to lack of monitoring.

Results

There are 18 localities along the Catalan coast where the Kentish Plover has been recorded breeding at least once during the period 1970–2002 (Table 1, Figure 1). The species was: a regular breeder at six (33%) of these localities; an irregular breeder at five (28%); extinct at four (22%); and of unknown status at three (17%). The most recurrent threat for the spe-

Table 1. Kentish Plover breeding localities recorded in Catalonia between 1970-2002.
Localitats de nidificació del Corriol Camanegre a Catalunya en el període 1970-2002.

Locality	Current status	Last count (nº of pairs)	Last census year	Main threats			Active conservation measures	Population trend
				Human presence	Predation	Habitat transformation		
Aiguamolls de l'Empordà	regular	46 - 54	1998	X	X			unknown
Torroella de Montgrí	unknown	3	1996					unknown
Bay of the River Ter	regular	6 - 10	1995 - 2002	X			X	stable
Tordera Delta	irregular	2	1996	X	X			stable
Santa Susanna	unknown	1	1998					stable
Mataró	extinct	2	1982					-----
Cabrera de Mar	extinct	3	1996	X		X		-----
Premià de Mar	unknown	?	1970's					decline
Besòs Delta	irregular	1	1999	X	X	X		decline
Llobregat Delta	regular	73	2002	X	X	X	X	decline
Cubelles - Foix	irregular	1	2001			X		decline
Comarruga	regular	3	2002	X		X		increase
Torredembarra - Creixell	regular	2 - 9	1996 - 2000	X	X		X	increase
Mouth of the River Gaià	extinct	1	1996					-----
Tarragona Port	irregular	1	2002			X		decline
River Francolí	extinct	1	1996	X		X		-----
Vila-seca	irregular	1	2001	X		X		decline
Ebro Delta	regular	1500 -1700	1992	X	X	X		decline

