Counts of Lappet-faced Vultures *Torgos tracheliotus* at Mahazat As Said (Saudi Arabia), with a discussion of the species' taxonomy

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**Summary** Lappet-faced Vulture *Torgos tracheliotus* is now known to be quite numerous in central Arabia. Transect counts indicated minima of 69–100 present in c. 300 km² of the Mahazat As Said reserve in west-central Saudi Arabia between 1 September and 9 October 1991, and a group of 36 birds was seen, the largest concentration ever recorded in Arabia. Ten nests were found, 5 m to 7.18 km apart, in *Maerua* trees. The birds are described, and the species' taxonomy in the region is discussed. Saudi Arabian birds have very small or no lappets and appear to be *negevensis*, a race formerly believed restricted to the Negev region of Israel.

THE STATUS of the Lappet-faced Vulture *Torgos tracheliotus* in the Middle East is still not well known. A small population was discovered in the Negev region of Israel in 1945 (Bruun 1981; Bruun *et al.* 1981; Leshem 1984; Paz 1987), though this is now practically extinct in the wild. The first breeding in Arabia was recorded in 1947 south-east of Riyadh (Jennings 1982), and since then many breeding locations have been confirmed in the peninsula, mainly in the centre and

Plate 1. Lappet-faced Vultures *Torgos tracheliotus* in *Maerua* tree, Mahazat As Said (Saudi Arabia). A group of Arabian oryx *Oryx leucoryx* shelters below the tree. (X. Eichacker)
Figure 1. Breeding distribution of Lappet-faced Vulture *Torgos tracheliotus* in Arabia. Data are from the *Atlas of the Breeding Birds of Arabia* (in prep., per M. C. Jennings), mapped on the basis of half-degree squares. Records from the vicinity of Mahazat As Said are not included.

South-east (Jennings and Fryer 1984; Jennings 1989a, 1990a: Figure 1).

Soon after the creation of the Mahazat As Said reserve in west-central Saudi Arabia in 1989 Lappet-faced Vultures were repeatedly recorded within it and occupied nests were found. A census was therefore carried out during the non-breeding season in 1991 and an unexpectedly high number of birds was found, constituting the largest concentration of Lappet-faced Vultures known from Arabia. The opportunity was also taken to compile descriptions of the birds’ morphology with a view to elucidating their taxonomic position.

**STUDY AREA**

The Mahazat As Said reserve, created by the National Commission for Wildlife Conservation and Development (NCWCD, Riyadh) and managed by the National Wildlife Research Center (NWRC, Taif), is located in the arid plains of west-central Arabia, 170 km north-east of Taif; the centre of the reserve lies at about 22°15'N 41°50'E. The whole area of 2,190 km² has been fenced to prevent the entry of bedouins and their livestock (camels, sheep, and goats).
The average altitude of the reserve is approximately 1000 m and the morphology is characterized by sandy plains with a few shallow wadis and two small jabals. In 1990 60 mm of rainfall was recorded. The main vegetation consists of a very few small Acacia tortilis trees and bushes, Salsola spinescens and Hammada elegans bushes, and the grasses Panicum turgidum and Stipagrostis plumosa, with Maerua crassifolia trees growing in relatively high density only in the east of the reserve (Launay 1990). The actual study area comprised about 300 km² of the eastern part of Mahazat As Said, where Maerua were the only large trees and probably therefore the only tree species suitable for Lappet-faced Vultures.

Plate 2. Part of a group of 36 Lappet-faced Vultures Torgos tracheliotus (and a Griffon Vulture Gyps fulvus) near a dead camel, Mahazat As Said (Saudi Arabia), September 1991. (C. Weigeldt)

METHODS

Observations were carried out between 7 August and 10 October 1991. A census transect, 106 km long and covering almost the entire study area, was driven by car on seven days, starting at about sunrise and taking 3–4 hours. Only birds sitting in trees and on the ground were counted, though birds on the ground were difficult to see at a distance and some may have been overlooked. To avoid double counting, flying birds were not included. The data resulting from each census consequently represent a minimum number of vultures present in the study area. Positions of Maerua trees and vulture nests were located with a Loran C navigator and plotted on a map.

RESULTS

Roost and nest sites

More than 200 Maerua trees, approximately 3–5.5 m in height, are located within the study area, giving an overall density of roughly 0.7 per km²—though the den-
sity is highly variable, ranging from quite treeless parts to areas with up to 13 trees per km². *Maerua* trees were used by the vultures for resting during the day and probably also for roosting at night.

