NOTES ON THE ECOLOGY, CAPTURE AND BEHAVIOUR IN CAPTIVITY OF THE ELEPHANT SHREW *NASILIO BRACHYRHYNCHUS BRACHYRHYNCHUS* (A. Smith)

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INTRODUCTION

During studies on the lymphatic system of *Nasilio*, it became necessary to capture living elephant shrews and to maintain them in as physiologically normal a condition as possible. This paper is a record of observations made while attempting to capture and rear these animals. Field studies extended over three years. They were confined to two of the regions of Southern Rhodesia in which these elephant shrews are common, and which are separated by a distance of about 103 miles. The regions differ markedly in character, although presenting similarities in microhabitats.

It seems possible that specimens from the two regions may not all be referable to the subspecies *Nasilio b. brachyrhynchus* (A. Smith) (Roberts 1951 and Ansell 1960), but slight colour differences which exist do not seem to warrant further specific subdivision until the entire genus can be revised. However, crossbreeding has been achieved between the two ecological groups described in this paper.

HABITATS

Elephant shrews of this genus are most frequently found in microhabitats which offer three main conditions, i.e. dry rocky or rough ground for burrows; access to areas of plentiful insect food or fruits; and availability of zones of shade and sunlight. Such conditions occur in a contact zone of vegetation where, for example, dry woodland merges with grassland or leafy forest.

The two localities to be described (Fig. 1) both provided this type of microhabitat despite differences in plant associes.

Locality 1 (21° 15′ S., 32° 20′ E., 500–700 ft. a.s.l.)

The area extends for 12 miles along the eastern bank of the Sabi river near the Portuguese East African border, from a point 14 miles south-east (down-river) of Hippo Mine Island to the confluence of the Sabi and Lundi rivers (Fig. 2).

Temperatures may reach 130° F by about 2 p.m. in summer and 80° F in winter with a drop at nightfall of at least 10°. Rainfall is moderate and usually confined to the summer months, November to March.

