Successful second breeding of Black-headed Heron *Ardea melanocephala* after persecution by humans in Waza-Logone, Cameroon

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Summary

Following flood releases beginning in 1994, the Black-headed Heron *Ardea melanocephala* colony in the Waza-Logone area in Far North Region, Cameroon increased from 750 nests in 1993 to 2500 in 2003. We earlier attributed the exceptional colony size, many times larger than other known colonies, to flooding, favourable rainfall and protection. In 2010 the habitual rainy-season breeding was disturbed, triggering the departure of the herons. Two weeks later, herons returned and started a second breeding attempt. The subsequent 452 nests resulted in a surprising output of 1080 juveniles, not lower than in the 1990s. Dry season number of herons (2047) in the floodplain was also in line with late 1990s observations. The colony has, so far, been able to withstand increased pressure, likely due to protection by the nearby villagers. We offer suggestions to enhance future protection.

Résumé

Deuxième reproduction réussie de Hérons mélanocéphales *Ardea melanocephala* en réponse à une persécution accrue par la population dans le Waza-Logone, Cameroun. A la suite de lâchers d'eau en période de crue ayant débuté en 1994, la colonie de Hérons mélanocéphales *Ardea melanocephala* dans la zone du Waza-Logone en Région de l'Extrême-Nord, Cameroun, s'est accrue de 750 nids en 1993 à 2500 en 2003. Nous avions auparavant attribué la taille exceptionnelle de la colonie, plusieurs fois celle des autres colonies connues, aux inondations, à une pluviométrie favorable et à la protection. En 2010, la reproduction habituelle de saison des pluies a été perturbée, provoquant le départ des hérons. Deux semaines plus tard, les hérons revinrent et commencèrent une seconde tentative de reproduction. Les 452 nichées qui s'en suivirent produisirent le nombre surprenant de 1080

juvéniles, pas inférieur à celui des années 1990. Le nombre de hérons en saison sèche (2047) dans la zone d'inondation a aussi été en ligne avec les observations de la fin des années 1990. La colonie a, jusqu'à présent, été en mesure de résister à une pression accrue, probablement en raison de la protection par les villageois du voisinage. Nous avons présenté des suggestions pour renforcer la protection dans l'avenir.

Introduction

The Waza-Logone area, situated in the Far North Region of Cameroon, is characterized by a Sahelo-Sudanian climate. In addition to long periods of below average rainfall during the 1970s and 1980s, the area underwent a dramatic reduction in flooding, due to the construction of an embankment along the Logone River in 1979 (Scholte 2005). Nevertheless, Waza-Logone still holds an impressive avifauna, comprising over 379 species (Scholte *et al.* 1999). Its inclusion as Important Bird Area was because of its abundant and diverse waterbird fauna (Fotso *et al.* 2001).

From 1994 onwards, attempts have been undertaken to rehabilitate the Logone floodplain by opening two watercourses that had been closed off by the embankment (Scholte 2005). This triggered the re-inundation of some 600 km^2, in which perennial vegetation re-established in the following decade (Scholte 2005). We analysed the subsequent changes in waterbird populations showing that their numbers in the dry season increased, between 1993 and 2000, from 60,000 to 105,000, whereas the number of species surpassing international 1% criteria doubled from 6 to 12 (Scholte 2006). The increase in Anatidae (ducks and geese) corresponded to their recovery in West Africa following droughts in the 1980s. The increase in Ciconiiformes (storks, herons, egrets and ibis) was not paralleled by similar trends in other West African floodplains, suggesting that for these species the floodplain rehabilitation had played an important role. The limited increase in the Marabou Stork *Leptoptilos crumeniferus*, Yellow-billed Stork *Mycteria ibis* and Pink-backed Pelican *Pelecanus rufescens* was attributed to repeated destruction of their breeding colonies by people, who believe that they take larger fish than herons do, thereby competing with them. In contrast, a Black-headed Heron *Ardea melanocephala* colony increased from 750 nests in 1993 to 2500 in 2003. The exceptional colony size, several times larger than the next largest known colony, implied that besides improved habitat due to reflooding and favourable rainfall, protection also played a vital role (Scholte 2006).

