

Spatiotemporal Dynamics in Bird Species Assembly in the Coastal Wetlands of Sicily (Italy): a Multilevel Analytical Approach to Promote More Satisfactory Conservation Planning

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Table S1. List of the 58 sampling points used in the sixteen Sicilian wetlands under study.

Inc.	Wetland	Province	X-coord	Y-coord	Distance from the nearest sampling point (m)
1	Auruca	Siracusa	1,041,330	4,077,644	243
2	Auruca	Siracusa	1,041,172	4,077,177	250
3	Auruca	Siracusa	1,041,246	4,077,416	243
4	Baronello	Siracusa	1,041,439	4,076,252	297
5	Baronello	Siracusa	1,041,672	4,076,069	297
6	Baronello	Siracusa	1,041,957	4,075,912	325
7	Cuba	Siracusa	1,038,392	4,079,685	290
8	Cuba	Siracusa	1,038,696	4,079,558	329
9	Cuba	Siracusa	1,038,607	4,079,879	290
10	Faro	Messina	1,081,147	4,256,474	271
11	Faro	Messina	1,080,916	4,256,616	271
12	Ganzirri	Messina	1,078,913	4,255,453	448
13	Ganzirri	Messina	1,079,308	4,255,666	448
14	Ganzirri	Messina	1,079,807	4,255,833	527
15	Gela	Caltanissetta	975,490	4,110,478	278
16	Gela	Caltanissetta	976,038	4,110,334	348
17	Gela	Caltanissetta	974,871	4,111,229	266
18	Gela	Caltanissetta	975,356	4,110,721	278
19	Gela	Caltanissetta	975,772	4,110,558	293
20	Gela	Caltanissetta	974,933	4,110,971	266
21	Gornalunga	Catania	1,038,541	4,155,367	411
22	Gornalunga	Catania	1,038,922	4,155,130	446
23	Gornalunga	Catania	1,038,168	4,155,539	411
24	Longarini	Siracusa	1,036,244	4,080,051	357
25	Longarini	Siracusa	1,036,511	4,079,771	379
26	Longarini	Siracusa	1,037,371	4,079,885	400
27	Longarini	Siracusa	1,036,946	4,079,943	379
28	Longarini	Siracusa	1,036,000	4,079,734	400
29	Longarini	Siracusa	1,036,619	4,080,134	377
30	Longarini	Siracusa	1,037,771	4,079,884	400
31	Longarini	Siracusa	1,036,345	4,080,394	357
32	Morghella	Siracusa	1,046,614	4,079,288	322
33	Morghella	Siracusa	1,046,843	4,079,515	322
34	Morghella	Siracusa	1,046,252	4,079,367	331
35	Morghella	Siracusa	1,046,453	4,079,630	331
36	Pantano Bruno	Ragusa	1,035,079	4,078,329	373
37	Pantano Bruno	Ragusa	1,034,706	4,078,342	373
38	Pantano Grande	Siracusa	1,044,621	4,091,242	299
39	Pantano Grande	Siracusa	1,044,182	4,090,984	313
40	Pantano Grande	Siracusa	1,044,495	4,090,970	299
41	Pantano Piccolo	Siracusa	1,044,861	4,091,907	311
42	Pantano Piccolo	Siracusa	1,044,826	4,091,598	311
43	Preola	Trapani	821,817	4,169,890	468
44	Preola	Trapani	821,354	4,169,954	353
45	Preola	Trapani	821,024	4,170,081	353
46	Roveto	Siracusa	1,043,491	4,088,206	473
47	Roveto	Siracusa	1,043,822	4,089,614	297
48	Roveto	Siracusa	1,043,304	4,088,640	398
49	Roveto	Siracusa	1,043,712	4,089,338	297
50	Roveto	Siracusa	1,043,618	4,089,898	350
51	Roveto	Siracusa	1,043,569	4,088,937	388
52	Roveto	Siracusa	1,044,075	4,089,100	389
53	Roveto	Siracusa	1,043,908	4,088,749	388
54	Tindari	Messina	1,030,788	4,238,557	850
55	Tindari	Messina	1,030,328	4,239,272	850
56	Tondi	Trapani	821,976	4,169,255	272
57	Tondi	Trapani	822,201	4,169,102	272
58	Tondi	Trapani	822,537	4,168,860	414

Text S1. Calculation of β diversity

Beta diversity was computed as (Routledge, 1977)

$$\beta = \log_{10}(T) - \left[\frac{1}{T} \sum_i e_i \log_{10}(e_i) \right] - \left[\frac{1}{T} \sum_j \alpha_k \log_{10}(\alpha_k) \right]$$

where T is the total number of species occurrences, e_i is the number of wetlands containing the waterbird species i , and α_k is the number of species at wetland k .

