ARTICLES

Nesting associations between vultures and weavers

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Summary

Records of nesting associations between vultures and weavers are collated and presented, based on literature records, and records from the citizen science databases: PHOtos of Weaver Nests (PHOWN) and southern African Nest Record Cards. 43 records of weaver-vulture nesting associations were found involving at least four vulture species and 14 weaver species. Records of vultures nesting on top of weaver nests are included in this study. Information from records listed in this study seems to confirm the Predator Protection Hypothesis. Vultures may use the large nests of buffalo-weavers and Sociable Weavers as a platform for their own nests. This could provide energetic savings for vultures as well as make these vulture nests less conspicuous from below. Vulture researchers are encouraged to record nesting associations with weavers (and other species), and publish these and/or submit to PHOWN.

Introduction

Nesting associations between vultures and weavers have been known for a long time, with one of the earliest records describing a frequent nesting association between Palm-nut Vultures and weavers in Liberia (Büttikofer 1883). Since then, there have been scattered

records of vulture-weaver nesting associations, with some of these being listed in the comprehensive review of African vultures by Mundy *et al*. (1992). In a global review of avian nesting associations, Quinn & Ueta (2008) listed a single case of a nesting association between vultures and other birds, namely between Hooded Vultures and Red-headed Weavers *Anaplectes rubriceps* (citing Walsh & Walsh 1976). Although this has not been tested, the Predator Protection Hypothesis seems to apply, i.e. birds, including weavers, derive protection by nesting near the nests of larger or more aggressive birds (Quinn & Ueta 2008). Correlative studies have shown that nesting associations occur by active choice rather than the associate species choosing similar habitat.

What could be considered as a special case of association is where birds use the nests of other species, either to nest inside or on top. Vultures often re-use their own nests, or the nests built by other raptors or birds (Mundy *et al*. 1992). Records of vultures nesting on top of weaver nests are included in this paper as a separate category.

Due to the scant coverage of nesting associations involving vultures and weavers, this paper collates as many published and database records as possible, although there will probably be missed records. Databases included are the PHOtos of Weaver Nests (PHOWN) database, and the Southern African Nest Record Cards (NRC). In addition to collating known records, this paper aims to encourage vulture (and raptor) researchers to submit past and new records to be databased and/or published.

Methods

Original published references of nest associations between vultures and weavers were searched using a global bibliography of the Ploceidae family, now numbering over 18,500 references. Much of the primary vulture literature (including *Vulture News* 1-68) was searched. Nesting associations are included if an author mentioned an association.

The PHOWN (PHOtos of Weaver Nests) database http://weavers.adu.org.za/phown.php was searched for records of weavers and vultures nesting in the same tree. PHOWN is a Virtual Museum (http://vmus.adu.org.za), citizen science project of the Animal Demography Unit, to collect and monitor breeding distributions and

colony sizes of weaver birds globally. It began in mid-2010 and has collected over 20,000 records to date.

The vulture and weaver cards of the southern African Nest Record Cards (NRC, 1952-) were searched. The Nest Record Cards were collected by different observers across southern Africa.

Each record was assigned one of the following categories: Weavers and vultures building nests close to each other; Vultures building on top of weaver nests.

Results

The vulture NRCs yielded two cards (of 602 cards), the weaver NRCs had one record (of 10,133 cards), PHOWN had 12 records (of 18,760), and there were 28 Literature records. A record consists of a Literature, PHOWN or NRC reference, even if a particular Reference or NRC mentions several different nest sites with associations. Results are presented for nesting associations (Table 1), then for vultures nesting on top of weaver nests (Table 2). Within these two categories, results are ordered by vulture species, then by weaver species. In a few cases either the vulture or the weaver species was not identified. Some additional results follow below.