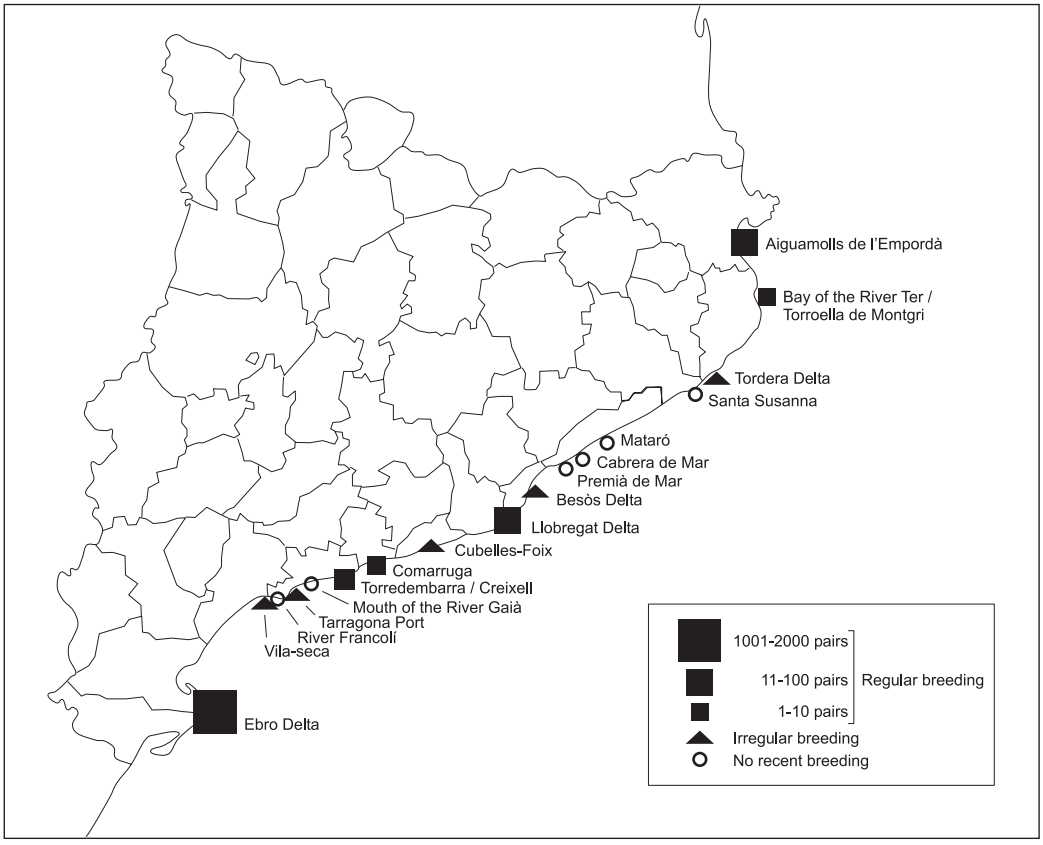

Figure 1. Distribution of Kentish Plover in Catalonia during the breeding season. Some localities hold breeding birds regularly (squares), while in others, the species breeds irregulary (triangles), or there has been no recent breeding (unfilled dots).
Distribució del Corriol Camanegre Charadrius alexandrinus *a Catalunya durant l'època reproductora. Algunes localitats tenen parelles nidificants de manera regular (quadrats), mentre que en altres, l'espècie nidifica irregularment (triangles), o no ho ha fet recentment (cercles blancs).*

cies during the breeding season was human presence (11 localities); followed by habitat transformation (nine); and, to a lesser extent, predation (six). At regular localities, the most repeated threat is human presence, whereas at irregular ones it is habitat transformation, and at localities where it is classed as extinct both threats seem to be present frequently. Only at three localities have active conservation measures been taken, and the species breeds regularly at all three.

Girona coast

Aiguamolls de l'Empordà. In 1989 the population was estimated at 20–25 pairs (Sargatal & del Hoyo 1989), whereas a 1996 estimate gave 31 pairs (J. Martí *in* Copete 1998). More detailed census work, based on marked individuals, estimated a larger population of 46–54 pairs in 1997, and 45–54 pairs in 1998 (Figuerola *et al.* 1999). No complete census data were available for the period 1999–2002 (J. Martí pers. comm.). Human presence is important on some of the beaches, with nests and chicks being squashed by cars or trampled by humans or domestic animals. The best-protected beach (Platja de Castelló) is not used by people at the beginning of the breeding season, but disturbance by gulls resting in the area can be important at this time. Late breeders can also be disturbed by human presence since the beach is

open to tourism from 15th June, when many birds are still breeding (Figuerola *et al.* 1999).

Torroella de Montgrí. At least 3 breeding pairs in 1996 (ABRA, DBRA *in* Copete 1998). No further information is available.

Bay of the River Ter. Between 1995 and 2003, 6–10 pairs were breeding in the area (D. Burgas pers. comm.). The main threat for the breeding birds are the human leasure activities on the beach. Some actions recently undertaken by the LIFE 99 NAT/E/006386 project for restoring the Ter Vell wetlands have improved the conditions of that breeding area, because they have restricted the access to the beach along paths limited by stakes and ropes, avoiding any trampling on the nesting areas outside these paths.

Barcelona coast

Tordera Delta. One pair with chicks was recorded at a small lagoon at the mouth of the River Tordera in 1982 (Cordero-Tapia 1983). There were at least two pairs breeding in 1996 (CJMA *in* Copete 1998). Birds were observed from May to July in 1997, although breeding could not be confirmed (C. Jensen pers. comm.). The same happened from 1998 to 2001, when some birds were present from March to July, including some males defending territories, but breeding was not confirmed (E. Badosa pers. comm.). As at the other localities, human presence, as well as the presence of feral cats and dogs, were important causes of disturbance for the Kentish Plover.

Santa Susanna. At least one pair was breeding on the beach in 1982 (Cordero-Tapia 1983), and one pair was breeding on the beach 1996–1998 (C. Jensen pers. comm.) No further information is available.

Mataró. There were two pairs breeding in farm fields in 1981 and 1982 (Cordero-Tapia 1983). No further information is available.

Cabrera de Mar. Three pairs bred in a sand pit in 1996 (RCAA, OCVA, ACAB *in* Copete 1998), and some birds were observed in 1997 (ACAB, RCAA *in* Copete 2000). No further breeding has occurred in this area since then, due to the considerable disturbance caused by human activity and habitat transformation (O. Clarabuch pers. comm.).

