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ROADSIDE DENSITIES AND VARIATION IN NEST SIZE AND STRUCTURE OF SOCIABLE WEAVER COLONIES NEAR PRIESKA, NORTHERN CAPE, SOUTH AFRICA

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Introduction

The Sociable Weaver *Philetairus socius* is a species restricted mainly to the drier, western and central parts of South Africa, inhabiting mainly the Karoo and Savannah biomes (Hockey *et al.* 2005). It is a highly colonial and social species that builds large nests housing up to 500 pairs (Maclean 1973, Spottiswoode 2005). Nests are usually built in large trees (usually Camel Thorn *Acacia erioloba*) but in the absence of suitably large trees they make use of man-made structures such as telephone poles, windmills and buildings for nest construction (Clancey 1950, Spottiswoode 2005). Densities of nests can vary depending on population size, food and nest material availability and landscape elements (Spottiswoode 2005). During a visit to the Prieska area of the Northern Cape from 16-19 December 2013, large numbers of roadside colonies (nests) were observed along the R357 and this paper presents results from a short survey that was undertaken looking at nest densities, nest clumping and size and shape/structure of the nests in relation to population ecology.

Study area and methods

The survey was carried out by DMH along a 60-km section of the R357 from Prieska to Vanwyksvlei (Fig 1). The starting point of the survey was the railway bridge at Prieska (S29° 40.543' E22° 45.185') to just south of the Kronos sub-station on the R357 (S30° 01.861' E22° 18.867'). The road was divided into 10 km sections and nests were counted per section to look at spatial distribution of the colonies along the entire route. For the purpose of this study, nests were classified as being small (<5 nest chambers), medium (5-15 nest chambers) or large (>15 nest chambers). Small nests were considered as new colonisations, while medium and large nests were considered as colonies that were relatively well established; for the latter these were lumped together for analyses. Additional notes were made of nests along the Copperton Road (Fig 1). Double nest masses on a single pole were counted as one nest mass.

Fig 1 - Google Earth map showing the R357 survey route (orange line) and the Copperton Road section (blue line). The black lines mark the end/starting points of each 10-km section.

Table 1. Densities of Sociable Weaver nests along a 60-km section of the R357 between Prieska and Vanwyksvlei.

Colony size	10-km sections (marked from railway bridge at Prieska)						
	0-10	10-20	20-30	30-40	40-50	50-60	Total
Small (< five nest chambers)	10	19	17	10	-	-	56
Medium-large (> five nest chambers)	19	54	80	115	11	1	280
Total	**29**	**73**	**97**	**125**	**11**	**1**	**336**
Nest density (nests/km)	**2.9**	**7.3**	**9.7**	**12.5**	**1.1**	**0.1**	**5.6**

The number of successive poles with nests, irrespective of size or shape, was also counted to determine nest clumping and colonization in each 10 km section. Where there was at least one telephone pole without a colony this was regarded as a gap between successive colonies.

Photos were taken of some nests to document the variation in size, structure and position of the colonies on the telephone poles, and these were uploaded to PHOWN (PHOtos of Weaver Nests, http://weavers.adu.org.za/phown.php).

Results

A total of 336 nests was counted along the 60 km route. The mean overall density was 5.6 nests/km; medium-large nests had densities of 4.7/km and small nests 0.9/km (Table 1).

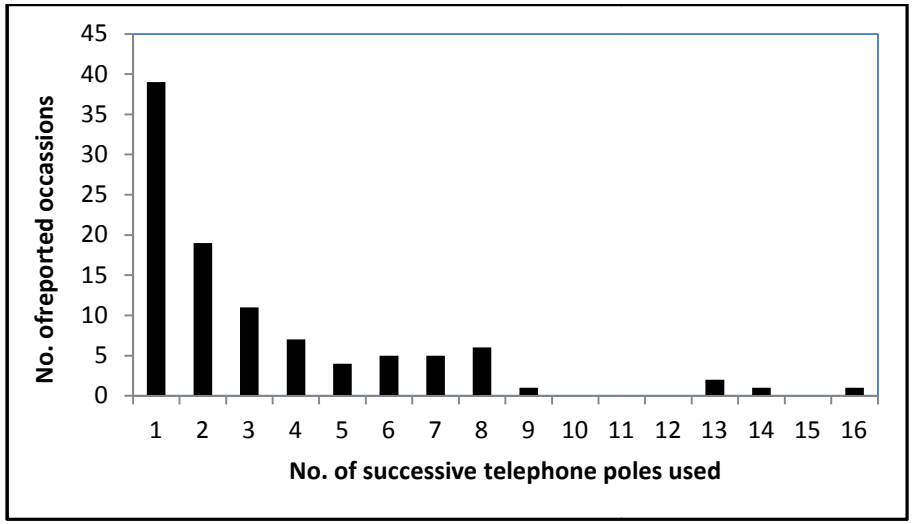

Fig 2 - Frequency of nest counts on successive telephone poles.

