fidelity to natal area. In the northern hemisphere the female returns faithfully to the area from which she fledged. The males on the other hand, who pair with the females on the wintering grounds, follow the female to her natal area. Therefore the return of a male to his natal area depends entirely on the female with whom he pairs. As the duck in these winter concentrations are often drawn from diverse geographical areas, the importance of this behaviour from the point of gene flow through duck populations is considerable. There are also important management implications. In North America, and recently in South Africa, experiments have been carried out on the value of 'seeding' waterfowl breeding grounds with reared birds. If few of these birds return after the non-breeding dispersal period then the exercise has little value. If only the females return in numbers then they should be stocked preferentially. Cassie Heÿl described his work on this problem on the Cape Teal in the first issue of Safring News. We urgently need data for other species.

If large numbers of juveniles in the pre- or immediate post-fledging periods can be caught, sexed and banded then it may be possible to retrap some of these individuals in later years. Differential recovery rates and distances may provide some clues as to the degree of natal area fidelity.

Finally one might look at nest site tenacity of females from year to year. Do females return to nest at the same water from year to year? Do females remate with their original mates? In the northern hemisphere (where pair bonds are short lived) this phenomenon appears to be of rare and fortuitous occurrence. There is some evidence that in at least some anatids in the southern hemisphere pair bonds are both longer and the number of rematings higher. Shoveler and Redbill would be good species to investigate from this point of view. Colour-rings would be essential for marking the birds.

These therefore are some problems that a team of ringers could investigate. The basic requirements would appear to be a suitable locality, a variety of traps (nets, walk-in and decoy traps, nest traps and clap nets) colour-rings and plenty of patience. However the data obtained would be most valuable to waterfowl biologists. Moreover such information provides us with much needed back-up data used in presenting arguements for the conservation of important wetlands. Problems such as those outlined above are a starting point to a wider understanding or our waterfowl populations.

RINGING AND COLOUR MARKING THE RED-BILLED OXPECKER IN THE KRUGER NATIONAL PARK

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1. Introduction

The Red-billed Oxpecker Buphagus erythrorhynchus is a bird with a very close relationship to certain mammal species. Very little is known about this strange bird and a two year project was

started in the Kruger National Park. The project's official title is 'The ethology, physiology, ecology and interspecies relationships of the Red-billed Oxpecker'. Although the scope of the study is clearly very large, the ringing and marking of the birds for individual recognition is crucial to the success of the study.

Interest in the Oxpecker stems from the fact that it appears to be a specialist. It has developed various structural and behavioural adaptations which enable it to exploit the ectoparasites of large mammals. One of my tasks will be to find out the extent to which the bird is a specialist. I will follow individually marked birds and find out to what extent their feeding is restricted to large fleas, ticks, etc. or if in fact they have quite a wide diet. If the diet is a specialist one, I will try to find out what consequences this has on the bird in relation to the breeding season, and the energetics of breeding. It is known that oxpeckers have helpers at the nest in addition to the parents and this may be related to the