Premià de Mar. Chicks were found on the railway in the 1970's (Cordero-Tapia 1983). There is a small area apparently suitable for the breeding of this species, where individuals were present from April to July in 2002 (T. Montalvo unpubl. data). No further information is available.

Besòs Delta. One pair was recorded in 1997 (XLBA, DPHA *in* Copete 2000), and one in 1999 (CGPA, DPHA, XLBA *in* Martínez Vilalta 2002). Intensive degradation of the area caused by human activity and large numbers of terrestrial predators (rats, cats and dogs), make the establishment of the species difficult. Despite some searches in 1998 and 2000, breeding was not confirmed (X. Larruy pers. comm.).

Llobregat Delta. The population in this area was estimated at 105 pairs in 1989 (Santaeufemia *et al.* 1990). It declined during the first half of the 1990's, reaching a low of 69 pairs in 1995 (Figuerola & Cerdà 1998). After several measures were adopted in 1996 to reduce the impact of human activities on breeding success, the population rose to 88 breeding pairs in 1997 (Figuerola & Cerdà 1998). Intense landscape transformation due to the rerouting of the river and enlargement of the harbour affected the area used by the 40% of the breeding population, and has probably resulted in the reduction of the breeding population to the 73 pairs censused in 2002 (Montalvo *et al.* 2002). It is important to realize that this region is included in the metropolitan area of Barcelona, where 4·5 million people live, making this population especially vulnerable to human disturbance. Other important causes of breeding failure have been the destruction of some nests in farm fields during ploughing, and intense predation by magpies and gulls on the beach (Figuerola & Cerdà 1998, Montalvo *et al.* 2002). The conservation of this population relies, to a great extent, on the management measures adopted to protect the species: access restriction to sand-cleaning machines in some areas; protection of sand dune vegetation; and limitation of human access to nesting areas.

Tarragona coast

Cubelles-Foix. The species was listed as breeding at this locality at the end of the 1980's (Mestre 1989). Regular breeding occurs in the area, at least since 1996: one or two pairs breeding there in 1996 (GMVA in Copete 1998); 1 pair in 1997 and 1998 and 2 in 1999 (X. Bayer pers. comm.; an unknown number of pairs breeding in 2000 (PTEA *in* Aymí & Herrando 2003); and again one pair in 2001 (X. Bayer pers. comm.). The projected urbanization of the dune area and the zone around the mouth of the River Foix will undoubtedly lead to the extinction of the species at this locality.

Comarruga. Breeding has been recorded regularly since 1997, but no earlier information is available. The population has been estimated at one pair (1997, 1998, 2000 and 2001), two pairs (1999) and a maximum of three pairs in 2002 (T. Montalvo unpubl. data). The important tourist pressure and the destruction of the dune plant communities by sand-cleaning machines are important threats for the species. Limitations on sand-cleaning operations in part of the beach could make the tourist use compatible with the conservation of plant communities. Other nearby localities (Segur de Calafell, Roda de Barà) present suitable habitats for the species, but breeding has not been recorded there in recent years due to intense disturbance by humans along this stretch of coast.

Torredembarra-Creixell. The Kentish Plover breeds regularly at this locality, with the population ranging from two to nine pairs between 1996 and 2000 (AVDA *in* Copete 1998; AVDA, JVDA *in* Copete 2000; JVDA, CGPB, RFSA *in* Martínez Vilalta 2001; Xavier Bayer unpublished data; PARA, JVDA, AVDA, RFSA in Aymí & Herrando 2003). The population has increased in the last few years thanks to protection of the breeding areas (R. Ferré pers. comm.). This population is greatly threatened by disturbance caused by both humans and dogs, although management measures have been taken to reduce their impact (R. Ferré pers. comm.).

Mouth of the River Gaià. One pair bred in 1996 (GMVA *in* Copete 1998). There is no subsequent evidence of breeding (X. Bayer pers. comm.).

Tarragona Port. One pair successfully bred in 2002, in the harbour enlargement area. The nest was situated in a field artificially created for the enlargement work (A. Cama pers. comm.).

