

The Yellow-crowned Night Heron *Nyctanassa violacea* (Aves: Pelecaniformes: Ardeidae) in the Azores and Madeira Archipelagos: a new species for the Western Palearctic

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This paper presents and describes the first confirmed occurrence of the Yellow-crowned Night Heron *Nyctanassa violacea* in the Azores, which also represents the first record for Europe and the Western Palearctic. We also present and discuss subsequent reports of the species in Macaronesia. Several hypotheses may help to explain the occurrence of this species in this part of the Atlantic, including disorientation caused by strong winds and increasing observation pressure. However, further studies are necessary to assess the part played by the different factors in the occurrence of new vagrant individuals/species in Macaronesia.

Key words: Herons, vagrants, migration, reverse migration, climate change

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INTRODUCTION

Birds have considerable dispersal abilities. Their migration trips may last as long as several weeks, and extend through thousands of kilometres (Newton 2008). Apart from migrations, which are predictable and obligate processes, necessary for the survival of the individuals (e.g., reproduction, feeding), birds may also be accidentally driven far from their normal range. The latter phenomenon

is called vagrancy and has marvelled observers for many years. However, vagrancy raises several scientific questions, which are not fully answered yet. Weather conditions, food supply and genetic factors are three of the main factors that may influence this phenomenon (Vinicombe & Cottridge 1996).

The Azores archipelago is a remote set of nine recent volcanic islands (0.3 to 8 MY) lying along a ca 600-km transect in the North Atlantic Ocean

(36°55'-39°43' N, 25-31° W), roughly halfway between Europe and North America (Santa Maria Island is 1437 km away from Lisbon and 2467 from Newfoundland). Its climate is strongly influenced by the Gulf Stream, and mean air temperatures range between 13°C (winter) and 23°C (summer) (Azevedo et al. 2004).

According to the most recently published checklist (Rodrigues et al. 2010), the Azores harbour 51 breeding species, regular and occasional (Table 1) and 326 strictly non-breeding species (86,5%), and the latter number is regularly increasing (see data collected by the Azores Bird Club (ABC, formerly Birding Azores), “Aves dos Açores” (AdA), the Azores Bird Sightings (ABS) and the Portuguese Rarities Committee (e.g., Muchaxo et al. 2011).

Interestingly, about a third of all the non-breeding species listed by Rodrigues et al. (2010) have a strictly Nearctic origin while ca 253 have an Holarctic distribution.

Therefore, the Azores archipelago is a good locality for bird watching and one of the best spots in Europe to observe vagrant American birds (Pereira 2010; Rodrigues & Michielsen 2010). This suggests that the archipelago could act as a safe haven in the middle of the Atlantic for regular migratory and vagrant bird species.

The Yellow-crowned Night Heron *Nyctanassa violacea* (Linnaeus, 1758) is a common species in the Americas. It occurs from the south of the USA to the Brazilian coast, northern Peru, and as far as the Galapagos (Restall et al. 2006; Ugarte et al. 2010; Gianuca et al. 2011). The species is a year-round resident in the south-eastern part of the United States (Sibley 2003).

Laying occurs between March and June in the northern parts of the species' range and between August and October in the south. Both sexes incubate the eggs, which hatch after 21 to 25 days. The young fledge around 25 days after hatching (King & Leblanc, 1995; Martinez 2004).

The first record of a Yellow-crowned Night Heron in the Azores occurred in October 2009 but was accepted by the Portuguese Rarities Committee only in 2011 (Muchaxo et al. 2011). Since then, four other individuals have been observed in the archipelago (Table 2). The first (and so far, unique) record of this species on Madeira occurred in 2011 (Correia-Fagundes et al. 2011).

DISCUSSION

According to the last checklist of the Azorean birds (Rodrigues et al. 2010), these records of a new occasional migratory species elevates the Azorean bird record to 378 species. Nevertheless, more than 390 species have been observed in the Azores by 2014 (ABC [cited 2014]). Since only a small proportion of these species are known to breed (regularly or occasionally, see Table 1) in the archipelago (n=51, Rodrigues et al. 2010), this is one more piece of evidence of the importance of the Azores islands as a safe haven for migratory birds, of European and/or American origin (Figure 1). None of the regularly breeding species is of Nearctic origin but many, if not most, occasional migratory birds come from this region (Pereira 2010; Rodrigues et al. 2010).

The Yellow-crowned Night Heron is considered sedentary from the eastern and southern USA to Peru but it is occasionally observed in the northern parts of the United States and in Canada. However, breeding has never yet been documented there (Kaufman 1996). It was also recorded, as a vagrant, on Saint Pierre and Miquelon (France, 46°47'N) (BirdLife International 2014). Given that there is a breeding population in the United States which is migratory (Steven-son 1957), we assume that the individuals observed in the Azores were of North American origin. So far, only the nominate subspecies *N. violacea violacea* is known to migrate from its eastern and central North American breeding grounds, in September, to overwinter in Central America and the Caribbean, the spring migration occurring in March (Watts 2011).