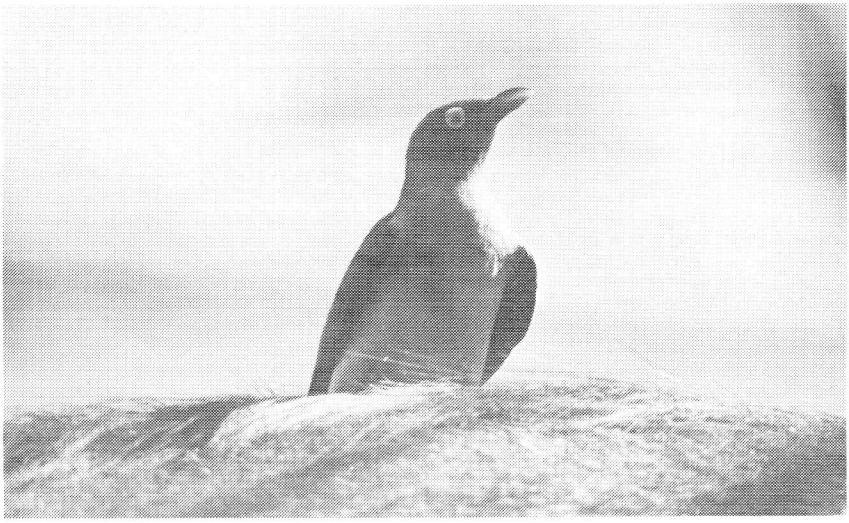

Fig.1. Red-billed Oxpecker sitting on a buffalo

specialist status. Trying to sort out the pairs, helpers and family groups again depends on the success of individual marking and recognition. Finally I will be investigating other aspects of the bird - mammal relationship such as whether the birds really perform an important warning function to their hosts thus making the system a mutual symbiosis rather than a one-sided relationship in favour of the birds.

At this stage in the study most of my problems have been conerned with the capture and marking of birds. Details are given below.

2. Trapping

Oxpeckers spend most of their activity period on the mammalian simbiont and is therefore not an easy bird to trap. The use of a baited net fitted with nooses on a donkey (Davidson, 1963) and a

stove chimney (van Someren, 1951) is recommended in the literature but was found not to be practical in the Kruger Park.

The following methods were tried with success:

2.1. Mist nets at water holes

During the dry season the birds are attracted by the mammals that concentrate around permanent water holes. By erecting mist nets over the water it was possible to catch some of these birds. This method was not very successful because the nets had no background and the birds easily avoided them. A constant watch was also needed for animals that wade into the water to drink like buffalo or elephant. These had to be chased away or the nets removed. The trapping success was about one bird per day.

2.2. Bow nets at water holes

A few birds were caught at water holes in the dry season by using a two meter bow net fitted with 3cm nylon netting and a trigger mechanism that could be manipulated from a distance. The oxpeckers are caught when they leave the mammals to drink water. The best method was to submerge the bow net completely because the birds avoided all strange objects. By using this method the trapping success was about three birds per day.

2.3. Mist nets at the nest

In the Kruger Park oxpeckers breed in natural holes in trees. By erecting a mist net in front of this nesting hole all the birds in a family party could be very easily caught. This method can only be used after the eggs had hatched because of the danger of the birds deserting the nest.

2.4. Mist nets at animal pens.

Large numbers of oxpeckers are attracted by their mammalian simbionts kept in pens. The birds can be caught by using a mist net between two of these pens. This method proved to be quite successful and at one locality near Skukuza 143 oxpeckers were caught with 31 recaptures in a period of 14 months.

3. Colour marking

The Red-billed Oxpecker is a fairly small bird with a mean total length of about 22cm. For its specific way of life, adaptations are a long tail, short tarsus, very sharp claws and a fairly heavy bill. Taking this into considertaion the following marking methods were used.

3.1. Colour neckbands

Once centimeter strips of brightly coloured "Safflag" were used for neckbands. Only six different colours were available but by combining two different colours, 42 colour combinations were possible. Identification of this neckband depends on the streamers formed at the connection between the two different colour strips because the birds preened the neckbands into their feathers. These neckbands were visible from a distance of about 100 metres. The oxpeckers frequently nibbled these streamers and after about 8 months the streamers were completely worn down and in most cases impossible to identify. This was probably due to the sharp cutting edges of the heavy bill. Too tightly fitted neckbands formed abrasions and too loosely fitted neckbands got entangled with the bill. This marking

method was eventually abandoned because of the many disadvantages. However, birds marked with colour neckbands were seen feeding their young. It could therefore be assumed that properly fitted neckbands had no harmful effect on the oxpeckers.

3.2. Backtag markers

Backtags were successfully used on pheasants (Labisky and Mann, 1962). A lighter and modified backtag with a serial number was made of "Safflag" and thin nylon string and tested on Cape Sparrows. It was found to hamper their flying and the method was not used with the oxpeckers.