Dirk, Karen and Stefan van Stuyvenberg recorded several White-backed Vultures nests in association with six White-browed Sparrow-weaver colonies and three Sociable Weavers colonies in North West Province, South Africa (Table 1). The background to these vulture surveys was published by van Stuyvenberg *et al*. (2014), although the nesting association with the weavers was not mentioned.

Harris *et al*. (1993) recorded a Palmnut Vulture taking a green weaver nest as nest lining for its own nest, in the Mtunzini area, South Africa. The weaver colony (species not identified) was probably not in direct association, but probably not too far away and is not included in Tables 1 or 3.

H.D. Oschadleus recorded a White-backed Vulture flying off from the top of a Red-billed Buffalo-Weaver nest on Mayholme farm along the Limpopo River, South Africa, on 3 Feb 2010 (PHOWN 14690). It is unclear if the vulture had a nest on top, and this record is not included in Tables 1 or 3.

Salvan (1968) recorded a vulture nesting on top of buffalo-weaver (i.e. White-billed) nests in Chad (see Table 2).

Table 1: Records of vultures and weavers nesting in association. NRC=Nest Record Card, PHOWN = PHOtos of Weaver Nests.

Notes	Locality	Country	Date	Reference
White-backed Vulture *Gyps africanus* - Red-billed Buffalo-Weaver *Bubalornis niger*				
30 of 106 vulture nests also had associated nests of this weaver	Satara, Kruger National Park	South Africa	1967 - 1968	Kemp & Kemp (1975)
Two vulture nests with weaver nests in the same trees	Chizarira, Chirisa, or Gonarezhou	Zimbabwe	<1982	Mundy (1982)
Both species nesting next to each other in an acacia tree	Sengwa Wildlife Research Area	Zimbabwe	Jan & Feb 2000	Salewski *et al*. (2001)
White-backed Vulture *Gyps africanus* - White-browed Sparrow-weaver *Plocepasser mahali*				
One tree with nests of both species; empty vulture nest	Nottingham Farm	South Africa	3 April 2012	PHOWN 16827
One tree with nests of both species; two adult vultures, no eggs	Molopo Nature Reserve	South Africa	11 July 2014	PHOWN 16824
Four trees with nests of both species; each vulture nest had an egg and an adult vulture	Birnamwood Farm	South Africa	15-16 July 2015	PHOWN 16826, 16932, 16935, 16936

Table 1: Continued

White-backed Vulture *Gyps africanus* - Sociable Weaver *Philetairus socius*				
One tree with nests of both species in an *Acacia erioloba*	Inglewood farm, Kimberley	South Africa	24 Aug 2011	PHOWN 18492
One tree with nests of both species; one vulture egg	Vlakplaas farm	South Africa	11 July 2012	PHOWN 16933
One tree with nests of both species; vulture present	Vlakplaas farm	South Africa	11 July 2012	PHOWN 16934
One tree with nests of both species; one vulture egg	Vlakplaas farm	South Africa	13 July 2012	PHOWN 16825
White-backed Vulture *Gyps africanus* - Southern Masked Weaver *Ploceus velatus*				
Four vulture nests with nearby weavers, vultures built nests first	Mkuzi Game Reserve	South Africa	Oct [1962]	Gush (1962, 1993)
Vulture nest with weaver nests	Mkuzi, Nkongolwana area	South Africa	recent [1993]	Gush (1993)
White-backed Vulture *Gyps africanus* - Village Weaver *Ploceus cucullatus*				
Colony of 60 Village Weaver nests with a vulture nest	Hippo Pool, in the Serengeti	Tanzania	21 May 2013	PHOWN 5627

