

## Breeding of Black-necked Grebe *Podiceps nigricollis* C.L. Brehm, 1831 (Aves Podicipedidae) in the SCI and SPA ITA060002 “Lago di Pergusa” (Sicily, Italy)

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### ABSTRACT

On 2015 breeding season, we censused a high number of *Podiceps nigricollis* C.L. Brehm, 1831 (Aves Podicipedidae), breeding in the SCI and SPA ITA060002 “Lago di Pergusa”, including the Nature Reserve “Lago di Pergusa”. After 1950 the breeding records of the *P. nigricollis* in Italy were of approximately twenty and relative to a few pairs. Since 2010, in the Lake Pergusa, the *P. nigricollis* has changed its status from “migratory, overwintering and irregular breeder” to “regular breeder”. In 2010, and more regularly in 2012–2015, there are in fact documented breeding attempts with relative offspring. This Lake has so far counted the largest number of breeding pairs for Sicily and Italy. We point therefore to the importance of this protected natural area as a breeding site for the *P. nigricollis*.

### KEY WORDS

Black-necked Grebe; nesting; Pergusa Lake; *Podiceps nigricollis*; Sicily.

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### INTRODUCTION

After 1950 the breeding records of the *Podiceps nigricollis* C.L. Brehm, 1831 (Aves Podicipedidae) in Italy were of approximately twenty and relative to a few pairs (Brichetti & Fracasso, 2013; Verducci & Sighele, 2013).

In Sicily (Fig. 1), this specie was considered resident and regularly breeding (Benoit, 1840; Doderlein, 1873). Later on, only two breeding attempts were recorded: in 1957 in the Lake Pergusa (20–25 pairs approximately) (Krampitz, 1958) and in 1966 in Palermo province, in the Scanzano dam (1 pair) (Iapichino & Massa, 1989). For over thirty years on the Island there have been anecdotal sightings and irregular summer occurrence (AA.VV., 2008).

From 2000 to 2011 there were a few cases of breeding attempts: in 2000 and 2005 in Caltanissetta province (Mascara, 2007); in 2004, in 2006 (Corso, 2005, 2007) and 2011 (Di Blasi, pers. comm. 2011) in Siracusa province.

Since 2010, in the Lake Pergusa, the *P. nigricollis* has changed its status from “migratory, overwintering and irregular breeder” to “regular breeder”.

There are in fact documented breeding attempts with relative offspring:

- in 2010, with maximum observation of 16 adults at most and 13 chicks and juveniles together (Ientile et al., 2010; Termine et al., 2011);

- in 2012, with maximum observation of 50 adults at most and 49 chicks and juveniles together (Termine & Massa, 2015);

- in 2013, with maximum observation of 128 adults and 112 chicks and juveniles together (Termine & Massa, 2015).

In 2011, between April and July, there are records of 8 individuals with nuptial plumage, however at the end of June their number was already reduced to 2 and, given the absence of observations of new born chicks, there are hypotheses that those were summer residents (Termine & Massa, 2015).

## MATERIAL AND METHODS

Main object of this study, the monitoring of *P. nigricollis*, was conducted from October 2013 to August 2015 by observation sessions at least every 15 days with 10x42 binoculars and 25÷50x80 telescope. We walked the whole lake perimeter with an electric boat to access sites not seen from the coast.

In the warm season, observation sessions were conducted in early mornings and late afternoon, thus during activity peak for water birds. Observation data were then inputted in a complete database.

## Study area

The SCI and SPA ITA060002 “Lago di Pergusa” (EN) include the Nature Reserve “Lago di Pergusa” (402.5 hectares) created after the Regional Law No. 71 of 1995 and managed by the former Regional Province of Enna, now “Libero Consorzio Comunale”.

The Lake Pergusa is a closed basin, approximately 140 hectares large and characterized by marked water level fluctuations influenced by both precipitations and summer evaporation that make their waters as brackish ones.

For about twenty years the Lake water level decreased gradually down to its almost complete disappearance in the summer 2002 following long drought periods and several anthropic actions started in ‘30s with land reclamation works and continuing throughout ‘60s and ‘70s with ground water draw from private and public wells.