Reference

Routledge, R. D. On Whittaker's components of diversity. *Ecology* **1977**, 38, 1120–1127.

Table S2. Matrix **R**: species richness (number of avian species) recorded in the coastal wetlands of Sicily during five sampling sessions.

Wetland	July (2nd half)	August (1st half)	August (2nd half)	September (1st half)	September (2nd half)
Auruca	0	0	1	0	0
Baronello	8	17	22	14	5
Cuba	21	8	4	0	13
Faro	0	8	11	9	10
Ganzirri	2	10	12	14	10
Gela	10	28	22	23	25
Gornalunga	2	15	18	19	13
Longarini	6	0	0	0	4
Morghella	1	0	0	0	0
Pantano Bruno	3	15	11	1	3
Pantano Grande	4	16	3	15	9
Pantano Piccolo	0	6	10	10	6
Preola	3	12	11	14	16
Roveto	9	34	31	40	27
Tindari	0	3	3	4	7
Tondi	4	5	8	6	5

Table S3. Matrix **P**: presences–absences of waterbird species recorded in the Sicilian wetlands in five dates of sampling. J2, A1, A2, S1 and S2 stand for the second half of July (J2), the first (A1) and second (A2) half of August, the first (S1) and second (S2) half of September, respectively.

Species	J2	A1	A2	S1	S2
Audouin's Gull	1	1	1	1	1
Black Stork	0	0	0	1	0
Black Tern	0	1	1	0	1
Black-crowned Night Heron	0	1	1	1	1
Black-headed Gull	1	1	1	1	1
Black-necked Grebe	0	1	0	0	0
Black-tailed Godwit	1	1	0	0	0
Black-winged Stilt	1	1	1	1	1
Broad-billed Sandpiper	0	0	0	1	0
Caspian Tern	0	1	1	1	0
Common Greenshank	1	1	1	1	1
Common Kingfisher	0	1	1	1	1
Common Moorhen	1	1	1	1	1
Common Pochard	0	1	1	1	1
Common Redshank	1	1	1	1	1
Common Ringed Plover	1	1	1	1	1
Common Sandpiper	0	1	1	1	1
Common Shelduck	0	0	0	1	1
Common Snipe	0	0	0	1	0
Common Tern	0	0	1	0	0
Curlew Sandpiper	1	1	1	1	1
Dunlin	0	1	1	1	1
Eurasian Coot	1	1	1	1	1
Eurasian Curlew	1	1	0	1	1
Eurasian Spoonbill	1	1	1	1	1
Eurasian Stone-curlew	0	1	1	0	1
Eurasian Teal	0	1	1	1	1
Eurasian Wigeon	0	1	1	1	1
European Golden Plover	0	0	0	1	0
Ferruginous Duck	1	1	1	1	1
Gadwall	0	0	0	1	1
Garganey	0	1	1	1	1
Great Cormorant	0	0	1	1	1
Great Crested Grebe	1	1	1	1	1
Great Egret	1	1	0	0	0
Greater Flamingo	1	1	1	1	1
Green Sandpiper	0	1	1	0	0
Grey Heron	1	1	1	1	1
Grey Plover	0	0	0	1	1
Gull-billed Tern	0	1	0	0	1
Kentish Plover	1	1	1	1	1