River Francolí. At least one pair bred successfully in 1996 (JLJA *in* Copete 1998). Several pairs tried to breed in 1997 but habitat transformation and human disturbance has now impeded further breeding for several years (XJLA in Copete 2000). Since 1997 the species has disappeared as a breeder due to the harbour enlargement.

Vila-seca. No information is available prior to 2001, when one pair was recorded breeding (A. Cama pers. comm.). After that year, harbour enlargememt and increased human presence, as well as the access of cars and motorcycles to the beach, have made the area very unsuitable for breeding.

Ebro Delta. This locality is the most important breeding area for the Kentish Plover in Catalonia, and indeed in Spain (Figuerola *et al.* 2004). The population was estimated at more than 1000 pairs in the early 1980's (Martínez-Vilalta 1985) and 1500–1700 pairs in 1992 (Oró *et al.* 1992). The differences in precision of these censuses make the results unsuitable for determining the trends of the species in the area. The results in the detailed monitoring of the species between 1995 and 1999 at Niño Perdido, one of the breeding sites at the Ebro Delta, did not show any clear trend in the abundance of the species (A. Bertolero pers. comm.). Nevertheless, between 2002 and 2004 the area suffered important transformations that have caused disturbance in the breeding area: part of the zones bordering brackish water have been covered with material from the harbour construction; and illegal apartments were built in the area. In addition, in brackish-water zones suitable for breeding there is human pressure, together with the effects of uncontrolled dogs, motorbikes and quadbikes. Another important impact not quantified due to lack of data is whether the increase in tern and gull populations (principally in the Punta del Fangar and Punta de la Banya) are negatively affecting the population of Kentish Plovers. Obviously, more information is necessary on the popula-

tion trends and population dynamics of the species in the area. The great increase in tourist pressure, as well as the loss of beach may have a negative impact on the species. All these negative factors indicate that the breeding population might have been significatively reduced in recent years.

Discussion

The information available suggests that the Kentish Plover breeding population in Catalonia probably amounts to some 1650-1850 pairs. The species occurs at many coastal localities, with most pairs concentrated at the Ebro Delta. Other important populations occur at the Llobregat Delta and Aiguamolls de l'Empordà, and very few pairs also breed regularly at the Aiguamolls de Torredembarra, Comarruga, and Bay of the River Ter (Table 1). The species breeds irregularly at several other coastal localities: Tordera Delta; Besòs Delta; Cubelles-Foix; Tarragona Port; and Vila-seca. Together with the rest of localities in Table 1, these sites probably hint at the former distribution of the species in Catalonia before the great boom in the tourist use of beaches (Figure 1). Although it is not possible to determine the overall trends in the breeding population due to lack of data from the Ebro Delta, the species is nearly extinct at a large number of small localities: Mataró; Cabrera de Mar; Mouth of the River Gaià; and River Francolí (Table 1). Many of these sites are threatened by development projects, with the concomitant human presence and habitat transformation. This situation represents an overall threat to the conservation of the species in Catalonia, as the concentration of the majority of breeding pairs at a small number of localities (in this case just one, Ebro Delta) makes the species especially sensitive to any local factor negatively affecting this population.

Management efforts should be concentrated on counteracting the factors with negative effects on the breeding localities. In many areas potentially suitable for the breeding of the species, dune vegetation is destroyed to facilitate the access of people to beaches. However, experiences at the Llobregat Delta show that the conservation of dune vegetation (and the conservation of the Kentish Plover, in consequence) is compatible with the human use of beaches (Figuerola & Cerdà 1998). Marking set paths across the dunes allows the plant community to be conserved, while permitting the recreational use of the beach fringe alongside the sea. Obviously, some disturbance still occurs due to the considerable human presence, but such a solution is clearly preferable to the complete absence of the species from most beaches in Catalonia at present. This management technique could usefully be implemented at all the localities where human presence is affecting the species, for instance Comarruga, Tordera, Besòs Delta, and Torroella de Montgrí.

The species is very opportunistic in the selection of breeding habitats, as shown by the rapid colonisation of harbour enlargement areas (see Results). This suggests that where suitable conditions for the species are recovered the species will have a good chance of re-establishing itself. An example of this is illustrated by the experience in the Llobregat Delta, where protection of the dune vegetation in a 100-m belt on the beach of Viladecans resulted in three pairs breeding in the first year.