Ten large nests, two of them destroyed, were found in the crowns of *Maerua* trees, all of which were about 4.5 m high. Two nest-trees were located at a distance of only 5 m from each other, though the average nearest-neighbour distance for all nest sites (excluding these two very close nests) was 3.96±SD2.39 km, ranging from 0.62 to 7.18 km. All trees with nests in the crown showed signs of use by vultures, such as feathers, bones, etc., in the nest as well as in the tree and on the ground below, and occasionally Lappet-faced Vultures were seen sitting on the nests, though it was not possible to assess how many had actually been occupied during the previous breeding season. In Africa, pairs can each have up to 3 nests, using them in rotation (Brown *et al.* 1982), so nest counts can give an inflated picture of the number of pairs present.

**Transect counts**

Surprisingly high total numbers of Lappet-faced Vultures were recorded in the study area (Table 1), with minimum numbers of 69–100 birds present. Outside the actual study area very few vultures were observed, although many surveys were driven through the entire Mahazat As Said reserve. On trees outside Mahazat As Said only a few vultures were noted, these being seen during drives along the perimeter fence. Single Lappet-faced Vultures were seen, however, on several occasions during the census period at distances of up to 200 km from the study area.

**Table 1.** Results of transect counts of vultures in the Mahazat As Said reserve (Saudi Arabia), September–October 1991 (see text).

<table>
<thead>
<tr>
<th>Date</th>
<th>Lappet-faced Vulture</th>
<th>Egyptian Vulture</th>
<th>Griffon Vulture</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Sep</td>
<td>100</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>14 Sep</td>
<td>84</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>18 Sep</td>
<td>69</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>19 Sep</td>
<td>91</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>24 Sep</td>
<td>69</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>2 Oct</td>
<td>76</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>9 Oct</td>
<td>81</td>
<td>12</td>
<td>1</td>
</tr>
</tbody>
</table>

In most cases Lappet-faced Vultures were seen alone or in pairs. Occasionally small groups of 3–5 birds were observed, most of them perching in the crowns of *Maerua* trees, but some were also sitting on the ground. On three occasions large groups were discovered:

- On 7 August at 06.00–09.00 hrs a group of 23 Lappet-faced Vultures, 4 Egyptian Vultures *Neophron percnopterus*, and 1 Griffon Vulture *Gyps fulvus* was found; the birds were sitting on the ground and in the top of four *Maerua* trees, in an area about 100 m across.

- On 20 August at 07.00–09.00 hrs a group of 15 Lappet-faced Vultures, 2 Egy-
On 19 September at 09.00 hrs a group of 36 Lappet-faced Vultures, 8 Egyptian Vultures, and 1 Griffon Vulture was observed just outside the eastern border of the reserve; they were sitting on the ground and on a mound close to an old camel carcass (these birds are included in the totals for the transect count on that day: Table 1).

The majority of Lappet-faced Vultures observed in Mahazat As Said probably roosted regularly in the study area. The birds usually left the study area and the reserve between 09.15 and 11.30 hrs, apparently to forage, and returned between 14.30 and 16.30 hrs each day, depending on the development of thermals. However, when midday searches were made of the region surrounding Mahazat As Said and at garbage dumps near the neighbouring villages of Al Khurma and Al Muwayh, no vultures were found.

**Description of birds**

The following description of Lappet-faced Vultures in Mahazat As Said is compiled from field observations and close-up photographs. During the census it was not possible to distinguish juveniles from adults, but features relating specifically to adults are taken from photographs at other times of year of birds at the nest.
with eggs or chicks. The description of the head and bill refers only to adults.

Size. Appeared to be significantly larger and heavier than Griffon Vulture.

Head. Naked or covered on top and behind eyes with short silvery-grey down; skin greyish or with pink shade on cheeks, and below and around eyes; nape pink or, depending on sunlight, sometimes appearing to be red (probably depending also on the bird’s state of agitation); skin around base of bill violet. Lappets (fleshy folds of skin on the side and rear of the head and neck) very small or completely absent.

Bill. Dark brown or black, with lower edge of upper mandible or basal part of lower edge of upper mandible and hook on tip very light brown.

Back. Dark brown.