Lesser Black-backed Gull	0	1	1	1	1
Little Bittern	0	0	1	0	1
Little Egret	1	1	1	1	1
Little Grebe	1	1	1	1	1
Little Ringed Plover	1	1	1	1	1
Little Stint	1	1	1	1	1
Little Tern	1	1	1	1	1
Mallard	1	1	1	1	1
Marbled Duck	0	1	1	1	0
Marsh Sandpiper	1	1	1	1	1
Mediterranean Gull	0	1	1	0	1
Northern Pintail	0	1	0	1	1
Northern Shoveler	0	1	1	1	1
Pied Avocet	0	1	1	1	1
Purple Heron	0	1	1	0	1
Red knot	0	0	0	1	0
Ruddy Turnstone	0	0	1	1	0
Ruff	1	0	0	1	1
Sandwich Tern	0	1	1	1	1
Slender-billed Gull	1	1	1	1	1
Spotted Redshank	1	0	0	1	1
Squacco Heron	0	1	1	1	1
Temminck's Stint	0	0	0	1	0
Tufted Duck	0	0	0	0	1
Water Rail	0	0	1	1	1
Western Cattle Egret	0	1	1	0	0
Western Swamphen	1	1	1	1	1
Whimbrel	0	1	0	1	0
Whiskered Tern	0	1	1	0	1
White Stork	0	0	1	1	1
Wood Sandpiper	1	1	1	1	1
Yellow-legged Gull	1	1	1	1	1

Table S4. Species-by-site incidence matrix **I** in the second half of July (J2): 1s indicate presences, 0s stand for absences.

[illegible]

[illegible]

Table S5. Species-by-site incidence matrix **I** in the first half of August (A1): 1s indicate presences, 0s stand for absences.

Common name	Gela	Tondi	Tindari	Faro	Ganzirri	Gornalunga	Precola	Auruca	Baronello	Pantano Bruno	Cuba	Pantano Grande	Longarini	Morghella	Pantano Piccolo	Roveto
Audouin's Gull	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Black Stork	1	0	0	1	1	1	0	0	0	0	0	1	0	0	0	1
Black Tern	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Black-crowned Night Heron	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Black-headed Gull	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Black-necked Grebe	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1
Black-tailed Godwit	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Black-winged Stilt	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Broad-billed Sandpiper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Caspian Tern	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
Common Greenshank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Kingfisher	1	0	0	0	0	0	0	0	1	1	1	1	0	0	0	1
Common Moorhen	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Common Pochard	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Common Redshank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Ringed Plover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Sandpiper	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Common Shelduck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Snipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Tern	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	1
Curlew Sandpiper	1	0	0	0	0	0	0	0	1	0	1	1	0	0	0	1
Dunlin	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Eurasian Coot	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eurasian Curlew	1	1	1	0	1	1	1	0	0	1	0	1	0	0	1	1
Eurasian Spoonbill	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
Eurasian Stone-curlew	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1
Eurasian Teal	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	1
Eurasian Wigeon	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
European Golden Plover	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Ferruginous Duck	1	0	0	1	1	0	1	0	1	0	0	1	0	0	0	1
Gadwall	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1
Garganey	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Great Cormorant	1	1	1	0	0	1	0	0	0	1	0	0	0	0	0	1
Great Crested Grebe	1	0	0	0	0	1	0	0	1	1	1	1	0	0	0	1
Great Egret	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Greater Flamingo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Green Sandpiper	1	0	0	0	1	1	1	0	1	0	0	1	0	0	0	1

[illegible]

Table S6. Species-by-site incidence matrix **I** in the second half of August (A2): 1s indicate presences, 0s stand for absences.

Common name	Gela	Tondi	Tindari	Faro	Ganzirri	Gornalunga	Preola	Auruca	Baronello	Pantano Bruno	Cuba	Pantano Grande	Longarini	Morghella	Pantano Piccolo	Roveto
Audouin's Gull	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Black Stork	1	0	0	1	1	1	1	0	1	0	0	1	0	0	1	1
Black Tern	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Black-crowned Night Heron	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Black-headed Gull	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Black-necked Grebe	1	0	0	0	0	1	1	0	1	0	0	0	0	0	1	1
Black-tailed Godwit	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Black-winged Stilt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Broad-billed Sandpiper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Caspian Tern	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
Common Greenshank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Kingfisher	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1
Common Moorhen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Pochard	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Redshank	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Ringed Plover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Sandpiper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Shelduck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Snipe	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Common Tern	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
Curlew Sandpiper	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
Dunlin	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
Eurasian Coot	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eurasian Curlew	1	1	0	0	1	1	1	0	0	1	0	0	0	0	1	1
Eurasian Spoonbill	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
Eurasian Stone-curlew	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1
Eurasian Teal	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
Eurasian Wigeon	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
European Golden Plover	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Ferruginous Duck	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	1
Gadwall	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1
Garganey	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Great Cormorant	1	1	1	0	0	1	0	0	0	1	0	0	0	0	0	1
Great Crested Grebe	0	0	0	0	1	1	0	0	1	1	1	0	0	0	0	1
Great Egret	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Greater Flamingo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Green Sandpiper	1	0	0	0	1	1	1	0	1	0	0	1	0	0	1	1

[illegible]

Table S7. Species-by-site incidence matrix **I** in the first half of September (S1): 1s indicate presences, 0s stand for absences.