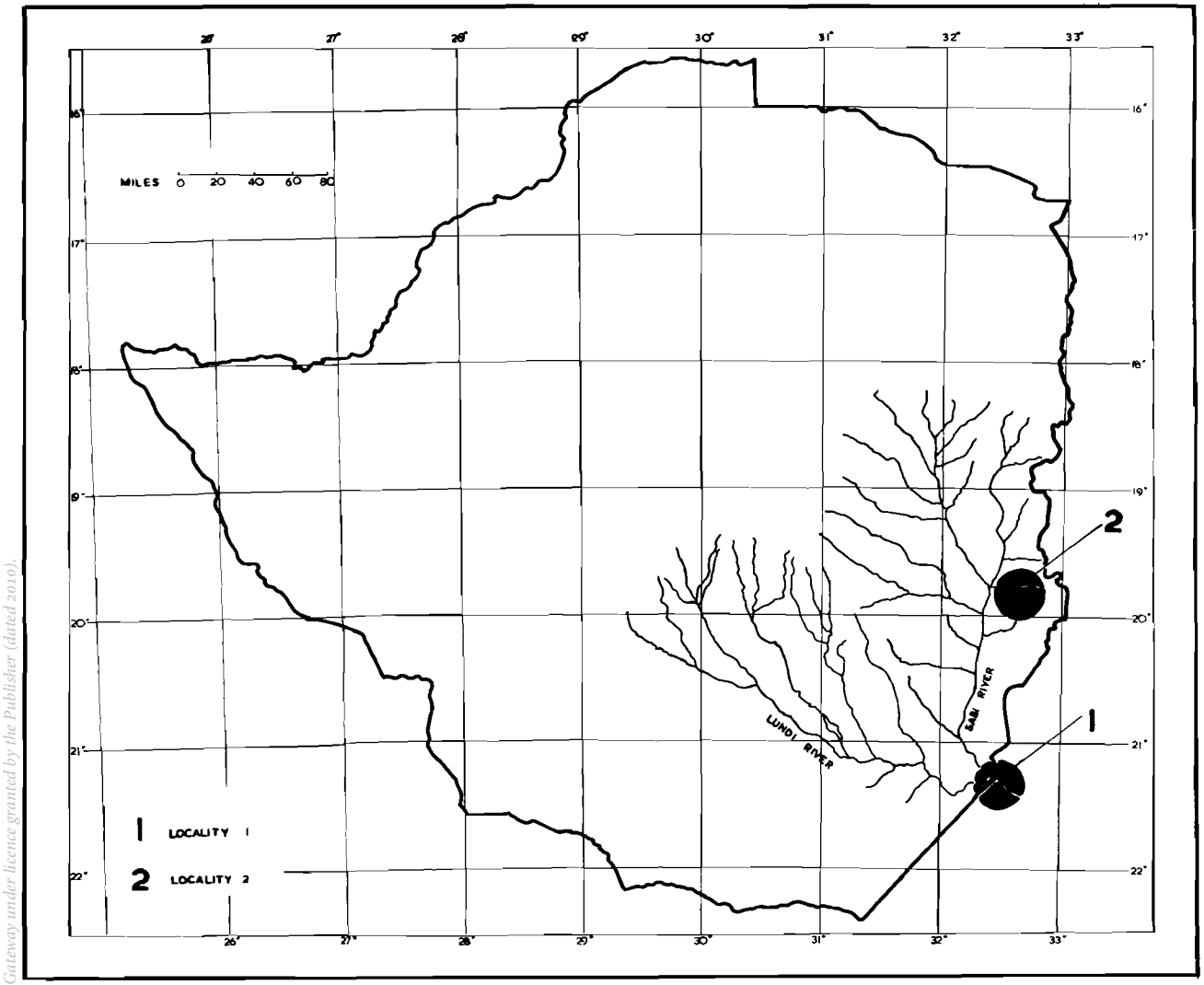

FIGURE 1. Map of Southern Rhodesia showing localities from which elephant shrews, *Nasilio b. brachyrhynchus* (A. Smith) were collected.