Breast. Streaking brownish-white; sometimes very well developed but usually not so, in either adult or young birds.

Thighs. Feathering variable in colour, even between known adults; often dark or light brown, with lower or upper parts being brighter (very light brown or grey-white);

Plate 4. Breeding pair of Lappet-faced Vultures *Torgos tracheliotus* on their nest in a *Maerua* tree, Mahazat As Said (Saudi Arabia). (X. Eichacker)

Plate 5. Lappet-faced Vulture *Torgos tracheliotus* on *Maerua* tree, Mahazat As Said (Saudi Arabia). (X. Eichacker)
rarely whitish or very light brown, with only a narrow band of darker brown just above tibiotarsal joint.

**Underwing.** Usually dark brown, with only a very faint light brown bar on the coverts, though in a few birds the bar is white and well developed.

**DISCUSSION**

**Status in Mahazat As Said and Arabia**

The number of up to 100 Lappet-faced Vultures present in the 300 km² study area represents the highest density recorded in Arabia up to 1991. Jennings (1990b) recorded 22 birds at a dead sheep north of Hanakiyah in central Saudi Arabia, but flocks of up to 36 birds found in the present study were larger than ever seen before in the peninsula, and approach those found in some parts of the species’ African range. According to Pennycuick (1976), in East Africa, where ‘Lappet-faced Vultures can be seen anywhere in suitable habitats’, it is unusual to see more than eight together; in some subdesert areas of Africa, however, 40-50 can occur together (Brown *et al.* 1982). Association of Lappet-faced Vultures with other vulture species during resting, as observed in Mahazat As Said, has been described as common in other countries of the species’ range (Cramp and Simmons 1980). Numbers at Mahazat As Said were even greater in 1992, when counts using methodology closely similar to the present study found 142 birds on 8 September and 162 on 12 October (Newton and Shobrak in press).

Jennings and Fryer (1984) considered that the increased number of Lappet-faced Vulture records in Saudi Arabia probably does not reflect an actual increase in numbers of birds, but merely the increased activity of observers. On the other hand, M. C. Jennings (*in litt.*) has made the point that numbers may have risen recently due to the higher numbers of livestock now in central Arabia. In the case of Mahazat As Said, however, the large total number of vultures and the formation of unusually large groups may well be linked to the protection from disturbance, as well as to the fact that the study area offers an exceptionally high density of suitable trees. Jennings and Fryer (1984) estimated the total population of the Lappet-faced Vulture in Saudi Arabia to be not more than about 100 birds, this conclusion being based on scattered observations from several other nesting locations in central Saudi Arabia. The results presented above indicate clearly, however, that the population in the Kingdom is significantly larger than previously believed.

The total of only ten nests found, if compared with the number of birds observed, indicates that few of the vultures observed were breeding birds from Mahazat As Said or their young, even considering that attainment of maturity in the Lappet-faced Vulture requires 4–5 years (Cramp and Simmons 1980). Distances between nests in Mahazat As Said were almost identical with those of a dense population of Lappet-faced Vultures in Zimbabwe (Anthony 1976), where the average distance was 3-2 km, ranging from 0·7 to 5·9 km (64 nests, 18 of which were occupied). This indicates that, although no conclusions can be drawn at present on the actual nesting density, the breeding population in Mahazat As Said is probably rather high. Further work should be carried out during the breeding season.
in order to identify the number of breeding pairs.

Most of the non-breeding population of Mahazat As Said thus originates outside the area, but from where is unknown. Neither is it certain whether a breeding population existed at all in this area before the reserve was created, though, according to a local bedouin now working as a ranger in the reserve, the number of Lappet-faced Vultures present before the area was fenced was much lower than now. He also mentioned that in the past vultures were shot by local people, an observation confirmed by Jennings (1989a, b) who found single Lappet-faced Vultures shot on nests north of Medina and on the Al Arid escarpment.