The first record in the Azores occurred in October 2009 and concerned an immature individual. This is consistent with the normal dates of migration of the species. The first record in the Madeira archipelago concerned a first winter individual observed in late January 2011 (Correia-Fagundes et al. 2011; see Figure 1), a date which corresponds to the wintering period of the species. In the Azores, the first individual to be observed is likely to have remained until December 2011, because the subsequent sightings of a Yellow-crowned Night Heron at the same location concern an immature, and finally an adult (see Table 2).

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Table 1. Number of bird taxa occurring in the Azores and their respective status: Azores-endemic (AzE); Native non-endemic (Nat); Introduced (Int); Regular Wintering (RW); Occasional Wintering (OW); Regular Migrant (RM); Occasional Migrant (OM) (adapted from Rodrigues et al. 2010); *two species and eleven subspecies.

	AzE	Nat	Int	RW	OW	RM	OM	Total
Breeding Taxa	13*	23	15					51
Non breeding Taxa				17	40	30	246	333

Table 2. Confirmed sightings of *Nyctanassa violacea* in the Azores.

Date	Island	Place	N; Age	Observer	Reference
25/10/2009	Terceira	Marina de Angra do Heroísmo	1; immature	Ricardo Rego	Azores Bird Club Aves dos Açores
24/07/2010 to 28/07/2010	Terceira	Marina de Angra do Heroísmo	1; immature	Paulo Borges; Filipe Correia	Azores Bird Club Portuguese Rarities Committee
18/10/2010	Pico	Lajes do Pico	1; juvenile	João Quaresma	Azores Bird Club
05/01/2011 to 18/04/2011	Terceira	Marina de Angra do Heroísmo	1; immature	Carlos Pereira; Cecília Melo; Staffan Rodebrand; Bosse Carlsson; Jerry Bettencourt; Fernando Pereira; Richard Bonser; Nuno Fonseca; Jan Kåre Ness; Sofia Goulart; Carla Veríssimo; Laia Carbonell; José Silva; Inês Silva	Azores Bird Club Aves dos Açores
28/06/2011	Santa Maria	Vila do Porto	1; 2 nd year	Nelson Moura	Azores Bird Club Aves dos Açores
26/09/2011 to 09/10/2011	Corvo	Porto da Vila Nova and shore below lower fields	1; 1 st year	Richard Ek; Olof Jönsson; Jesper Segergren; Tommy frandsen; Bosse Carlson; Vicent Legrand; Daniel Mauras	Azores Bird Club
08/12/2011	Terceira	Marina de Angra do Heroísmo	1; adult	Luis Barcelos; Susana Ázera	Azores Bird Club Aves dos Açores
06/12/2013 to 16/01/2014	Santa Maria	Ribeira de São Francisco and Marina de Vila do Porto	1; first winter	Nelson Moura; Alan Vittery; Diana Braga	Azores Bird Club Aves dos Açores

In June 2011, a second year bird was observed on Santa Maria Island, and in September 2011, a first year bird was found on Corvo Island. The sighting on Santa Maria may correspond to the spring migratory period, when birds leave the Caribbean and Central America in March (Watts 2011). The

observation on Corvo is consistent with the dates of the autumn migration. The reports from Pico in October 2010 and Santa Maria during the winter of 2013-2014 also concern first year individuals (see ABC for more details).