Common name	Gela	Tondi	Tindari	Faro	Ganzirri	Gornalunga	Preola	Auruca	Baronello	Pantano Bruno	Cuba	Pantano Grande	Longarini	Morghella	Pantano Piccolo	Roveto
Audouin's Gull	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Black Stork	1	0	0	1	1	1	1	0	1	0	0	1	0	0	1	1
Black Tern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Black-crowned Night Heron	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Black-headed Gull	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Black-necked Grebe	1	0	0	0	1	1	1	0	0	0	0	0	0	0	1	1
Black-tailed Godwit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Black-winged Stilt	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Broad-billed Sandpiper	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Caspian Tern	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0
Common Greenshank	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Common Kingfisher	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1
Common Moorhen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Common Pochard	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Common Redshank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Common Ringed Plover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Common Sandpiper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Common Shelduck	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1
Common Snipe	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Common Tern	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1
Curlew Sandpiper	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
Dunlin	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
Eurasian Coot	1	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1
Eurasian Curlew	1	1	0	0	1	1	1	0	0	0	0	0	0	0	1	1
Eurasian Spoonbill	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1
Eurasian Stone-curlew	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Eurasian Teal	1	0	1	1	1	0	0	0	0	0	0	1	0	0	0	1
Eurasian Wigeon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
European Golden Plover	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Ferruginous Duck	1	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0
Gadwall	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Garganey	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Great Cormorant	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0
Great Crested Grebe	0	0	0	0	1	1	0	0	1	0	0	1	0	0	0	1
Great Egret	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Greater Flamingo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Green Sandpiper	1	1	0	0	1	1	1	0	1	0	0	1	0	0	1	1

[illegible]

Table S8. Species-by-site incidence matrix **I** in the second half of September (S2): 1s indicate presences, 0s stand for absences.

Common name	Gela	Tondi	Tindari	Faro	Ganzirri	Gornalunga	Preola	Auruca	Baronello	Pantano Bruno	Cuba	Pantano Grande	Longarini	Morghella	Pantano Piccolo	Roveto
Audouin's Gull	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Black Stork	1	0	1	1	1	1	1	0	1	0	1	1	1	0	1	1
Black Tern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Black-crowned Night Heron	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Black-headed Gull	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Black-necked Grebe	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1
Black-tailed Godwit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Black-winged Stilt	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Broad-billed Sandpiper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Caspian Tern	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
Common Greenshank	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Common Kingfisher	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1
Common Moorhen	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Common Pochard	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Redshank	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Common Ringed Plover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Sandpiper	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Common Shelduck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Common Snipe	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Common Tern	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Curlew Sandpiper	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Dunlin	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	1
Eurasian Coot	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Eurasian Curlew	1	1	1	0	1	1	1	0	0	0	0	0	0	0	1	1
Eurasian Spoonbill	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Eurasian Stone-curlew	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Eurasian Teal	1	0	0	1	1	0	0	0	0	0	0	1	0	0	0	1
Eurasian Wigeon	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
European Golden Plover	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Ferruginous Duck	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
Gadwall	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Garganey	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Great Cormorant	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0
Great Crested Grebe	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1
Great Egret	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Greater Flamingo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Green Sandpiper	1	1	1	1	1	1	0	0	1	0	1	1	1	0	1	1

[illegible]

Table S9. Functional traits (foraging, migration) of the bird species recorded in the coastal wetlands of Sicily.

Foraging guilds. Diver from flight: species that catches food entering the water from flight; diver from the surface: species that catches food entering the water from the surface; intermediate wader: species having tarsometatarsus between 4 and 8 cm; large wader: tarsometatarsus > 8 cm; small wader: tarsometatarsus between 0 and 4 cm; surface feeder: species that collects items of food floating or swimming at the surface.