3.3. Wing tags

Wing tags were made from stainless steel dental wire, nylon washers and a "Safflag" number tag. However, the birds were able to

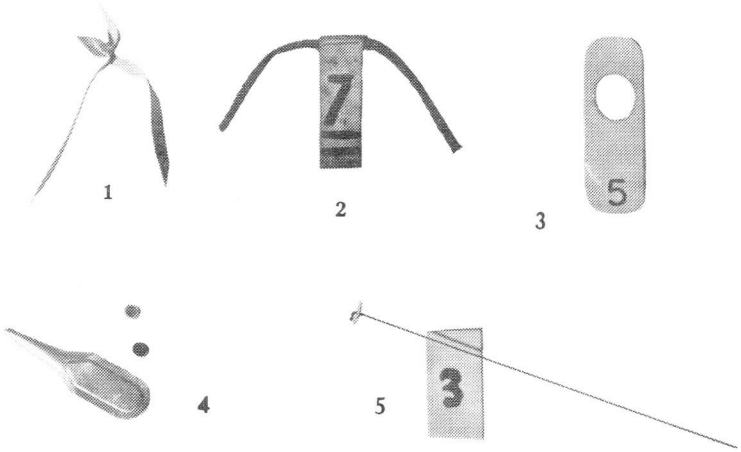

Fig.2. Methods used for colour marking the Red-billed Oxpecker: (1)Neckbands; (2)Backtag marker; (3)Poncho marker; (4) Colour rings; (5) Wing tag.

reach these tags and nibbled them. Because of possible injuries to the birds it was decided against using them.

3.4. Poncho Markers

Numbered poncho markers were made from 2,5cm white "Safflag" strips. These numbers were easily visible from a distance of 100 metres. The oxpeckers preened the markers out of their feathers and they got entangled with their bills. Only two oxpeckers were marked by this method.

3.5. Colour rings

Three millimetre colour rings supplied by the National Unit for Bird-ringing Administration were used. These colour rings could be identified at a distance of about 50 metres with a good pair of bi-

noculars. The advantage of this method is that it is very safe and has no visible disturbing effect on the oxpeckers. Nine different colours being available, a vast number of colour combinations were possible. But these rings were suitable to overseas climatic conditions and after a short period of about 4 months of use colour fading was already visible. A total of 120 oxpeckers were marked by this method and after a period of 14 months no loss of rings or evidence of leg mutilation were found.

Acknowledgements

I would like to acknowledge the financial assistance and facilities provided by the National Parks Board, C.S.I.R. and the Rembrandt Tobacco Corporation.

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COMPUTERISATION AT NUBRA

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Introduction

It may be of some consolation to ringers to know that NUBRA's "computer consultant" is a ringer. Although I doubt if he remembers it, I was introduced to the gentle art of bird-ringing by Mr.Peter Mendelsohn. This was at the Pretoria sewage works. A few years later, on a Statistics Association Conference, I visited those same reed beds - from the other side - where a water purification plant had displaced the reeds, and, I presume, the swallows.

The highlights of my ringing career have been, I suppose, catching a Belgian Knot at Langebaan before I got my full ringing permit, and catching 7 foreign swallows - 1 Polish, 4 British and 2 Russian - on three successive ringing trips. Five of these came on one night!

Currently I participate in the activities of the Western Cape Wader Study Group and in the mass-ringing of Hartlaub's Gull chicks on Robben Island.

So much for my ringing bona fides,-what of the computer. Of great advantage to NUBRA, is the fact that the University's Computer Centre is only at the other end of the same corridor. The Centre houses its central unit, the UNIVAC 1106 Computer, which is classified as "medium to large". The Central Processor Unit (C.P.U.) includes a set of 128 integrated-circuit control registers with a cycle time of 166 nano-seconds per 36-bit word. (A nano-second is 1/1000 millionth of a second.) Main storage (memory) on the computer