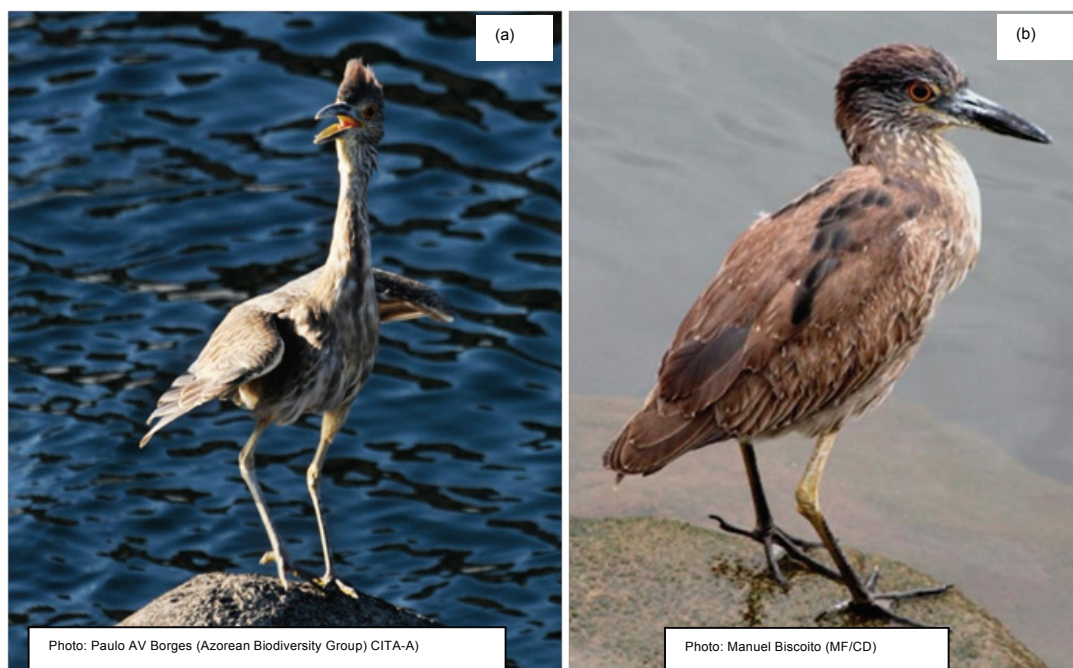


Fig. 1. Photographs of juvenile Yellow-crowned Night Herons found in the Azores and on Madeira: a) First record for Europe and the Western Palearctic, Angra do Heroísmo Marina, Terceira Island, Azores (Photo by P.A.V. Borges, 24 July 2010 b) Posterior record from Funchal harbour, Madeira Island (Photo by M. Biscoito, 27 March 2011 see also Romano et al. 2011).

Several hypotheses can be invoked to explain the occurrence of Yellow-crowned Night Herons in Macaronesia. First, and as suggested by Thorup (2003) in other bird species, some individuals might perform a "drift migration", that is, the phenomenon in which migrating birds are blown off course by the winds at the time they are in flight. Drift migration is more likely to happen in autumn because inexperienced young birds are less able to compensate when drifting than adults and second-year individuals heading north in spring. In the Azores, sightings of this species were generally preceded by strong westerly, south-westerly or north-westerly winds during the previous two weeks (Table 3).

In 2009, these strong winds blew from the north-east quadrant in September, and from the south-west in October. In 2010, the winds blew mostly from the north-west in June, from the north-east in July and September, and from west to north in October.

Between December 2010 and February 2011 winds predominantly blew from the south-west, and from the north-east in May 2011. In June, August, September, November and December 2011, the prevailing wind direction alternated between south-west and north-west.

North-west winds were prevailing in October 2013, whereas winds blew mainly from the south-west in November and December, and again from the north-west in January 2014. All sightings occurred when westerly winds were prevailing, except for July 2010 when eastern quadrant winds predominated albeit blowing from the north-west in June 2010. However, the bird from July 2010 may well have been that from October 2009 (see Table 3). Therefore, the hypothesis that these individuals have been driven to the Azores by winds blowing from America is plausible.

Table 3. Year and month of *Nyctanassa violacea* observations and strength of the wind (westerly winds prevailing) during the two weeks preceding sightings (under kind permission of www.windguru.com).

Year	Month	Wind strength (Beaufort scale)
2009	Sept	5
	Oct	7
2010	Jun	6
	Jul	8
	Sept	4
	Oct	8
	Dec	8
	Jan	8
	Feb	7
2011	May	6
	Jun	5
	Aug	7
	Sept	7
	Nov	8
	Dec	6
	Oct	7
2013	Nov	6
	Dec	8
2014	Jan	7

The preferred habitats of this species in the normal parts of its range are humid zones such as swamps, tidal plains, sheltered bays, estuaries, lagoons (Sick 1997; Kushlan & Hancock 2005; Restall et al. 2006), and mangroves (Kushlan & Hafner 2000; Olmos & Silva e Silva 2003). Yellow-crowned Night Herons feed on a large array of prey such as fish, amphibians, molluscs (snails), and especially crustaceans (crabs) (Olmos & Silva e Silva 2003; King & Leblanc 1995; Martinez 2004). Therefore, many areas may be suitable for Yellow-crowned Night Herons in the Azores, for instance humid zones in coastal areas, lagoons and lakes, which are widespread on the islands (Morton et al. 1998). Nevertheless, the individuals observed in the Azores were all observed in coastal habitats near the tidal zone. These areas provide food and shelter for vagrant individuals during their stay in the Azores, giving them a chance to return to their normal range.

Most of the observations of vagrant species in the Azores occur between October and March and the birds are mainly first winter individuals which possibly got disoriented and were taken to the islands by the winds. This is consistent with the

migration patterns observed in many bird species. Typically, individuals depart under relatively clear weather associated with high pressures, which offer ideal conditions for normal migration (light tail winds and clear skies allow easy navigations, Lees & Gilroy 2009). However, such conditions do not prevail for long, due to the variable nature of the Atlantic weather. Clear skies easily become overcast when cold fronts meet offshore low-pressure systems, making it difficult for the birds to use stars and/or the sun to orientate. Such conditions generate strong westerly winds which may disorient migrants and make them drift eastwards across the open ocean (Lees & Gilroy 2009). These arguments probably allow us to dismiss the “reverse migration” theory (Newton 2008), since it is not obvious that the innate orientation of these birds was *ca* 180° opposite to the direction they should have taken.

Given that new species have been observed in the Azores since Rodrigues et al. (2010) published their checklist (see above), the Azorean avifauna could still be enriched in a near future. Nevertheless, further studies are needed to determine which factors (e.g., the influence of the Gulf Stream on the archipelago, eventually associated with global warming phenomena, increasing observation pressure) may contribute to new records of vagrant bird species in the Macaronesian archipelagos

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