MB observed the colony during July–August 2010 and, together with PS, revisited it in late November 2010, at the beginning of the dry season. Surprisingly, the Black-headed Heron colony was still at full activity in November, with full-grown juveniles in the nests (Fig. 1); this is the stage that it had reached in August in all previously monitored years (Scholte 2006). Here we report this locally unusual case of second breeding of a Black-headed Heron colony. Results from a waterfowl count

conducted in the Logone floodplain by the Garoua Wildlife School a few months later (Battokok *et al.* 2011) allow comparison with the 1992–2000 dry-season counts. We conclude by proposing measures that may further help the people of the adjacent village of Andirni to reinforce protection of the colony.

Figure 1. Part of the Black-headed Heron colony at Andirni, with no adult birds, and many juveniles having already left their nests (28 Nov 2010, photo: P. Scholte).

Study area

We earlier described the Waza-Logone area and presented an annotated checklist of its avifauna (Scholte *et al*. 1999, Scholte & Dowsett 2000). The Black-headed Heron colony is located in the southeastern corner of Waza National Park, 10 km west of the Logone floodplain, adjacent to Andirni, a village home to several National Park guides, who regularly survey the colony and protect it from robbers. The area has witnessed a continuing influx of seasonal labourers from Chad, bringing in cultures with habits that pose a threat to large birds. Already in 1998, some people were caught at night trying to trap young herons. In 1993, the colony had existed for more than a decade and was restricted to woodland west of the village. In 1994 it expanded into

the area south of the village, exposing it to robbers. In 1998 the colony moved again into the western woodland and in 2002 to the north of the village, where the most effective protection could be expected (Scholte 2006). In 2010 the colony was once again immediately west of the village, as the trees north of the village had died back, most likely because of the repeated breeding of the herons. Until 1995, three small Black-headed Heron colonies (< 50 nests) were present in the immediate vicinity of Waza NP but, as far as we know, no new colonies have been established since.

As in many other parts of the Sahelo-Sudanian belt in West-Central Africa, in 2010 rainfall in Waza-Logone rainfall continued longer than usual, well into October. Rainfall measured in Ndjamena (Chad) *c.* 50 km away, the closest reliable rainfall data available (Scholte 2005), was 563 mm, comparable with the average of 1993–2000 and 2003 (569 mm). However, our impression was that the extent of flooding was well above average, comparable to the levels of 1994 and 1998.

Methods

Numbers of herons in the colony in July–August 2010 were estimated by MB based on qualitative impression only.

In November 2010, only an area west of the village was occupied by the heron colony, which facilitated counting. On 28 November, we counted the number of nests, adults and young, following the same methodology as we applied in the 1990s (Scholte 2006). From 6h45 till 8h30 we counted the number of nests and adult herons in each nest tree. MB systematically orientated PS, who did the counting: for each tree with nest occupancy, nests, young and the few adults were counted from the ground, with binoculars. Median values were compared with Mann-Whitney tests.

Total waterbird counts were conducted between 14 and 23 Feb 2011, in the same way as in 1992–2000 (see Scholte 2005). The area counted in 2011 was, however, smaller than in the 1990s, when the floodplain north of Waza NP (including Kalamaloué NP) was included. The number counted in 2011 is therefore expected to be less than the total number present in the whole area. In addition the count was conducted in February, like in 1994 and 2000, when the area had dried up considerably.

Results

The number of herons in the colony in July–August 2010 appeared to be in the same order as in the late 1990s, *i.e.* some 2000–2500 nests (Fig. 2). At the height of the breeding season (first week of August), the colony was robbed of eggs and young chicks and all adult birds left. A few adults arrived 2–3 weeks after the desertion and started breeding again, although we cannot be certain that these individuals had been present in August.

