

Important areas for breeding waders in Italy

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Twelve wader species bred regularly in Italy during 1983-1994, in a wide range of habitats. A classification of the most important habitats and areas used for breeding was made by analysis of the most recent data on the distribution and population size of each species. Salt-pans were the most important habitat both for the number of breeding species and the number of pairs. Salt-pans are also the most threatened habitat in view of rapid and widespread habitat changes.

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В течение 1983-1994 гг. в Италии регулярно гнездились 12 видов куликов в широком диапазоне биотопов. Анализом новейших данных по распространению и популяционной численности каждого вида была сделана классификация самых важных биотопов и мест, использованных для гнездования. Бассейны для испарения морской воды были самыми важными биотопами как для числа гнездящихся видов, так и для числа пар. Ввиду быстрых и широко-распространенных изменений биотопов, такие бассейны, также, являются местообитанием, находящимся под наибольшей угрозой.

Introduction

This paper highlights the most important areas and habitats for breeding waders in Italy, both at international and national level.

The first description of breeding wader distribution in Italy was available only in the late 1980s (Tinarelli & Baccetti 1989) as a result of the Atlas Project (Meschini & Frugis 1993) and national or regional enquiries about single species. For the period 1983-1988, the population size has been assessed for Black-winged Stilt *Himantopus himantopus* and Avocet *Recurvirostra avosetta* (with counts in all, or almost all, the breeding sites), for Oystercatcher *Haematopus ostralegus* and Black-tailed Godwit *Limosa limosa* (which have very localised populations) and for Redshank *Tringa totanus*, Lapwing *Vanellus vanellus*, Kentish Plover *Charadrius alexandrinus* and Collared Pratincole *Glareola pratincola* on the basis of partial censuses (Tinarelli & Baccetti 1989). For Little Ringed Plover *Charadrius dubius*, Stone Curlew *Burhinus oedicnemus*, Common Sandpiper *Actitis hypoleucos* and Woodcock *Scolopax rusticola* rough estimates

have been produced, as for all the breeding birds in Italy in the period 1983-1986, by Brichetti & Meschini (1993) in the framework of the Italian Atlas.

Since 1986, accurate estimates have been produced annually for Avocet and Black-winged Stilt on the basis of counts in the most important breeding areas and habitats. For Oystercatcher, censuses were carried out in 1991, 1992 (Scarton *et al.* 1993) and 1994 (Valle *et al.* 1996); for Redshank an almost complete national census was carried out in 1993 (Valle *et al.* 1995); for Black-tailed Godwit counts are available for each year (Della Toffola pers. comm.). For the other species, it has been possible to produce updated and more reliable estimates, especially for Lapwing, Collared Pratincole and Kentish Plover, by increasing the areas censused. In particular, the preparation of a detailed report on available data concerning biology, distribution and population of each bird species recorded in Italy (Brichetti, De Franceschi & Baccetti (eds.), Volume 2 in press) includes much previously unpublished information.

Results and Discussion

Information on population size of breeding waders in different habitats and areas has been mainly taken from the most recent reports by Casini & Tinarelli (in press); Grussu & Tinarelli (in press); Iapichino & Massa (1989); Schenk *et al.* (1995); Tinarelli *et al.* (1995); Tinarelli (in press); Valle *et al.* (1995, 1996).

For Little Ringed Plover, Common Sandpiper and Stone Curlew the population estimates shown in Table 1 are an improvement on those reported by Brichetti & Meschini (1993) but should still be considered approximate. So, for Little Ringed Plover, Common Sandpiper and Stone Curlew the

Table 1. Population sizes of waders breeding in Italy in the period 1983-1994; numbers of pairs and years considered are indicated.

	No. of pairs	Years of data	Trend in 1983-94	Source
<i>Haematopus ostralegus</i>	59	1993-94	increasing	Valle <i>et al.</i> 1996
<i>Himantopus himantopus</i>	1860-2150	1993	increasing	Tinarelli in press
<i>Recurvirostra avosetta</i>	1636-1838	1993	increasing	Casini & Tinarelli in press
<i>Charadrius alexandrinus</i>	1600-2000	1990-93	stable?	Tinarelli in press
<i>Charadrius dubius</i>	3000-4000	1988-93	stable?	Tinarelli in press
<i>Charadrius morinellus</i>	<10	(1978-84)	?	Tinarelli & Baccetti 1989
<i>Vanellus vanellus</i>	1300-1600	1990-93	increasing	
<i>Limosa limosa</i>	<10	1993	stable	M. Della Toffola pers. comm.
<i>Scolopax rusticola</i>	30-100	1983-86	?	Brichetti & Meschini 1993
<i>Tringa totanus</i>	1076-1169	1993	?	Valle <i>et al.</i> 1995
<i>Actitis hypoleucos</i>	200-1000	1983-86	?	Brichetti & Meschini 1993
<i>Glareola pratincola</i>	>110-120	1993-94	?	Grussu & Tinarelli in press
<i>Burhinus oedicnemus</i>	>500	1988-93	?	