Since 2003 the Lake water level has been instead increasing, because both precipitation increase and well closing, so that in the last years the level is recorded beyond 4 metres versus 27 centimetres in 2002, when the water deficit and

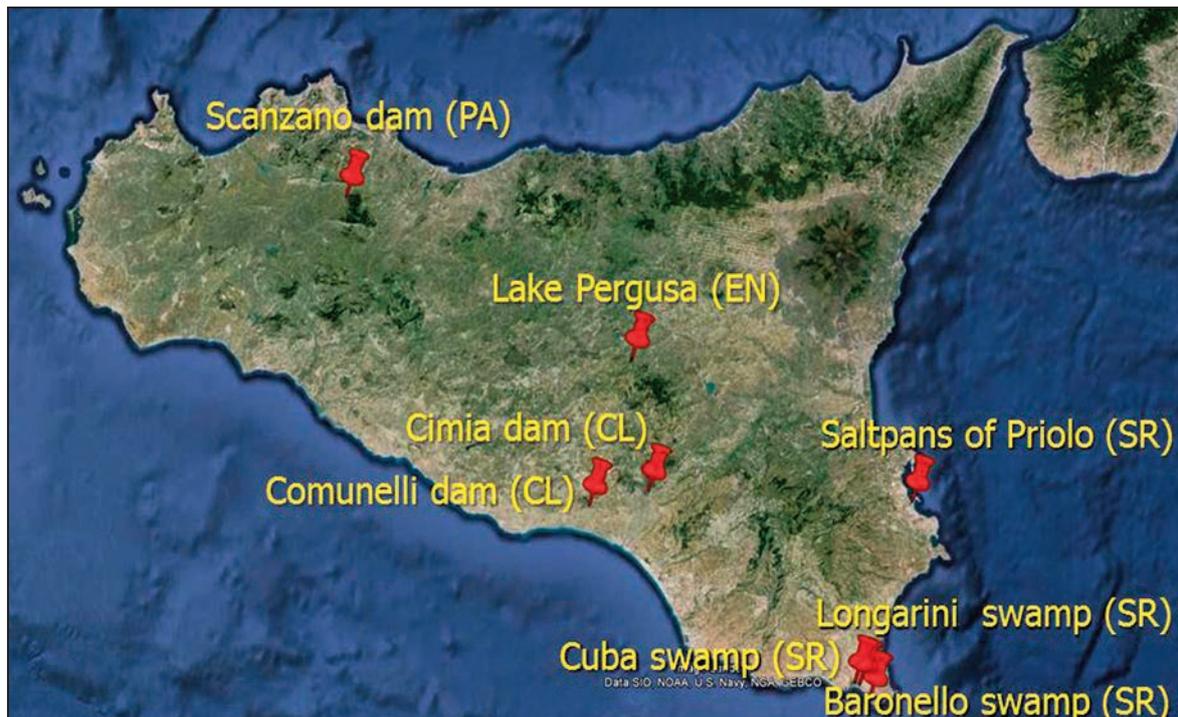


Figure 1. Breeding sites of *Podiceps nigricollis* in Sicily (1957–2015).



Figure 2. Swimming adult with three chicks on its back in the “Lago di Pergusa”. Figure 3. Young grouped in large crèche.

the salty conditions were so marked that they resulted in an almost complete absence of its biotic component.

Controlled inflows of external water from the nearby Ancipa dam of Troina (Enna) have also contributed to the recovery of the Lake. Between 2002 and 2004, indeed, the managing body conducted a test for the environmental recovery of the Lake: 804,420 cubic metres of water were put in between December 11, 2002 and May 7, 2003, and 750,010 cubic metres of water were put in between March 29 and May 31, 2004. Each inflow represents 1/6 of the total lake volume, today estimated as approximately 4,500,000 cubic metres.

Despite its small size, the Lake hosts a rich avifauna; censuses recorded more than 170 species, including breeding, overwintering and migratory ones.

Some of them are with a specific conservation status; among the breeders, 18 species are included in the European lists SPEC, among these 5 species are included in the Annex I, Dir. 2009/147/CE: *Tyto alba* (Scopoli, 1769), *Calandrella brachydactyla* (Leisler 1814), *Aythya nyroca* (Güldenstädt, 1770), *Porphyrio porphyrio* (Linnaeus, 1758) and *Ixobrychus minutus* (Linnaeus, 1766). Moreover, 5 species are included in the Italian Red List: *Otus scops* (Linnaeus, 1758), *Tyto alba*, *Aythya nyroca*, *Porphyrio porphyrio* and *Ixobrychus minutus* (Termino et al., 2008).

## RESULTS AND DISCUSSION

On the 18th February 2014, on 12 individuals, 6 were with nuptial plumage; 4 of them showed an intraspecific competition, whereas one individual with nuptial plumage and another with winter plumage appeared as a pair that was observed also on the following days; the breeding pairs were observed from May to October, with observation of maximum (Table 1, red font) 146 adults and 238 chicks and juveniles together.