The highest densities were recorded between 30-40 km along the study route; nest density here was 12.5 nests/km. The second and third largest nest densities were recorded in the 20-30 km (9.7 colonies/km), and 10-20 km (7.3 colonies/km) stretches respectively.

The section between 10-30 km had an overall mean density of 8.3 nests/km. The majority of nests (n=125, 83%) were medium to large (i.e. five nest chambers or more), the remaining 56 (17%) were small and had less than five nest chambers.

Besides the actual survey route, an additional eight nests were recorded on telephone poles along a 6.5 km section of road leading to Copperton; these are called the Copperton Road colonies. (Fig 1). Six of these nests were small, the remaining two nests medium-large.

Fig 3 - An example of a section that contained 13 sequential nests on successive telephone poles. These nests were located along the 30-40 km section of the route.

Nest clumping

Fig 2 summarises the number of successive telephone poles that contained nests along the 60 km survey stretch. Thirty-seven nests (11.0%) were recorded on a single telephone pole with at least a gap of one unused telephone pole between nests. There were 19 recorded cases of two adjacent nests (n=38 nests, 11.3%), while on 11 occasions three successive poles were used (n=33 nests, 9.8%); these were regarded as having a low degree of clumping. A total of 170 nests (50.3%) showed medium to high degree of clumping, i.e. birds used four-nine consecutive poles on which to build nests (Fig 3). On four occasions the number of successive telephone poles that had nests was 13 or higher; with a maximum of 16 (n=56 nests, 16.7%). These nests showed a high degree of clumping.

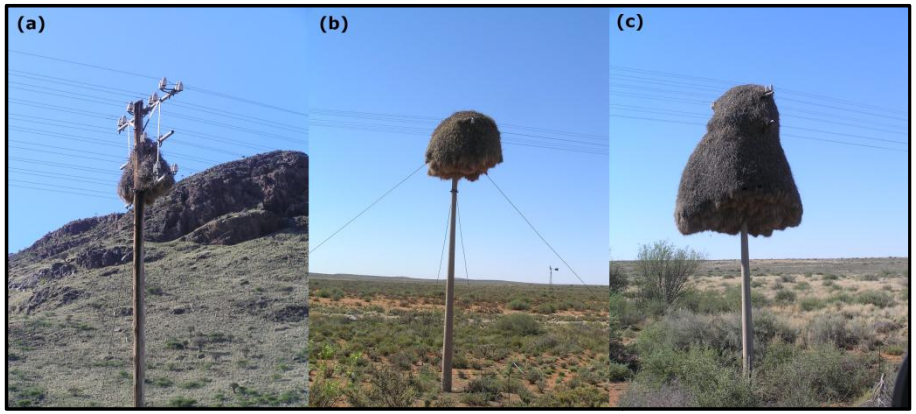

Fig 4 - Photos showing (a) small, (b) medium and (c) large Sociable Weaver nests that were distinguished during the survey.

Variation in nest shape and size

There was considerable variation in shape and size of nests. Fig 4 shows examples of the small, medium and large nest classes that were used for this study. Within the medium and large classes there was an assortment of different shapes and structures; these are summarised in Fig 5.

Only one nest was not built on a telephone pole; this nest was constructed on a disused lookout tower at the Kronos Sub-station (Fig 6) even though telephone poles were available along the road. This nest was also the furthest from its closest neighbour, at approximately 7.5 km.

Other birds utilising nests

Two nests were recorded with pairs of Pygmy Falcons *Polihierax semitorquatus*. Numerous Southern Pale Chanting Goshawks *Melierax canorus* were seen perched on top of nests but were flushed when approached. Along the 30-40 km section large

Fig 5 - Some examples of the variation in nest size and structure of large Sociable Weaver colonies along the R357 between Prieska and Vanwyksvlei.

numbers (est. 80-100 birds) of Pied Crows *Corvus albus* were observed near a quarry and some birds were seen perched on nests, often two-three at a time. It was uncertain if the crows were predating chicks or just using the nest structure as a perch.