figures for the percentages of pairs breeding in each habitat are estimates based on local situations. Habitats used by breeding waders in Italy include:

- a) sandy sea-beaches and coastal dunes;
- b) operational and recently abandoned salt-pans;
- c) brackish lagoons and marshes permanently connected with the sea;
- d) coastal brackish ponds occasionally connected with the sea, temporarily flooded ponds with salted soils (including ancient abandoned salt-pans);
- e) dammed ponds of brackish water used for extensive fish-farming, including small islands and foreshore found by recent changes of lagoons and coastal marshlands;
- f) freshwater marshlands with low water levels (including man-made ponds for fish-farming and/or hunting, flooded clay-pits and drainage canals with gently sloping banks, borders of lakes);
- g) arable lands and meadows (mainly in northern Italy);
- h) rice fields (flooded from the last ten days of March until August and situated mainly in the north-western regions);
- i) settling ponds of sugar factories, piggeries, byres and waste waters (scattered mainly in the Po plain far from the largest wetlands and with low water levels and emergent mudflats of

organic substances from March/April until August);

- j) sandy and gravel flats of rivers and streams;
- k) cultivated and pasture-lands of arid areas with steppe-like vegetation in inland plains and hills; and
- l) deciduous and coniferous woods with moist soil in northern Italy.

For each wader species the percentages of pairs breeding in the above habitat categories are given in Table 2; with the percentages of breeding pairs, by means of the proportional similarity index of Colwell & Futuyma (1971), a dendrogram (Figure 1) shows the habitat affinities among different species.

The areas of international importance for breeding waders in Italy have been determined by means of the 1% criterion proposed by Atkinson-Willes *et al.* (1982) and according to the population estimates reported by Rose & Scott (1994). Areas of national importance are those supporting 10% or more of the Italian breeding population. Names and extents of each area of international and national importance for breeding waders (Table 3 and Figure 2) are (whenever possible) those used in the Italian list of

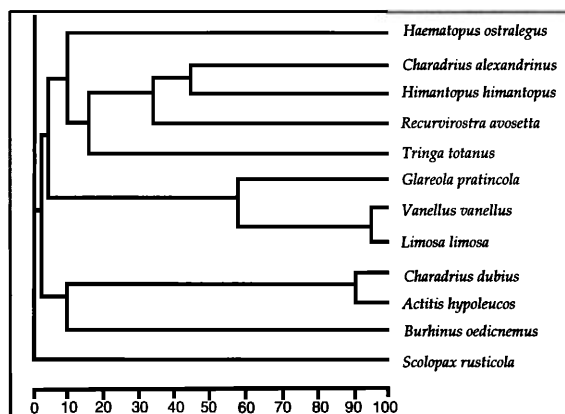


Figure 1. Dendrogram of the habitat affinity among breeding waders in Italy. Habitat affinity was estimated by the proportional similarity index $C_{ij} = 100 - 0.5 \sum (P_{ij} - P_{ji})$ (Colwell & Futuyma 1971) where P is the proportion of habitat j that is respectively used by the two species i and h.

Table 2. Habitats used by breeding waders in Italy. For each species, according to the data reported in Table 1, the percentages of pairs breeding in different habitat categories are indicated. (+) indicates habitat used occasionally or by less than 1% of the Italian breeding population in the period 1983-1994.

