Roosting behaviour and host selection of oxpeckers (Aves: Buphaginae) in Moremi Wildlife Reserve, Botswana, and eastern Caprivi, South West Africa

Irene M. Stutterheim and K. Panagis
Department of Agriculture and Nature Conservation, S.W.A./Namibia

Roosting behaviour and host preferences of oxpeckers were investigated in Moremi and eastern Caprivi. Redbilled oxpeckers were found on six mammal species in Moremi and two in Caprivi. Yellowbilled oxpeckers were found on two host species in Moremi and one in Caprivi. Redbilled oxpecker roosts were located in palm trees in Moremi, while yellowbilled oxpeckers roosted on their host species. Roosting by yellowbilled oxpeckers on their hosts is thought to be the result of their more limited choice of host species.


The redbilled oxpecker Buphagus erythrorhynchus and the yellowbilled oxpecker B. africanus form an endemic Afrotropical family. Both species are predators of ticks and other ectoparasites adapted to feeding on large herbivorous animals (Moreau 1933; Attwell 1966). Both species have similar habits, including nesting and feeding (Mengesha 1978), but there are important differences. One of these is the shape of the bill which possibly relates to food preferences (Stutterheim, Mundy & Cook 1976). However, the reason for their very different distribution in Africa remains obscure.

Redbilled oxpeckers roost in large groups in reed beds and trees (McLachlan & Liversidge 1981), in large dead trees in water (Newman 1983) and in clumps of large palm trees Hyphaene natalensis (Stutterheim 1976). However, Dowsett (1969) recorded redbilled oxpeckers roosting on buffaloes in the Luangwa Valley National Park in Zambia. Yellowbilled oxpeckers roost in dead acacia trees (Mundy & Cook 1974) and on a variety of host mammals (Dowsett 1969). Because of these conflicting reports the present investigation into the roosting behaviour of oxpeckers was undertaken.

Specific ecological requirements often favour group formation. Any attempt to understand the functional role of group composition must be combined with an understanding of the ecological requirements of the species involved. Host selection by oxpeckers has been recorded by Attwell (1966), Buskirk (1975), Stutterheim (1976, 1979), Grobler & Charsley (1978), and Grobler (1980). Although quantitative studies have been initiated in areas where the two species occur sympatrically (Stutterheim & Panagis 1985 and Huster, in prep) information on host preferences is lacking. It was therefore deemed necessary to conduct a limited investigation into host relationships in both the study areas.

Methods
Two study areas in which both species were known to occur were selected: the Moremi Game Reserve in Botswana and the Eastern Caprivi Tribal Lands in SWA/Namibia. The major difference between the two areas is that oxpeckers occurred on game in Moremi, whereas the key host for both species in eastern Caprivi was cattle (Stutterheim & Panagis 1985). This information was supplemented by a study conducted at the Veterinary Research Institute at Onderstepoort on five redbilled and five yellowbilled oxpeckers obtained from eastern Caprivi and kept in captivity.

Counts of oxpeckers and herbivorous mammals were conducted from a vehicle and on foot following the methods of Stutterheim (1979). This was done over a distance of 351 km in Moremi and 1 661 km in eastern Caprivi between April...
and June 1984. To illustrate differences in host selection, a preference index was calculated on the basis of one bird per number of individuals of a host species (i.e. mammal/oxpecker ratio) following the methods of Grobler (1980). Oxpecker roosts were located in Moremi by following a group of oxpeckers by vehicle from 17h00 until they went to roost, or by driving around looking for roosting birds. In eastern Caprivi one yellowbilled oxpecker was fitted with a radio transmitter and followed to its roosting site. Additional sightings were done by systematically searching cattle kraals after sunset, because of human disturbance, it was difficult to determine the actual number of birds in the roosting groups. Careful inspection of kraals at night revealed roosting yellowbilled oxpeckers on five occasions. No redbilled oxpeckers were seen roosting on cattle during the same period. Yellowbilled oxpeckers left the cattle before sunset in a southerly direction towards Botswana and returned again after sunset. It was not possible to find the exact location of redbilled oxpecker roosts in the Caprivi.