Discussion

The mean density reported here (5.6 nests/km) is more than five-times that of roadside surveys undertaken previously. In southern Namibia Oschadleus *et al.* (2003) recorded a maximum of 1.08 nests/km. In the Kalahari, Maclean (1973) recorded nest densities of 0.62 nests/km (and maximum of 5.6 nests/km in northern Nossob River) but these were all nests in trees. During a roadside survey on the 119 km stretch between Griekwastad and Prieska, Rudebeck (1956) counted 131 nests (1.10 nests/km, calculated from Table 4) on telephone poles. Rudebeck (1956) surveyed over 2 430 km from Pretoria-Prieska-Upington – northern Namibia and the Griekwastad to Prieska section had the highest density of nests (1.201 nests/km, including a few tree sites). Brown and Lawson (1989) found 132 colonies in 1 447 km on pylons (=0.091 nests/km) in Namibia. These results appear to provide the highest ever recorded roadside nest densities for Sociable Weavers.

It is interesting to note that the highest densities were recorded in the middle of the route. Although no detail records were made of habitat in each section it is likely that this is where the vegetation provides optimal nesting material and food for the weavers.

The reason for the high number of colonies along this section is probably related to a number of factors: a large population of birds in the area, availability of nesting material (stiff, dry grasses), high breeding success and the need for new birds to start new colonies. Interestingly the weavers have been in the Prieska area since at least the early part of the 20th century; two birds, a male and a female, were collected near Prieska in October and November 1913 (Ditsong National Museum of Natural History, formerly the Transvaal Museum; in Rudebeck 1956) although there is no indication of the precise collection locality. The first Southern African Bird Atlas Project (SABAP1, Harrison e*t al.* 1997) recorded a mean reporting rate of 31.6% for Sociable Weavers in the Quarter-Degree Grid Cells (2922CD, 2922DA, 2922DC and 3022AB) covered by this survey route.

Fig 6 - Sociable Weaver colony on an abandoned lookout tower at Kronos Sub-station.

Based on current data, mean reporting rates from the second Southern African Bird Atlas Project (SABAP2, http://sabap2.adu.org.za) are 80.3%. Although one must be cautious in interpreting changes in reporting rates between the two atlas periods as a genuine difference, it does suggest that the birds are more commonly seen and reported during SABAP2 which supports the results presented in this paper.

It seems that over the last 100 years Sociable Weaver populations have become well established in the area, bred successfully with large numbers of young birds being recruited into the population which has necessitated the establishment of new colonies. This exponential growth in Sociable Weavers in the area has thus resulted in high nest densities. The dominance of small nests amongst the Copperton Road nests seems to indicate an expansion from the R357 roadside colonies and perhaps alludes to a recent increase in the local population.

Although there is a fair amount of variability in nest clumping there are sections along the route that show nest clumping to be relatively high. Rudebeck (1956) and Farre (1954, in Rudebeck 1956) found similar variability in the use of successive poles for nests where clumping in one area is high and in sections low or with no nests. Rudebeck (1956) found that nests on the edges of sections with sequential nests were generally smaller and therefore younger and suggested and that colonisation can spread in both directions. Although there were far fewer small nests compared with medium-large nests in this study it indicates that recruitment and expansion of colonies does take place. Actual positions of small nests in relation to large nests along sections where nest clumping was high was not detailed in this study; however, observations seemed to suggest that small (newer) nests were generally located away from larger nests, although this was not always the case. Some small nests were recorded adjacent to larger nests and this probably reflects a case of an unoccupied adjacent telephone pole being colonised by new birds from the larger nests. This could lead to more sequential use of adjacent telephone poles and an increase in nest clumping in certain sections. It is known that the size of the nest site does limit the maximum size of the nest (Maclean 1973). In this study one can assume that the 'large' nests would represent the upper size limit for telephone poles that were used and that new colonies would start once this upper size limit has been reached. It would be interesting to determine if there is a maximum colony size before any new colonisation takes place or is considered by birds from existing colonies, e.g. young birds wanting to establish their own territories.

The use of telephone poles or other artificial structures (e.g. windmills) in treeless areas is well known (Clancey 1950, van der Merwe 1966, Spottiswoode 2005) and this short study has highlighted the important role they play for Sociable Weavers in areas where large trees are absent. This ability to use man-made structures enables the species to successfully colonize new areas and has no doubt enabled the population in the Prieska/Copperton area to grow and expand over many decades. In fact, the southernmost record of Sociable Weaver is of a colony nesting on a telephone pole on the farm Damhoek, near Williston (Oschadleus 2012). The use of a lookout tower is the first recorded instance of birds using such a structure to build a nest; there are records of nests on water towers (e.g. van der Merwe 1966, Maclean 1973). The nest constructed on the lookout tower provides additional evidence that birds will use any artificial structure that is suited to building their nests.

This short survey has provided some interesting insights into the nesting habits and ecology of the Sociable Weaver close to the southern end of its southern African range. Follow up surveys every five years would be useful to monitor changes in nest densities and to look at other aspects such as location of new colonies. Further to this, additional surveys should try and be carried out from the end of this survey route to Vanwyksvlei to determine nest densities further south than the present survey route.

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