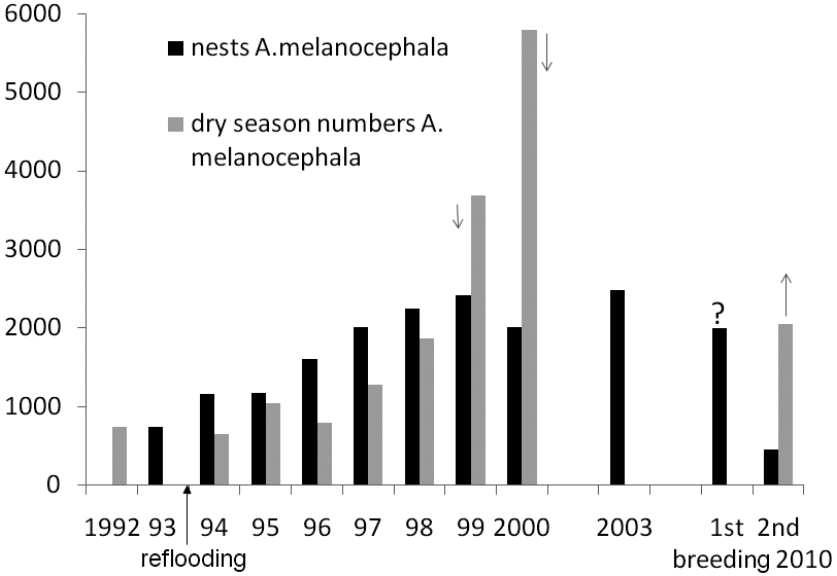

Figure 2. Numbers of Black-headed Heron nests in the Andirni colony and dry-season counts of herons. ↓ indicates a count conducted in a larger area than the other counts, including the area north of Kalamaloué. ↑ indicates a count conducted in a smaller area than the other counts, not including the area north of Waza NP. The question mark indicates an estimation only (see Methods). Counts for 1995 and 1998 are adjusted: see footnote 2 to Table 1.

The colony count in November took place at a later stage in the breeding cycle than previous counts: young were readily visible, contrary to the earlier counts, but the often flimsy nests were not always easy to distinguish and many young were out of nests (Fig. 1). No Cattle Egrets *Bubulcus ibis* were observed, in contrast to the earlier, rains breeding seasons (Table 1). The number of nests per tree was not different from that found during the relatively late breeding observations in 1993 and 1997b (Table 1). The number of nests and nest trees was, however, much reduced (Table 1, Fig. 2). On the other hand, the number of juveniles (1080), was between the numbers for the other two years that we surveyed the breeding colony (1993, 1997b), due to the high number of juveniles per nest in 2010 (2.27), much higher than in 1993 and 1997 (Table 1).

The 2011 dry-season count found 2049 individuals of Black-Headed Heron (Battokok *et al.* 2011), fewer than in 1999 and 2000, but considerably more than in 1992–8 (Fig. 2).

Table 1. Breeding data of the Black-headed Heron colony at Andirni.

	Count date	n nests	Median adults/nest[1]	n young	Median young/nest[1]	n nest trees	Median nests/tree[1]	Cattle Egrets
1993	7 Aug	742		484	0.60[a]	76	9.0[bc]	breeding
1994	23 Jun	1160				139		533 present
1995	5 Jun	718[2]	2.33[a]			102	5.8[e]	none
1996	2 Jun	1604	1.71[c]			201	7.0[cd]	>100 present
1997	17 May	1229	2.00[ab]			157	7.0[de]	none
1997	16 Aug	2012	0.94[f]	1666	0.55[a]	180	10.0[b]	breeding
1998	12 Jun	1372[2]	1.80[b]			150	8.0[c]	none
1999	1 Jul	2418	1.60[c]			167	14.0[a]	1052 present
2000	15 Jul	2016	1.43[d]			197	9.0[bc]	breeding
2003	12 Jul	2479	1.00[e]			180	13.0[a]	breeding
2010	28 Nov	452	0[g]	1080	2.27[b]	38	11.0[b]	none

[1]Data with a different letter in that column, $P < 0.05$; if at least one letter is the same, $P > 0.05$.