On 17th February 2015, on 25 individuals, 13 were with a nuptial plumage; 6 of them showed an intraspecific competition; the breeding pairs were observed from May to August, with observation of maximum (Table 1, red font) 261 adults and 304 chicks and juveniles together.

According to the observations conducted in Pergusa since 2010, the chicks are moved on the back, even two-three at once (Fig. 2) by both parents and they become independent at 2–3 week old although they keep staying with their parents; as the breeding season goes on, the pairs move close to each other, together with their offspring, until they form larger and larger groups.

Then starting in mid-August the young are grouped in large crèche (often only one), while some adults hang round the groups (Fig. 3) and other adults move to different directions getting sometimes far from the groups.

Starting in mid-October young and adults

Date	Singles	Pairs	Tot. Adults	Pulli	Juv.	Total Pulli + Juv.
17.V.2014	65	1	67	1		1
15.VI.2014	19	37	93	68		68
29.VI.2014	21	39	99	27	53	80
13.VII.2014	12	65	142	113	83	196
03.VIII.2014	30	58	146	18	200	218
15.VIII.2014	84	30	144	12	226	238
29.VIII.2014	139		139		225	225
29.IX.2014	130		130		210	210
14.X.2014	117		117		193	193
25.V.2015	73	4	81	4		4
20.VI.2015	135	58	251	185		185
30.VI.2015	46	104	254	42	184	226
11.VII.2015	177	41	259	55	246	301
21.VII.2015	45	108	261	40	264	304
02.VIII.2015	172	38	248	15	283	298
15.VIII.2015	206	19	244	18	277	295

Table 1. Observations of *Podiceps nigricollis* during 2014 and 2015 breeding seasons in the “Lago di Pergusa” (Sicily, Italy).

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
2004	6	5	10									
2005					1	1		1	1			
2006		2		1	4	2		3	2	1		
2007	1			5	5	10	5		3			
2008	4	2	2	2	6		4	3				4
2009	2							6	12	12	8	5
2010	4	4			2	6	14	16	15	15	6	2
2011	2	4	6	8	8	8	4	2	2		5	3
2012	8	8	15	20	40	50	50	45	46	45	12	4
2013	5	5	10	18	41	81	128	124	120	120	10	8
2014	12	12	28	48	67	99	142	146	130	117	28	12
2015	23	25	32	56	81	254	261	248				

Wintering
  Migration
  Summer presence (not breeding)
  Breeding season

Post-breeding season

Table 2. Maximum number of adults of *Podiceps nigricollis* observed in the different months (2004–2015) in the “Lago di Pergusa” (Sicily, Italy).

cannot be distinguished as the adults turn into the winter plumage.

On the Lake, the number of individuals is markedly reduced starting in November; the occurrence of *P. nigricollis* in wintering is much reduced: in the 2010–11 winter there were 2–4 observed individuals, in the 2011–12 winter 3–8, in the 2012–13 winter 4–5 (Termine & Massa, 2015); in the 2013–14 winter 8–12, and in the 2014–15 winter 12–25 (Table 2).

During the breeding season, including the one in 2010, in the Lake there was a marked water vegetation cover forming floating mats, probably promoting the occurrence and breeding of this species.

## CONCLUSIONS

We therefore emphasise the importance of this protected natural area as a breeding site for the *Podiceps nigricollis*. The restored ecological and conservation conditions of the Lake may have favoured an optimal context for this species settlement.

This Lake has so far counted the largest number of breeding pairs for Sicily and Italy (Verducci & Sighele, 2013).

Monitoring of avifauna is fundamental for understanding the evolution of biotic elements of the ecosystems; in fact the avian populations change according to diverse and often fast paces, therefore the continuous monitoring is crucial for assessing the conservation status of protected natural areas, including the ones in Rete Natura 2000, given the significant effect of biotic and abiotic variables on the breeding success.

In Italy the low number of nesting sites make this breeding population particularly vulnerable to environmental fluctuations and the action of other disturbance elements even at small scales (Gustin et al. 2010). Accordingly, in addition to population monitoring, it is necessary to at least continue to monitor the water quality so that to prevent potential negative effects on the whole community.

Given its rare status as a breeder species, the Black-necked Grebe is a species understudied in Italy (Gustin et al., 2010) so that sessions of banding and marking are strongly warranted.

Finally, given the exceptional nature of breeding occurrence of the this species in Italy, investigating the winter movements of young with tracking

devices would warrant future investigations as this event appears to become consistent across the years.

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