Observations on the captive birds supported the findings in the two study areas. When first introduced to the cages the redbilled oxpeckers attempted to sleep on the leaves of the small palm tree. They all attempted to huddle together on the same leaf, but it could not hold the combined weight. After numerous attempts to roost together on various leaves, the group split up. Three birds roosted on two different palm leaves, while the other two birds roosted together in the dry tree or alternatively on the crossbeams of the cage. The redbilled oxpeckers were never observed roosting on the mammal.

The yellowbilled oxpeckers were never observed to sleep away from the host and could be induced to leave the host only after severe disturbance, after which they always returned. The preferred site was the rump of the mammal. When disturbed they would quickly move to the opposite side of the mammal without making a sound. This behaviour may explain why they are so seldom observed sleeping on mammals under natural conditions.

### Results

#### Roosting behaviour

In Moremi redbilled oxpecker roosts were located in clumps of tall palm trees (*Hyphaene benguellensis*) in the drier parts of the floodplains. Groups of up to 20 redbilled oxpeckers were found to roost in these palms. Other oxpeckers seen flying to roosts could not be followed as they appeared to roost on the vegetated islands. Yellowbilled oxpeckers were found to roost on giraffes (*Giraffa camelopardalis*). Group sizes varied from single birds to groups of nine birds per giraffe, although it was not always possible to obtain an accurate count of the birds on the animal. It was not possible to find buffaloes at night during the course of the present study, so that we could not establish whether yellowbilled oxpeckers also used buffaloes at night.

In the eastern Caprivi yellowbilled oxpeckers were located on cattle at night with the use of radio-telemetric equipment. As the yellowbilled oxpeckers only went down to the cattle after sunset, because of human disturbance, it was difficult to determine the actual number of birds in the roosting groups. Careful inspection of kraals at night revealed roosting yellowbilled oxpeckers on five occasions. No redbilled oxpeckers were seen roosting on cattle during the same period. Yellowbilled oxpeckers left the cattle before sunset in a southerly direction towards Botswana and returned again after sunset. It was not possible to find the exact location of redbilled oxpecker roosts in the Caprivi.

### Host selection

The results from the counts for Moremi and Caprivi are presented in Tables 1 and 2 respectively. Of the 12 herbivorous mammal species counted in Moremi, six were attended by redbilled oxpeckers and only two, giraffe and buffalo (*Syncerus caffer*) were attended by yellowbilled oxpeckers. Of the two species used by yellowbilled oxpeckers only buffaloes were used more intensively by yellowbilled than by redbilled oxpeckers. Redbilled oxpeckers therefore seem more adaptable and capable of exploiting a wider range of host species.

In the eastern Caprivi redbilled oxpeckers frequented both cattle and goats, while yellowbilled oxpeckers were found only on cattle. There was no significant difference between the overall use of cattle by the two oxpecker species although regional differences were recorded by Stutterheim & Panagis (1985).