[2]These counts were made prior to the main rains (as indicated by absence of breeding Cattle Egrets), and in Fig. 2 have been adjusted upwards by a factor of 1.64 derived from the two counts in 1997.

Discussion

During its growth in the 1990s, the colony occupied an increasing number of nesting trees and there was no increase in number of nests per tree (Table 1). The number of nests in August 2010 is based on qualitative impressions only. However, the apparent constant size (2000–2500 nests) of the colony since 1999 suggests that availability of food in the surroundings has limited its further increase (Fasola & Barbieri 1978). The years 1993 and 1997 were characterized by low breeding success, less than one young per nest (Table 1), as also reported from East Africa (Brown *et al.* 1982). This year, 2010, with more than two juveniles per nest, was very different. We attribute this to the low number of returning breeders after the initial destruction of the colony, possibly resulting in less competition for food.

The number of nests was likely underestimated in November 2010, as nests were beginning to disintegrate. However, the count of young can be assumed to be reliable, as the count took place between a few days and a few weeks before fledging (Fig. 1). Even the smaller number of 452 nests during the November breeding in 2010 surpasses the size of all colonies reported in the literature (Scholte 2006).

We suspect that that the prolonged rainy and flooding season provided the conditions that allowed this successful second breeding. However, similar rain and flood conditions occurred in some years monitored previously, when no second

breeding took place. The late breeding in 2010 was likely due to the disturbance at the height of the normal (August) breeding season. Although Black-headed Heron is known for year-round breeding in more humid environments (Brown *et al*. 1982), this is the only second breeding that we observed in Waza-Logone in 20 years. Second breeding or "replacement" breeding is a common phenomenon after disturbance, and has been observed in related species such as Grey Heron *Ardea cinerea* (Milstein *et al*. 1970). However, we found no documented cases for herons in the west-central African Sahelo-Sudanian zone, where the single short rainy season is expected to limit an extension of the breeding season.

Conditions during the dry season may be critical for the survival of Black-headed Heron, as for other species in the Sudano-Sahelian region (Scholte 2005). We do not know what impact the fledging delay of *c.* three months had on the survival of Black-headed Herons in 2011.

Although the Black-headed Heron is considered of Least Concern on the IUCN Red List of Threatened Species (<www.iucnredlist.org> accessed 22 May 2011), Waza-Logone harbours > 1 % of its global population, as well as the largest known colony in the world (Scholte 2006), generating a special responsibility towards its protection. The observations in Waza-Logone show that, in addition to improved rainfall and floodplain rehabilitation, colony protection has played a crucial role for some of the Afrotropical waterbirds. Colony and habitat protection are likely to become more necessary because of increasing human pressure (Scholte 2006). The progressive die-off of trees close to the village may however limit protection of the heron colony. The protection of Waza NP has deteriorated in recent years, resulting in escalating poaching of large mammals (Tumenta *et al*. 2010). Stork and pelican colony robbery seems to have increased as well, although precise data are lacking. The August 2010 heron colony destruction shows that the colony near Andirni village, with its park guides, is not being spared. But the impact on dry season numbers seems to have been limited, likely because of the buffering by high breeding output, such as during the second breeding attempt in 2010. However, there is now a new management team at Waza NP, which we hope will make better use of the committed guides of Andirni. It remains a challenge to generate more interest in the colony among park authorities and communities, as its protection is mainly a concern of an ageing generation of park guides. When the breeding season continues into the dry season, during which tourism takes place, guided tours into the colony may become an option (cf. Bouton & Frederick 2003). Alternatively incentives could be developed to assure that younger residents of Andirni guard the colony.

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