Table 1: Continued

Eight vulture nests that had weaver nests suspended around them	Chizarira, Chirisa, or Gonarezhou	Zimbabwe	<1982	Mundy (1982)
White-backed Vulture *Gyps africanus* - Brown-capped Weaver *Ploceus insignis*				
Weaver pair building nest above nest with vulture nestling	Ngong district near Nairobi	Kenya	3 Aug 1956	Van Someren (1956)
White-backed Vulture *Gyps africanus* - Weavers not identified				
10 buffalo-weaver nests around vulture nest, the nearest touching the vulture nest, either White-billed Buffalo-Weaver *Bubalornis albirostris* or Red-billed Buffalo-Weaver	Near Mt Tomadur	South Sudan	1941	Moreau (1943)
Ploceus weavers built their nests around few vulture nests, photo included	Near Satara, Kruger National Park	South Africa	1967 - 1968	Kemp & Kemp (1975)
Group of vulture nests in palms, with weaver nests at bases of the vulture nests	Near Ruvana	Tanzania	Dec 1908-May 1912	Kittenberger (1958)

Table 1: Continued

Photo of a vulture on its nest, with *Ploceus* weaver nests attached to vulture nest. The vulture was listed as *Gyps bengalensis*, but refers to the White-backed Vulture	Near Lake Idi Amin, Virunga NP	DR Congo	<1976	Lippens & Wille (1976)
Lappet-faced Vulture *Torgos tracheliotos* - Village Weaver *Ploceus cucullatus*				
Village Weavers rarely built their nests below vulture nest	No locality given	[Africa]	<1992	Mundy *et al*. (1992)
Lappet-faced Vulture *Torgos tracheliotos* - Speke's Weaver *Ploceus spekei*				
Weaver nests below vulture's nest, vulture refurbishing nest	No locality given	Kenya	<1956	Van Someren (1956)
Hooded Vulture *Necrosyrtes monachus* - Village Weaver *Ploceus cucullatus*				
Weavers nesting above and around active nest of vulture	Sirheni bush camp	South Africa	Nov 1992	Laing & Laing (1993)

Table 1: Continued

Hooded Vulture *Necrosyrtes monachus*- Red-headed Weaver *Anaplectes rubriceps*				
Weaver nesting with this vulture in 1966, but not in 1967-69	Within 40km of Kainji Dam	Nigeria	1966	Walsh & Walsh (1976)
Palmnut Vulture *Gypohierax angolensis* - Heuglin's Masked Weaver *Ploceus heuglini*				
95% of vulture nests with small colonies of this weaver. The weavers abandon their nests if the vulture deserts	Lamto Reserve	Ivory Coast	1967-73	Thiollay (1975)
Palmnut Vulture *Gypohierax angolensis* - Village Weaver *Ploceus cucullatus*				
Presumably Village Weavers (and so identified by Gatter 1997), nesting with a *Gypohierax* nest over several years	No locality given	Liberia	[between 1879 – 1882]	Büttikofer (1883)
Weaver colony about a nest of *Gypohierax*	Uelle area	DR Congo	<1932	Chapin (1932)

Table 1: Continued

Palmnut Vulture *Gypohierax angolensis* - Vieillot's Black Weaver *Ploceus nigerrimus*				
Weavers building soon after the vulture completed nest building. If the vulture moved its nest site, weavers followed	Kumba	Cameroon	1949-50	Serle (1954)
Palmnut Vulture *Gypohierax angolensis* - Yellow-mantled Weaver *Ploceus tricolor*				
12 of 31 weaver colonies in immediate vicinity of vulture eyries	No locality given	Liberia	<1997	Gatter (1997)
Palmnut Vulture *Gypohierax angolensis* - Red-headed Malimbe *Malimbus rubricollis*				
Several weaver nests 1-2m from occupied vulture eyries	Cavalla River	Liberia	<1997	Gatter (1997)
Vulture species not identified - Red-billed Buffalo-Weaver *Bubalornis niger*				
This weaver often builds its nest in a tree occupied by the nest of an eagle or vulture	Limpopo River	South Africa	<1900	Stark (1900)