Migratory guilds. Mediterranean: species that remains in the Mediterranean basin; mixed: partly Mediterranean and partly trans-Saharan; sedentary: nonmigratory; trans-Saharan: species that breeds in Europe and overwinters in sub-Saharan Africa.

Species	Foraging guild	Migration guild
Audouin's Gull	surface feeder	mixed
Black Stork	large wader	trans-Saharan
Black Tern	diver from flight	trans-Saharan
Black-crowned Night Heron	intermediate wader	trans-Saharan
Black-headed Gull	surface feeder	Mediterranean
Black-necked Grebe	diver from the surface	Mediterranean
Black-tailed Godwit	intermediate wader	trans-Saharan
Black-winged Stilt	large wader	trans-Saharan
Broad-billed Sandpiper	small wader	trans-Saharan
Caspian Tern	diver from flight	trans-Saharan
Common Greenshank	intermediate wader	mixed
Common Kingfisher	diver from flight	Mediterranean
Common Moorhen	surface feeder	sedentary
Common Pochard	diver from the surface	mixed
Common Redshank	intermediate wader	mixed
Common Ringed Plover	small wader	trans-Saharan
Common Sandpiper	small wader	mixed
Common Shelduck	surface feeder	Mediterranean
Common Snipe	small wader	mixed
Common Tern	diver from flight	trans-Saharan
Curlew Sandpiper	small wader	trans-Saharan
Dunlin	small wader	Mediterranean
Eurasian Coot	surface feeder	Mediterranean
Eurasian Curlew	large wader	mixed
Eurasian Spoonbill	large wader	mixed
Eurasian Stone-curlew	intermediate wader	mixed
Eurasian Teal	surface feeder	mixed
Eurasian Wigeon	surface feeder	mixed
European Golden Plover	intermediate wader	mixed
Ferruginous Duck	diver from the surface	mixed
Gadwall	surface feeder	mixed
Garganey	surface feeder	trans-Saharan
Great Cormorant	diver from the surface	Mediterranean
Great Crested Grebe	diver from the surface	Mediterranean
Great Egret	large wader	Mediterranean
Greater Flamingo	large wader	sedentary
Green Sandpiper	small wader	mixed

Grey Heron	large wader	Mediterranean
Grey Plover	intermediate wader	Mediterranean
Gull-billed Tern	diver from flight	trans-Saharan
Kentish Plover	small wader	mixed
Lesser Black-backed Gull	surface feeder	mixed
Little Bittern	intermediate wader	trans-Saharan
Little Egret	large wader	Mediterranean
Little Grebe	diver from the surface	Mediterranean
Little Ringed Plover	small wader	trans-Saharan
Little Stint	small wader	trans-Saharan
Little Tern	diver from flight	trans-Saharan
Mallard	surface feeder	sedentary
Marbled Duck	surface feeder	trans-Saharan
Marsh Sandpiper	intermediate wader	trans-Saharan
Mediterranean Gull	surface feeder	Mediterranean
Northern Pintail	surface feeder	mixed
Northern Shoveler	surface feeder	mixed
Pied Avocet	large wader	mixed
Purple Heron	large wader	trans-Saharan
Red knot	small wader	trans-Saharan
Ruddy Turnstone	small wader	mixed
Ruff	intermediate wader	trans-Saharan
Sandwich Tern	diver from flight	mixed
Slender-billed Gull	surface feeder	Mediterranean
Spotted Redshank	intermediate wader	trans-Saharan
Squacco Heron	intermediate wader	trans-Saharan
Temminck's Stint	small wader	trans-Saharan
Tufted Duck	diver from the surface	mixed
Water Rail	surface feeder	Mediterranean
Western Cattle Egret	intermediate wader	Mediterranean
Western Swamphen	surface feeder	sedentary
Whimbrel	intermediate wader	trans-Saharan
Whiskered Tern	diver from flight	trans-Saharan
White Stork	large wader	trans-Saharan
Wood Sandpiper	small wader	trans-Saharan
Yellow-legged Gull	surface feeder	sedentary

Table S10. List of the avian species recorded in the coastal wetlands of Sicily. SPEC categories: 1 = species of global conservation concern, i.e. classified as Critically Endangered, Endangered, Vulnerable or Near Threatened at global level; 2 = species whose global population is concentrated in Europe and which is classified as Regionally Extinct, Critically Endangered, Endangered, Vulnerable or Near Threatened at European level, or as Declining, Depleted or Rare in Europe; 3 = species whose global population is not concentrated in Europe, but which is classified as Regionally Extinct, Critically Endangered, Endangered, Vulnerable or Near Threatened at European level or as Declining, Depleted or Rare in Europe; Non-SPEC = species whose European population status is currently considered to be secure.