SPECIES	SPECIES										NUMBER OF SPECIES USING HABITATS	
	<i>Haematopus ostralegus</i>	<i>Himantopus himantopus</i>	<i>Recurvirostra avosetta</i>	<i>Barbhinus oedicnemus</i>	<i>Glaucola pratinicola</i>	<i>Charadrius dubius</i>	<i>Charadrius alexandrinus</i>	<i>Vanellus vanellus</i>	<i>Scolopax rusticola</i>	<i>Limosa limosa</i>		<i>Tringa totanus</i>
Sandy sea beaches and coastal dunes	100		(+)		2	43						3 (1)
Operational and recently abandoned salt-pans	29	84	(+)	(+)	(+)	17				2		4 (3)
Brackish lagoons and marshes permanently connected with the sea	(+)	1	1		(+)	(+)	6			84		4 (3)
Coastal brackish ponds with salted soil or occasionally connected with the sea	19	1		38	(+)	26					(+)	4 (2)
Dammed ponds of brackish water for extensive fish-farming	13	14			(+)	8			(+)	14		4 (2)
Freshwater marshlands with low water levels	10		(+)	1	5	(+)	3				(+)	4 (3)
Arable lands and meadows	(+)		(+)	61	(+)		93	100				3 (3)
Rice fields	12				(+)		3	(+)				2 (2)
Settling ponds of sugar factories, piggeries, byres and waste waters	16	(+)			3	1	1					4 (1)
Sandy and gravel flats of rivers and streams	(+)		10		90	(+)					100	3 (2)
Cultivated and pasture-lands of arid areas with steppe-like vegetation		90									1	
Deciduous and coniferous woods with moist soil								100				1

Important Bird Areas (Grimmett & Jones 1989). Italy harbours important populations, at a European and Mediterranean level, of Black-winged Stilt, Avocet and Redshank. These three species, together with Kentish Plover, have a high habitat affinity (Figure 1), occurring mainly in salt-pans and other wetlands with brackish water.

The highest numbers of breeding waders are found in the Venice lagoon, wetlands of Comacchio, salt-pans of Cervia, salt-pans of Margherita di Savoia and in wetlands (lagoon, ponds and salt-pans) around Cagliari. These areas are among the largest coastal wetlands in Italy, and salt-pans seem to be the habitat preferred by breeding waders since all such areas have higher densities of breeding pairs

than elsewhere. For example, the salt-pans of Comacchio, which are listed together with the Comacchio lagoon in Table 3, had 33 breeding pairs/km² in 1993 whereas the neighbouring lagoon had only 3.9 pairs/km².

Threats

A list of threats to each habitat (Table 4) has been made using bibliographical data and unpublished studies. Information on the real effect of these threats often remains anecdotal.

Destruction of wetland habitat suitable for breeding waders in Italy includes:

- creation of ponds for intensive fish-farming in salt-pans, coastal ponds and lagoons;

Table 3. Most important areas for breeding waders in Italy. I = area of international importance according to 1% criterion (Atkinson-Willes *et al.* 1982) and population estimates reported by Rose & Scott (1994). N = area of national importance (>10% of the Italian breeding population).

Wetland	Area	<i>Haematopus ostralegus</i>	<i>Himantopus himantopus</i>	<i>Recurvirostra avosetta</i>	<i>Tringa totanus</i>	<i>Glareola pratincola</i>	<i>Limosa limosa</i>
Lagoon of Venice	55,000 ha		I		I		
Po Delta (including V. Bertuzzi)	25,000 ha	N					
Rice fields near Vercelli	c. 25,000 ha		I				N
Wetlands of Comacchio	28,570 ha		I	I			
Salt-pans of Cervia	1,000 ha			N			
Salt-pans of Margherita Di Savoia	6,000 ha			I			
Wetlands of Oristano	7,500 ha					N	
Wetlands around Cagliari	4,800 ha		I	I		N	
Arable lands near Gela						N	



Figure 2. Areas of international and national importance for breeding waders in Italy (see Table 3).

- urbanisation and infrastructure developments for tourism and recreation on wetland edges, at times inside coastal ponds and lagoons, with consequent increase in pollution.

Other damaging changes in breeding wader habitats in Italy are:

- cessation of salt-extraction activity;
- losing of sugar refineries;
- cultivation of river shores and steppe-like areas suitable for Stone Curlew (Rizzi & Cripezzi 1994; Tinarelli *et al.* 1991);
- cultivation of marginal areas in recently claimed marshlands (*e.g.* Valle Mezzano) suitable for Collared Pratincole;
- increases in the water level of dammed ponds of brackish water used for extensive fish-farming, with a consequent disappearance of suitable islands and foreshore used by breeding waders.

Sudden rises in the water level occur regularly in rice fields, salt-pans and settling ponds of sugar factories due to production activities or heavy spring rains. A sudden rise of the water level destroys annually 7-40% of the nests of Black-winged Stilt and Avocet breeding in salt-pans, 6-36% of nests

of Black-winged Stilt and Little Ringed Plover breeding in settling ponds of sugar refineries and an undetermined number of nests of Black-winged Stilt breeding in rice fields (Tinarelli 1990).