Table 1: Continued

Vulture species not identified - Scaly-feathered Finch *Sporopipes squamifrons*				
Nest below vulture nest, White-backed or Lappet-faced Vulture	Mirabib, Namib Desert Park	Namibia	4 Sep 1969	NRC 789-0477
Vulture species not identified - Heuglin's Masked Weaver *Ploceus heuglini*				
Often recorded small colonies of this weaver (listed as *Sitagra atrogularis*) weaving nests in same tree as nest of a vulture	Uelle River	DR Congo	<1932	Chapin (1932)

Table 2: Records of vultures using weaver nests as platforms

Notes	Locality	Country	Date	Reference
White-backed Vulture *Gyps africanus* - Red-billed Buffalo-Weaver *Bubalornis niger*				
Five vulture nests on top of Buffalo-Weaver nests	Near Satara, Kruger National Park	South Africa	1967 - 1968	Kemp & Kemp (1975 & 1974)
Vulture nests on the top of palm trees, particularly using those trees that already had a buffalo-weaver nest to use as a base	Near Tsumeb	Namibia	Winter 2005	Friederich (2007)
Three vulture nests, with two vulture nests being on top of buffalo-weaver nests. The vulture nests each had one egg	Wankie Game Reserve	Zimbabwe	June 1961	NRC 107-0052
Five vulture nests, all being on top of buffalo-weaver nests in isolated *Acacia nigrescens;* the vultures added a few sticks to complete the platform. In at least one case the weavers continued to roost in their nests under the brooding vulture	Along Shobi River, Mazunga Ranch	Zimbabwe	July 1965	NRC 107-0056
White-backed Vulture *Gyps africanus* - Sociable Weaver *Philetairus socius*				
Vulture nest located on a Sociable Weaver nest, which was built on a metal structure at a borehole	Kalahari	South Africa	<2000	Anderson (2000)

Table 2: Continued

Sociable Weaver colony (three nest masses) with a vulture nest on top of the highest weaver nest, in a camel thorn tree. The vulture chick was about seven weeks old (ring G33352).	Farm Eureka, near Kimberley	South Africa	5 Nov 2014	PHOWN 18684, Visagie (2015)
Lappet-faced Vulture *Torgos tracheliotos* - White-billed Buffalo-Weaver *Bubalornis albirostris*				
Vulture nesting on top of buffalo-weaver (i.e. White-billed) nests	No locality given	Chad	<1967	Salvan (1968)
Vulture species in dispute - White-billed Buffalo-Weaver *Bubalornis albirostris*				
A vulture nesting on top of buffalo-weaver (i.e. White-billed) nests; vulture listed as *Gyps rueppellii* – see text	No locality given	Chad	<1967	Salvan (1968)

Salvan (1968) listed the vulture as *Gyps ruppellii*. Many authors, e.g. Kemp & Kemp (1974) and Mundy *et al*. (1992), thought that this must have been an error for the White-backed Vulture. Rondeau *et al*. (2006) disputed this, however, providing several tree-nesting records for Rüppell's Griffon Vultures *Gyps rueppellii*. This record remains as vulture species undetermined in this paper.

Discussion

This paper shows that there are a relatively large number of nesting associations between vultures and weavers (Table 3), in contrast to the single record listed in Quinn & Ueta (2008), although the latter used strict search criteria.

Most records listed in this study were sourced from the literature, but PHOWN provided two species records not previously known. Six White-browed Sparrow-weaver and four Sociable Weaver records were associated with White-backed Vulture nests. The White-backed Vulture - Sociable Weaver nesting association was recorded by two different observers. The Nest Record Cards provided an unpublished species association, i.e. Scaly-feathered Finch with an unknown vulture species. Many more weaver species could be found to be breeding in association with vultures. The White-backed Vulture has the most association records (Table 3), possibly because more nests of this vulture are found compared to other tree-nesting vultures.