ID	Common name	Scientific name	Birds (2009/147/EC) Directive	SPEC category
1	Audouin's Gull	<i>Larus audouinii</i>	1	1
2	Black Stork	<i>Ciconia nigra</i>	1	Non-SPEC
3	Black Tern	<i>Chlidonias niger</i>	1	3
4	Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	1	Non-SPEC
5	Black-headed Gull	<i>Larus ridibundus</i>	0	2
6	Black-necked Grebe	<i>Podiceps nigricollis</i>	0	3
7	Black-tailed Godwit	<i>Limosa limosa</i>	0	1
8	Black-winged Stilt	<i>Himantopus himantopus</i>	1	Non-SPEC
9	Broad-billed Sandpiper	<i>Calidris falcinellus</i>	0	2
10	Caspian Tern	<i>Hydroprogne caspia</i>	1	3
11	Common Greenshank	<i>Tringa nebularia</i>	0	Non-SPEC
12	Common Kingfisher	<i>Alcedo atthis</i>	1	Non-SPEC
13	Common Moorhen	<i>Gallinula chloropus</i>	0	Non-SPEC
14	Common Pochard	<i>Aythya ferina</i>	0	1
15	Common Redshank	<i>Tringa totanus</i>	0	2
16	Common Ringed Plover	<i>Charadrius hiaticula</i>	0	Non-SPEC
17	Common Sandpiper	<i>Actitis hypoleucos</i>	0	Non-SPEC
18	Common Shelduck	<i>Tadorna tadorna</i>	0	Non-SPEC
19	Common Snipe	<i>Galinago gallinago</i>	0	3
20	Common Tern	<i>Sterna hirundo</i>	1	Non-SPEC
21	Curlew Sandpiper	<i>Calidris ferruginea</i>	0	1
22	Dunlin	<i>Calidris alpina</i>	0	3
23	Eurasian Coot	<i>Fulica atra</i>	0	3
24	Eurasian Curlew	<i>Numenius arquata</i>	0	1
25	Eurasian Spoonbill	<i>Platalea leucorodia</i>	1	Non-SPEC
26	Eurasian Stone-curlew	<i>Burhinus oediconemus</i>	1	3
27	Eurasian Teal	<i>Anas crecca</i>	0	Non-SPEC
28	Eurasian Wigeon	<i>Mareca penelope</i>	0	Non-SPEC
29	European Golden Plover	<i>Pluvialis apricaria</i>	1	Non-SPEC
30	Ferruginous Duck	<i>Aythya nyroca</i>	0	1
31	Gadwall	<i>Mareca strepera</i>	0	Non-SPEC
32	Garganey	<i>Spatula querquedula</i>	0	3
33	Great Cormorant	<i>Phalacrocorax carbo</i>	0	Non-SPEC
34	Great Crested Grebe	<i>Podiceps cristatus</i>	0	Non-SPEC
35	Great Egret	<i>Ardea alba</i>	1	Non-SPEC
36	Greater Flamingo	<i>Phoenicopterus roseus</i>	1	Non-SPEC
37	Green Sandpiper	<i>Tringa ochropus</i>	0	Non-SPEC
38	Grey Heron	<i>Ardea cinerea</i>	0	Non-SPEC

