

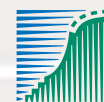
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Waterbirds around the world

A global overview of the conservation,
management and research of the
world's waterbird flyways

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Waterfowl marking in Portugal: main results and future perspectives

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The recent integrated monitoring of some Portuguese waterfowl populations has allowed several studies of their ecology, biology and management (Figueiredo 2003, Rodrigues 2001, Rodrigues & Fabião 1997, Rodrigues & Tenreiro 1996, Rodrigues *et al.* in press). This paper reports and discusses some results related to capture and marking processes used with waterfowl in Portugal.

We started the regular capture of waterfowl in Portugal in June 1993, and by the end of March 2004 we had marked 7 519 ducks and 1 047 rails. We also nasal-saddled ducks and obtained more than 21 000 resightings. The use of nasal saddles on ducks improved the results obtained (e.g. information on Mallard international movements increased 225%) and allowed new data analyses.

Ducks and Rails were captured on baited swim-in and walk-in traps, and marked with metal rings. Ducks were also nasal marked with flexible PVC, rubber (Rodrigues *et al.* 2001) or Polyurethane saddles (D. Rodrigues, unpubl. data). Nasal saddling started in 1993 with *Anas platyrhynchos* and continued with Wigeon *Anas penelope*, Gadwall *A. strepera*, Pintail *A. acuta* and Shoueler *A. clypeata* (from 1998), Teal *A. crecca* and Garganey *A. querquedula* (from 1999), and Tufted Duck *Aythya fuligula* (from 2003). Different colours and alphanumeric

codes on the nasal saddles allowed individual identification. Capture took place from July 1993 to the end of March 2004.

Capture totals, recoveries and resightings are summarised in Table 1. Most captured duck species have higher International resighting rates than recovery rates. Teal and Wigeon moulting primaries were captured between September and early December.

Nasal marks proved to be an efficient tool in the study of duck movements and migration. They increased the amount of information obtained from marked birds, allowed the estimate of survival rates (Rodrigues 2001), and will allow the assessment of returning rates of migratory ducks. The study has become less dependent on hunter reports, which gave a recovery rate of only 2.6%.

According to Rodrigues *et al.* (2000), Mallard populations from Central and Northern Portugal (from Mondego River basin to the north) are more related to Galicia and North Atlantic populations (Atlantic flyway) than to the Southern Portuguese populations (from Tagus basin to south). The latter should be more related to the southern Spanish and Mediterranean populations. This separation should probably also be applied to migratory species since ducks wintering in central and north Portugal prefer to use the Atlantic flyway, and birds wintering in south

Table 1. Total birds ringed and nasal marked within the study, recovered and resighted in Portugal, and recovered and resighted abroad.

Species	N (N marked)	Recoveries in Portugal	Resightings in Portugal	International recoveries	International resightings (N birds)
<i>Anas acuta</i>	8 (2)	0	0	1 (12.5%)	0
<i>Anas clypeata</i>	44 (33)	0	>80	2 (4.7%)	8 (4-12.1%)
<i>Anas crecca</i>	1 502 (847)	1 (0.1%)	>1000	61* (4.1%)	26 (14-1.7%)
<i>Anas carolinensis</i>	2 (=)	0	>25	0	0
<i>Anas penelope</i>	157 (138)	1 (0.6%)	>210	4 (2.5%)	10 (5-3.6%)
<i>Anas platyrhynchos</i>	5 739 (5 689)	216 (3.8%)	>20 000	20 (0.4%)	80 (54-0.9%)
<i>Anas querquedula</i>	3 (2)	0	11	0	0
<i>Anas strepera</i>	21 (18)	0	>35	1 (4.8%)	0
Hybrid of <i>Anas</i>	1 (=)	0	7	0	0
<i>Aythya collaris</i>	1 (=)	0	>20	0	0
<i>Aythya ferina</i>	5 (0)	0	0	1 (20%)	0
<i>Aythya fuligula</i>	36 (10)	1 (2.8%)	>55	1* (2.8%)	3 (1-10.0%)
<i>Fulica atra</i>	104 (-)	4 (3.9%)	-	0	-
<i>Gallinula chloropus</i>	846 (-)	5 (0.6%)	-	0	-
<i>Porphyrio porphyrio</i>	2 (-)	0	-	0	-
<i>Porzana porzana</i>	1 (-)	0	-	0	-
<i>Rallus aquaticus</i>	94 (-)	0	-	0	-
Total	8 566 (6 739)	228 (2.6%)	>21 000	91 (1.2%)	127 (78-1.2%)

* includes one recapture

Portugal have a higher component of the Central European and Mediterranean flyway, but this must be confirmed with more captures in the south.

The capture of Teal and Wigeon moulting primaries reinforced the importance of the Iberian wetlands as both wintering areas and as moulting grounds for those species that do not nest in Portugal (Rufino 1989)

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Mallard *Anas platyrhynchos* are one of several duck species to have been individually marked in Portugal. Photo: Paul Marshall.