Most beaches in Catalonia have habitats that would apparently be suitable for the species. However destruction of the vegetation and sand removal by sand-cleaning machines make the habitat unsuitable. Interestingly, current European legislation determines the environmental quality of beaches in function of microbiologic and tourist-facility criteria (presence of showers, etc.). It seems a contradiction that the preservation of natural habitats is not included in the necessary criteria for obtaining the blue flag of environmental quality for beaches. Unless the conservation of natural dune habitats is considered a necessary indicator of environmental quality, the future of the Kentish Plover, and other animals and plants characteristic of sand dunes, will be threatened.

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Resum

Distribució i conservació del Corriol Camanegre *Charadrius alexandrinus* a Catalunya

S'analitzen els canvis recents en la mida i distribució de la població nidificant de Corriol Camanegre *Charadrius alexandrinus*, a Catalunya. La població nidificant és probablement de més de 1650 parelles, principalment concentrades al delta de l'Ebre. El delta del Llobregat, els aiguamolls de l'Empordà i Torredembarra-Creixell, també tenen poblacions importants. No obstant això, la majoria de localitats són utilitzades irregularment, per un nombre molt baix de parelles. L'intensiu ús turístic de les platges a Catalunya, així com la completa destrucció de la vegetació dunar en moltes de les localitats, són les principals amenaces per a la conservació de l'espècie. La depredació natural és sobretot a causa de gavines i garses, mentre que els gats i gossos assilvestrats poden ser una font important d'alteració en algunes localitats. Més enllà del delta de l'Ebre, la conservació de l'espècie depèn de l'èxit en la gestió de les platges per fer compatible la seva conservació amb activitats humanes. L'extensió de les tècniques de gestió adients a localitats utilitzades per l'espècie, i la determinació acurada de la tendència de la població al delta de l'Ebre, són les mesures més importants que es poden adoptar per a la conservació de l'espècie a Catalunya.

Resumen

Distribución y conservación del Chorlitejo Patinegro *Charadrius alexandrinus* en Cataluña

Se analizan los cambios recientes en el tamaño y distribución de la población nidificante de Chorlitejo Patinegro *Charadrius alexandrinus* en Cataluña. La población nidificante probablemente es superior a las 1650 parejas, principalmente concentradas en el delta del Ebro. El delta del Llobregat, els aiguamolls de l'Empordà y Torredembarra-Creixell, también tienen poblaciones importantes. No obstante, la mayoría de localidades son utilizadas irregularmente, por un número muy bajo de parejas. El intensivo uso turístico de las playas en Cataluña, así como la completa destrucción de la vegetación dunar, son las principales amenazas para la conservación de la especie. La depredación natural se debe principalmente a las gaviotas y urracas, mientras que los perros y gatos asilvestrados pueden ser una fuente importante de alteración en algunas localidades. Más allá del delta del Ebro, la conservación de la especie depende del éxito en la gestión de las playas, de cara a hacer compatible su conservación con actividades humanas. La implementación de técnicas de gestión adecuadas en las localidades utilizadas por la especie, y el conocimiento detallado de la tendencia de la población en el delta del Ebro, son las medidas más importantes que se pueden adoptar para la conservación de la especie en Cataluña.

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Appendix

Abbreviations used for the names of observers. *Abreviatures emprades per als observadors.*

ABBA Albert Bertolero; ABRA Albert Burgas; ACAB Alexandre Canal; ACTA Albert Cama; AVDA Albert Vázquez; CGPA Cristina García; CJMA Cristian Jensen; DBRA Daniel Burgas; DPHA David Perpiñan; EBMA Enric Badosa; GMVA Grup d'Ornitologia del Museu de Vilafranca; JLJA Jose Antonio Latorre; JMAA Jordi Martí Aledo; JVDA Jordi Vázquez; OCVA Oriol Clarabuch; PARA Pere Xavier Albornà; PTEA Pedro Torres; RCAA Raül Calderon; RFSA Ramón Ferré; TMPA Tomás Montalvo; XLBA Xavier Larruy; XBGA Xavier Bayer; XJLA Xavier Jiménez Llobera.