Poaching (*i.e.* shooting) of breeding waders was recorded only occasionally; it happens most often on coastal wetlands of southern Italy and in the Po Delta, mainly to supply bird-collectors. Black-winged Stilt, Avocet, Oystercatcher and Collared Pratincole are the species usually involved.

Gathering of molluscs by hand and the presence of sunbathers seem to be the main factors limiting the breeding of Kentish Plover and Oystercatcher on the beaches of the Po Delta and in other coastal wetlands after the end of May. The presence of fishermen, sunbathers and motorcyclists causes local disturbance to Little Ringed Plover and Stone Curlew along rivers.

In recent years, agricultural activity has destroyed all the nests of the small population of Black-tailed Godwit on corn fields near Vercelli rice fields (Della Toffola *pers. comm.*). It is also an important factor limiting the breeding success of Lapwing in rice and corn fields (Boano & Brichetti 1986).

Nest robbing of waders breeding in colonies and on beaches is well verified, but it is now one of the lesser threats, having diminished considerably over the past few decades.

Wandering dogs and cats have a considerable impact on waders breeding in colonies in all the habitat categories.

Many nests can be destroyed by trampling cattle but it is uncommon and localised. It happens especially in meadows, salt-pastures and on the edge of freshwater marshlands, coastal ponds and rivers, affecting mainly Lapwing, Kentish Plover, Collared Pratincole, Black-winged Stilt and Stone Curlew. Predators (Black Rat *Rattus norvegicus*, Red Fox *Vulpes vulpes*, Crow *Corvus corone*, Yellow-legged Gull *Larus cachinnans*) may have a local effect on waders breeding colonially in coastal wetlands, but

Table 4. Threats in different habitats to waders in Italy. ● are the most frequent threats with a major impact on breeding waders; ○ are less frequent and/or less major threats; blank indicates threats are not considered to occur.

	habitat destruction	habitat changes	sudden level changes	poaching	uncontrolled human activities	agricultural work	nest-robbing	wandering dogs and cats	trampling by cattle	predation by animals	military exercises
Coastal sandy beaches	○			○	●		○				○
Operational & recently abandoned salt-pans	○	●	●	○	○			○			
Brackish lagoons and marshes permanently connected to the sea	○	○	○	○	○		○	○			
Coastal brackish pools with saline soil or occasionally connected to the sea	○	○			○					○	
Brackish ponds dammed for extensive fish farming	○	○	○							○	
Freshwater marshes with low water levels		○	○		○			○	○		
Arable land & meadows		○				●			○		
Rice fields			●			●					
Wastewater settling ponds: sugar factories, piggeries and byres		●	●					○			
Riverine sand and gravel flats		○	○			●				○	○
Arable and pasture in arid areas with steppe-like vegetation	○	○			○				○		○
Deciduous & coniferous woods with moist soil											

are probably uncommon threats.

Military exercises seem to be the main factor limiting the breeding of Stone Curlew on the alluvial areas with steppe-like vegetation near rivers and streams in Friuli-Venezia Giulia Region (north-east Italy) (Tinarelli *et al.* 1991); they prevent breeding in other areas suitable for Stone Curlew such as estuaries and coastal dunes (*e.g.* the mouths of the Reno and Serchio rivers) and in some inland areas.

Conclusions

At present, salt-pans are the habitat most threatened by imminent changes arising from the cessation of salt-extraction activities, by new methods of salt-extraction, and by the creation of ponds for intensive fish-farming in recently abandoned parts, or in sectors less used for salt extraction.

At a national level of importance, the rice fields near Vercelli (north-west Italy) support almost the entire Italian population of Black-tailed Godwit, whereas the Po Delta supports a population of Oystercatcher which probably belong to the subspecies *longipes* (Passarella 1995). These two species, being at the edge of their ranges, are of great interest at a national level and may be considered, together with Collared Pratincole, among the most threatened waders in Italy.

The less threatened species are Little Ringed Plover, Common Sandpiper, Woodcock (which are widely dispersed) and Black-winged Stilt (which use a wide range of habitats).

The restrictions imposed on hunting during winter by the recent national law (enacted in 1992) are allowing an increase of the breeding populations of

Lapwing and Black-tailed Godwit which start to breed early in March and occur on the game species list.

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