There are five African vultures that regularly breed in trees. Of these, four have at least one record of nesting with weavers, and only the White-headed Vulture *Trigonoceps occipitalis* has no records found to date. Since the latter often nests in baobabs *Adansonia* sp. (Mundy *et al*. 1992), it is likely that associations may occur as buffalo-weavers and Red-headed Weavers regularly nest in baobabs (Weaver Watch 2016).

No nest associations were found for Asian vultures and weavers. Four Asian weaver species prefer nesting in reeds or trees in flooded or wet areas (del Hoyo et al. 2010), making nest associations with vultures unlikely. The Baya Weaver *Ploceus philippinus* nests in a wide range of nest sites, and thus may be found nesting in association with one or more of the three Asian tree-nesting vultures, i.e. Red-headed Vulture *Sarcogyps calvus*, White-rumped Vulture *Gyps bengalensis*, and Slender-billed Vulture *Gyps tenuirostris* (del Hoyo et al. 1994).

Table 3: African vultures that are predominantly tree-nesters with number of nesting association records with weaver species. A published record or NRC record may consist of several associated nests within the study area (but each literature record is counted once as some sources did not provide number of nests), while PHOWN records are added individually.

	Nesting associations					Nesting platforms			Totals
Vulture species:	White-backed	Lappet-faced	Hooded	Palm-nut	Unidentified	White-backed	Lappet-faced	Unidentified	
Weaver species:									
White-billed Buffalo-Weaver							1	1	2
Red-billed Buffalo-Weaver	3				1	4			8
White-browed Sparrow-weaver	6								6
Scaly-feathered Finch					1				1
Sociable Weaver	4					2			6
Heuglin's Masked Weaver				1	1				2
Southern Masked Weaver	2								2
Village Weaver	2	1	1	2					6

Table 3: Continued

	Nesting associations					Nesting platforms			Totals
Vulture species:	White-backed	Lappet-faced	Hooded	Palmnut	Unidentified	White-backed	Lappet-faced	Unidentified	
Weaver species:									
Speke's Weaver		1							1
Vieillot's Black Weaver				1					1
Yellow-mantled Weaver				1					1
Brown-capped Weaver	1								1
Red-headed Malimbe				1					1
Red-headed Weaver			1						1
Weavers unidentified	4								4
Totals	**22**	**2**	**2**	**6**	**3**	**6**	**1**	**1**	**43**

Many authors note that weavers build nests close to larger birds as a form of protection (e.g. Chapin 1932, Moreau 1942, Mundy *et al*. 1992). Several records listed in this study seem to confirm the Predator Protection Hypothesis (Quinn & Ueta 2008), as the weavers were only active while the vultures were active, and the weavers build after the vultures settle and the weavers often follow the vultures when nest sites are moved (e.g. Gush 1962, Thiollay 1975, Serle 1954). Serle (1954) also noted predation of non-associated weaver nests by the African Harrier-hawk *Polyboroides typus* but not when the weaver colonies were near a vulture's nest.

Vultures may use the large stick and grass nests of buffalo-weavers and Sociable Weavers respectively as a platform for their own nests, where the weaver chambers may still be active or deserted. This could provide energetic savings for the vultures as nest building may be energetically costly (Hansell 2000). In addition, building on a weaver nest may make the vulture nest less conspicuous to mammalian predators from below (Kemp & Kemp 1975). Thus, vultures may benefit from nesting on top of weaver nests, and this fact should be taken into account in conservation management of vultures, a fact that Haemig (2001) pointed out for protective nesting associations for threatened species – the roles are reversed in the case of vultures-weavers but the principle remains!

Malan (2009) recommended that raptor researchers check every Sociable Weaver, Hamerkop *Scopus umbretta* and Red-billed Buffalo-Weaver nest for raptors breeding on top. It is suspected that there are many undocumented records in spite of this recommendation. Vulture researchers are encouraged to record nesting associations with weavers (and other species), and publish these and/or submit to PHOWN – including past records. Surveys of vulture nests should document the extent of associations, i.e. nests with and without associate species.

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