Two major resources are necessary for the establishment of a population of Lappet-faced Vultures: undisturbed trees for nesting, roosting, and resting, and carcasses for feeding. The fact that Mahazat As Said is fenced and strictly protected provides safe nesting sites, and the importance of trees is shown by the fact that birds were observed only in those parts of the reserve where large trees, in this case

Plate 6. Lappet-faced Vulture Torgos tracheliotus, Mahazat As Said (Saudi Arabia). Underwing markings are prominent, though perhaps due to moult. (B. Pambour)

Maerva, were growing at relatively high density. On the other hand, food resources are virtually absent inside the protected area, as there are no domestic livestock and only low numbers of Arabian oryx Oryx leucoryx and Arabian gazelle Gazella gazella have been released. Carcasses of domestic animals are, however, abundant outside the reserve, where the area is heavily grazed. Lappet-faced Vultures are known elsewhere in their range to carry out long-distance foraging flights, with birds of the Negev population being recorded up to 150 km from their breeding site (Mendelssohn 1971). Both key resources are thus available within the vicinity of Mahazat As Said, and this probably accounts for the concentration of vultures in the area.

**Taxonomic status**

The relationships of the various populations of Lappet-faced Vulture are not clear, as no quantitative data are available which would permit an accurate comparison of morphological features. However, qualitative observations and analysis of the literature have allowed the development of a hypothesis on the species' taxonomy.

Bruun (1981) and Bruun et al. (1981) described a separate subspecies from the
Negev (negevensis), distinct from two subspecies of the African population (nominate tracheliotus in southern and East Africa and nubicus in north-east Africa). Cramp and Simmons (1980) and Brown et al. (1982), in contrast, do not recognize any races. Birds from Arabia have been described as possibly intermediate between nubicus and negevensis (Jennings and Fryer 1984), but as only one pair of the Negev population now survives in the wild (H. Mendelssohn in litt.), with a few individuals in the Tel Aviv Research Zoo, it is of major importance to establish the true taxonomic position of the Arabian population.

Records from Arabia (Jennings and Fryer 1984; ABBA data, Figure 1) demonstrate that there is scarcely any geographical separation between Lappet-faced Vultures from the Negev and those from the Arabian peninsula, as northernmost Arabian records, in the north of Saudi Arabia, are not more than 300–400 km from the Negev population. In Africa young marked Lappet-faced Vultures have been sighted up to 300 km from their natal site after dispersal (Brown et al. 1982), so exchange of individuals between the Negev and Arabian populations has probably been regular, indicating that these populations are unlikely to comprise different subspecies.

Morphological characters used by Bruun (1981), Bruun et al. (1981), and Leshem (1984) for the identification of subspecies in the Lappet-faced Vulture are the size of the lappets, the coloration of the head, colour of the thighs, and the degree of development of a white bar on the underwing. Observations made during this study showed that in the Arabian population most of these characteristics are highly variable. Descriptions of birds from the Negev, on the other hand, suggest a much more constant morphology, though published photographs show that they too do in fact vary considerably. The thighs are described as brown or dark brown (Bruun et al. 1981, for adults; Leshem 1984, for both adults and juveniles), but photographs of adult birds (Mendelssohn and Leshem 1983; Mendelssohn and Marder 1989) show very light brown and partially whitish thighs—and Shirihai (1987) describes adults’ thighs as creamish-brown or pale creamy-brown. It appears that the initial description and classification of negevensis was based on only a very few birds, and that the variability of the characters employed has not been considered in sufficient detail. Comparison of birds observed in Saudi Arabia with those described from the Negev reveals, in most cases, striking similarities; only a few birds observed in Arabia had characteristics more similar to nubicus, such as a white bar on the underwing, and, given the high degree of variability found in Arabian birds (apparently also in those from the Negev), it has to be concluded that the two populations are not morphologically distinct. The suggestion of Jennings and Fryer (1984) that Lappet-faced Vultures in Saudi Arabia are smaller than Griffon Vultures, and thus considerably smaller than negevensis, has not been confirmed by our observations. As a consequence, the Saudi Arabian population of the Lappet-faced Vulture has to be assumed to belong to negevensis on the basis of morphology as well as on a presumption of gene flow. This indicates that the subspecies is not close to extinction as was previously believed.

For similar reasons it seems questionable whether negevensis should be considered subspecifically distinct from the African forms, nubicus and nominate
tracheliotus, though there is no doubt that morphological characteristics, such as
colour of head and size of lappets, differ more between the Arabian and African
populations than between those of Arabia and the Negev. However, the geographical
separation of African and Arabian birds is perhaps not sufficient to avoid regular
exchanges between them, and future more detailed studies may yet confirm
that the key morphological characteristics of Lappet-faced Vulture change clinally
from north to south over the whole range of the species, indicating that monotypic
treatment is appropriate.

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