39	Grey Plover	<i>Pluvialis squatarola</i>	0	Non-SPEC
40	Gull-billed Tern	<i>Gelochelidon nilotica</i>	1	Non-SPEC
41	Kentish Plover	<i>Charadrius alexandrinus</i>	1	3
42	Lesser Black-backed Gull	<i>Larus fuscus</i>	0	Non-SPEC
43	Little Bittern	<i>Ixobrychus minutus</i>	1	Non-SPEC
44	Little Egret	<i>Egretta garzetta</i>	1	Non-SPEC
45	Little Grebe	<i>Tachybaptus ruficollis</i>	0	Non-SPEC
46	Little Ringed Plover	<i>Charadrius dubius</i>	0	Non-SPEC
47	Little Stint	<i>Calidris minuta</i>	0	Non-SPEC
48	Little Tern	<i>Sternula albifrons</i>	1	Non-SPEC
49	Mallard	<i>Anas platyrhynchos</i>	0	3
50	Marbled Duck	<i>Marmaronetta angustirostris</i>	1	1
51	Marsh Sandpiper	<i>Tringa stagnatilis</i>	0	Non-SPEC
52	Mediterranean Gull	<i>Larus melanocephalus</i>	1	Non-SPEC
53	Northern Pintail	<i>Anas acuta</i>	0	3
54	Northern Shoveler	<i>Spatula clypeata</i>	0	3
55	Pied Avocet	<i>Recurvirostra avosetta</i>	1	Non-SPEC
56	Purple Heron	<i>Ardea purpurea</i>	1	Non-SPEC
57	Red knot	<i>Calidris canutus</i>	0	1
58	Ruddy Turnstone	<i>Arenaria interpres</i>	0	Non-SPEC
59	Ruff	<i>Calidris pugnax</i>	1	2
60	Sandwich Tern	<i>Thalasseus sandvicensis</i>	1	Non-SPEC
61	Slender-billed Gull	<i>Larus genei</i>	1	2
62	Spotted Redshank	<i>Tringa erythropus</i>	0	3
63	Squacco Heron	<i>Ardeola ralloides</i>	1	Non-SPEC
64	Temminck's Stint	<i>Calidris temminckii</i>	0	3
65	Tufted Duck	<i>Aythya fuligula</i>	0	3
66	Water Rail	<i>Rallus aquaticus</i>	0	Non-SPEC
67	Western Cattle Egret	<i>Bubulcus ibis</i>	0	Non-SPEC
68	Western Swamphen	<i>Porphyrio porphyrio</i>	1	Non-SPEC
69	Whimbrel	<i>Numenius phaeopus</i>	0	Non-SPEC
70	Whiskered Tern	<i>Chlidonias hybrida</i>	1	Non-SPEC
71	White Stork	<i>Ciconia ciconia</i>	1	Non-SPEC
72	Wood Sandpiper	<i>Tringa glareola</i>	1	Non-SPEC
73	Yellow-legged Gull	<i>Larus michahellis</i>	0	Non-SPEC

Table S11. Results of the procrustes analysis. The total length (L) of the residual vector gave for each species an assessment of its site fidelity/infidelity between any two dates (the higher L , the higher the site infidelity). The sum of such residuals (S_L) quantified for each species its overall fidelity/infidelity to the wetlands under study during the summer period. J2, A1, A2, S1 and S2 stand for the second half of July (J2), the first (A1) and second (A2) half of August, the first (S1) and second (S2) half of September, respectively.