#### Table 1 The mammal/oxpecker ratios in Moremi as calculated from counts conducted over 350 km in June 1984

<table>
<thead>
<tr>
<th>Mammal species</th>
<th>Number of mammals counted</th>
<th>Number of oxpeckers counted</th>
<th>Number of RBO$^b$ counted</th>
<th>Number of YBO$^b$ counted</th>
<th>Mammal/Oxpecker ratio RBO</th>
<th>Mammal/Oxpecker ratio YBO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buffalo</td>
<td>70</td>
<td>20</td>
<td>6</td>
<td>14</td>
<td>11,67</td>
<td>5,00</td>
</tr>
<tr>
<td>Giraffe</td>
<td>45</td>
<td>27</td>
<td>18</td>
<td>9</td>
<td>2,50</td>
<td>5,00</td>
</tr>
<tr>
<td>Kudu</td>
<td>32</td>
<td>20</td>
<td>20</td>
<td>9</td>
<td>1,60</td>
<td>1,60</td>
</tr>
<tr>
<td>Zebra</td>
<td>16</td>
<td>7</td>
<td>7</td>
<td>2</td>
<td>2,29</td>
<td>2,29</td>
</tr>
<tr>
<td>Wildebeest</td>
<td>29</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>14,50</td>
<td>14,50</td>
</tr>
<tr>
<td>Impala</td>
<td>965</td>
<td>22</td>
<td>22</td>
<td>22</td>
<td>43,86</td>
<td>43,86</td>
</tr>
<tr>
<td>Lechwe</td>
<td>103</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Elephant</td>
<td>75</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Warthog</td>
<td>29</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tsessebe</td>
<td>32</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Waterbuck</td>
<td>14</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Hippopotamus</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1 412</td>
<td>98</td>
<td>75</td>
<td>23</td>
<td>14,41</td>
<td>18,83</td>
</tr>
</tbody>
</table>

$^a$RBO = Redbilled oxpecker

$^b$YBO = Yellowbilled oxpecker

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Red-billed oxpeckers in captivity spent a mean of 39,6% of their time on the host (n = 351 observations), compared to 75,6% for yellow-billed oxpeckers (n = 300 observations). These two values show a significant difference ($\chi^2 = 26,33; P < 0,001$).

**Discussion**

Red-billed oxpecker roosting behaviour

The results of the present study confirm the observations by Stutterheim (1979) in the Kruger National Park that red-billed oxpeckers roost in palm trees by preference. There is, however, some uncertainty as to the roosting sites of red-billed oxpeckers in areas where suitable palm trees do not occur. Dowsett (1969) reported a single sighting of red-billed oxpeckers roosting on a herd of buffalo in the Luangwa Valley National Park in Zambia. No evidence of this type of behaviour was recorded either during the present study or during the intensive investigation of Stutterheim (1976 & 1979) in the Kruger National Park. Furthermore, personnel in the Kruger National Park involved with buffalo culling operations did not record red-billed oxpeckers roosting on buffaloes, despite requests for sightings (Pienaar, pers. comm.). The single record of Dowsett (1969) for red-billed oxpeckers roosting on buffalo is thought to be a misidentification.

Yellow-billed oxpecker roosting behaviour

The present investigation indicates that yellow-billed oxpeckers roost on their host species at night. Similar observations are reported by Hustler (in litt.) for yellow-billed oxpeckers roosting on kudu in the Hwange National Park and by A. Kemp (pers. comm.) who collected a yellow-billed oxpecker off a roan antelope at night. The predisposition of yellow-billed oxpeckers (pers. conun.) who collected a yellow-billed oxpecker (1969) for red-billed oxpeckers roosting on buffalo is thought to be a misidentification.

<table>
<thead>
<tr>
<th>Mammal species</th>
<th>Number of mammals counted</th>
<th>Number of oxpeckers counted</th>
<th>Number of RBO$^b$ counted</th>
<th>Number of YBO$^c$ counted</th>
<th>Number of oxpeckers/ RBO ratio</th>
<th>Number of oxpeckers/ YBO ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>3 683</td>
<td>369</td>
<td>188</td>
<td>181</td>
<td>9,98</td>
<td>19,59</td>
</tr>
<tr>
<td>Goats</td>
<td>112</td>
<td>4</td>
<td>4</td>
<td>28,00</td>
<td>28,00</td>
<td></td>
</tr>
<tr>
<td>Elephant</td>
<td>70</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Hippopotamus</td>
<td>18</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>3 853</td>
<td>373</td>
<td>192</td>
<td>181</td>
<td>10,33</td>
<td>20,07</td>
</tr>
</tbody>
</table>

$^a$Adapted from Stutterheim & Panagis, 1985  
$^b$RBO = Red-billed oxpecker  
$^c$YBO = Yellow-billed oxpecker

The ecological conditions which result in yellow-billed oxpeckers roosting in acacia trees in northern Nigeria (Mundy & Cook 1974) are not known and need to be investigated.

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**References**


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