Common name	L J2 vs. A1	L A1 vs. A2	L A2 vs. S1	L S1 vs. S2	S_L
Audouin's Gull	0.152	0.200	0.088	0.075	0.515
Black Stork	0.057	0.054	0.054	0.058	0.223
Black Tern	0.069	0.116	0.104	0.114	0.404
Black-crowned Night Heron	0.106	0.196	0.104	0.105	0.512
Black-headed Gull	0.160	0.063	0.111	0.107	0.441
Black-necked Grebe	0.057	0.054	0.044	0.045	0.201
Black-tailed Godwit	0.117	0.054	0.044	0.045	0.260
Black-winged Stilt	0.057	0.079	0.106	0.153	0.395
Broad-billed Sandpiper	0.057	0.054	0.054	0.058	0.223
Caspian Tern	0.077	0.119	0.056	0.058	0.309
Common Greenshank	0.133	0.092	0.093	0.067	0.385
Common Kingfisher	0.170	0.155	0.146	0.073	0.544
Common Moorhen	0.166	0.150	0.063	0.046	0.425
Common Pochard	0.077	0.101	0.104	0.071	0.353
Common Redshank	0.136	0.124	0.140	0.076	0.475
Common Ringed Plover	0.112	0.073	0.085	0.084	0.354
Common Sandpiper	0.069	0.147	0.088	0.097	0.401
Common Shelduck	0.057	0.054	0.054	0.051	0.216
Common Snipe	0.057	0.054	0.111	0.099	0.322
Common Tern	0.088	0.099	0.081	0.045	0.314
Curlew Sandpiper	0.166	0.130	0.082	0.112	0.490
Dunlin	0.110	0.131	0.077	0.089	0.407
Eurasian Coot	0.082	0.090	0.097	0.071	0.339
Eurasian Curlew	0.096	0.097	0.054	0.109	0.356
Eurasian Spoonbill	0.117	0.091	0.075	0.110	0.393
Eurasian Stone-curlew	0.199	0.160	0.089	0.092	0.540
Eurasian Teal	0.159	0.123	0.117	0.076	0.475
Eurasian Wigeon	0.077	0.071	0.154	0.150	0.452
European Golden Plover	0.057	0.054	0.054	0.058	0.223
Ferruginous Duck	0.109	0.073	0.079	0.071	0.332
Gadwall	0.057	0.054	0.098	0.062	0.271
Garganey	0.120	0.145	0.089	0.134	0.488
Great Cormorant	0.057	0.111	0.028	0.065	0.261
Great Crested Grebe	0.174	0.122	0.112	0.051	0.459
Great Egret	0.156	0.102	0.044	0.045	0.347
Greater Flamingo	0.140	0.099	0.084	0.090	0.413
Green Sandpiper	0.133	0.056	0.132	0.045	0.367
Grey Heron	0.161	0.149	0.070	0.100	0.480

Grey Plover	0.154	0.165	0.054	0.109	0.482
Gull-billed Tern	0.113	0.126	0.044	0.063	0.345
Kentish Plover	0.062	0.077	0.088	0.109	0.335
Lesser Black-backed Gull	0.186	0.213	0.028	0.103	0.530
Little Bittern	0.057	0.079	0.094	0.063	0.293
Little Egret	0.166	0.101	0.095	0.146	0.508
Little Grebe	0.267	0.228	0.088	0.109	0.692
Little Ringed Plover	0.130	0.114	0.101	0.107	0.452
Little Stint	0.166	0.205	0.085	0.096	0.552
Little Tern	0.158	0.112	0.129	0.157	0.555
Mallard	0.116	0.166	0.117	0.049	0.448
Marbled Duck	0.116	0.059	0.142	0.058	0.375
Marsh Sandpiper	0.096	0.095	0.104	0.051	0.346
Mediterranean Gull	0.113	0.057	0.134	0.063	0.366
Northern Pintail	0.086	0.113	0.054	0.100	0.352
Northern Shoveler	0.069	0.138	0.125	0.095	0.427
Pied Avocet	0.118	0.096	0.074	0.062	0.350
Purple Heron	0.120	0.086	0.115	0.110	0.431
Red knot	0.205	0.221	0.054	0.058	0.538
Ruddy Turnstone	0.057	0.091	0.056	0.058	0.262
Ruff	0.117	0.054	0.174	0.143	0.488
Sandwich Tern	0.140	0.089	0.059	0.100	0.388
Slender-billed Gull	0.193	0.143	0.118	0.062	0.516
Spotted Redshank	0.189	0.249	0.112	0.062	0.611
Squacco Heron	0.069	0.109	0.135	0.166	0.479
Temminck's Stint	0.198	0.217	0.054	0.058	0.527
Tufted Duck	0.093	0.078	0.044	0.100	0.314
Water Rail	0.093	0.109	0.036	0.063	0.300
Western Cattle Egret	0.086	0.062	0.079	0.045	0.273
Western Swamphen	0.211	0.164	0.096	0.077	0.548
Whimbrel	0.106	0.084	0.054	0.058	0.302
Whiskered Tern	0.057	0.107	0.079	0.063	0.306
White Stork	0.057	0.082	0.103	0.109	0.351
Wood Sandpiper	0.118	0.141	0.101	0.097	0.456
Yellow-legged Gull	0.131	0.110	0.093	0.071	0.405
Residual sum of squares:	1.172	1.099	0.631	0.577	
m^2 :	0.828	0.797	0.532	0.494	
P -value:	0.0001	0.0001	0.0001	0.0001	