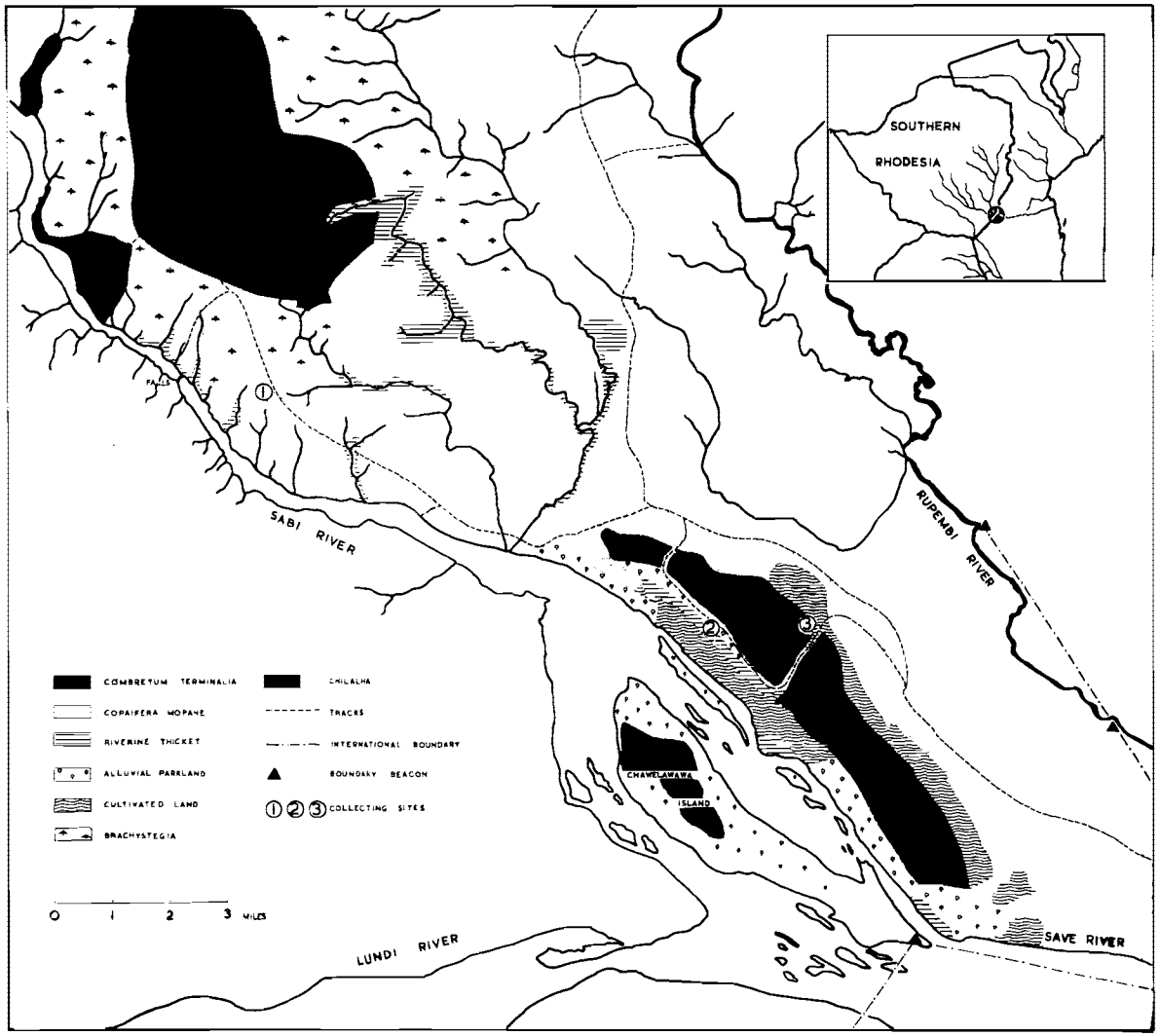

FIGURE 2. Map of Lower Sabie Valley showing characteristics of observation areas.

Within this locality there is a variety of microhabitats, many affording excellent cover for elephant shrews. Here the Sabi river flows through a narrow gorge and its eastern bank (Fig. 2) is characterised by hilly granite slopes covered by a dense forest of muunze *Brachystegia tamarindoides* interrupted by patches of mukondo *Combretum* and mungwe *Terminalia*. This is followed by a long zone of alluvial soil, with mopani *Copaifera mopane*, which gradually becomes broken up near the Sabi-Lundi confluence by large patches of parkland dominated by big shade trees such as *Trichelia emetica*.

Behind the patches of alluvial parkland is a wide band of thicket known locally as chihlahla, which becomes very dense. Tall trees (*Guibourtia* and *Ficus*) are scattered in amongst the tangle. Behind the chihlahla the mopani scrub continues except in scattered areas of cultivation. Three main observation zones were chosen.

(1) Contact zone of granite and alluvium with a mixture of *Brachystegia tamarindoides* and *Copaifera* with patches of *Guibourtia* and occasional *Terminalia* and *Combretum*.
(2) Contact zone of alluvial parkland and dense riverine thicket.
(3) Contact zone of chihlahla thicket and cultivated land.

The main vegetation of these ecotones is indicated on the chart in Fig. 2. The first area is rocky and hilly with a tendency to dryness and with patches of very dense undergrowth. It contacts the mopani area which has large trees with scattered patches of smaller specimens of *Guibourtia*.

The alluvial parkland has practically no undercover but borders on dense riverine forest and in this contact zone elephant shrews are plentiful.

In the chihlahla thicket the growth is so dense that in many places it is impenetrable. Accordingly, the area chosen for study was near the fringe bordering on the cultivated land. In this contact zone were also found a number of small fruit-bearing trees such as mutamba *Strychnos*.

Locality 2 (19° 45′ S., 32° 40′ E., 3,400–5,000 ft. a.s.l.)

The study area covers approximately a three-mile stretch in the Melsetter District along the Biriwiri river from the Biriwiri Mission Station to the junction with the Nyanyadzi river, which is a tributary of the Sabi River (Fig. 3). Except for cultivated areas, this region is characterised by high forest in which *Brachystegia* is dominant. Temperatures seldom exceed 90° F in the summer and may drop to 50° F or less in the winter. Rainfall is fairly high and is not restricted to the period November to March. Accurate meteorological data is not available.

Three zones were chosen for study, each on the hilly slopes above the Biriwiri river; two, on hills below the west bank and one on the east bank immediately behind the mission station. All were similar in character, having rocky outcrops, scattered patches of dense thicket, good general forest cover and open feeding areas.

HABITS

This species of elephant shrew chooses a variety of sites for burrows, for instance rocky outcrops with scrub cover, old termite mounds, or scattered rocky patches among dense thickets.

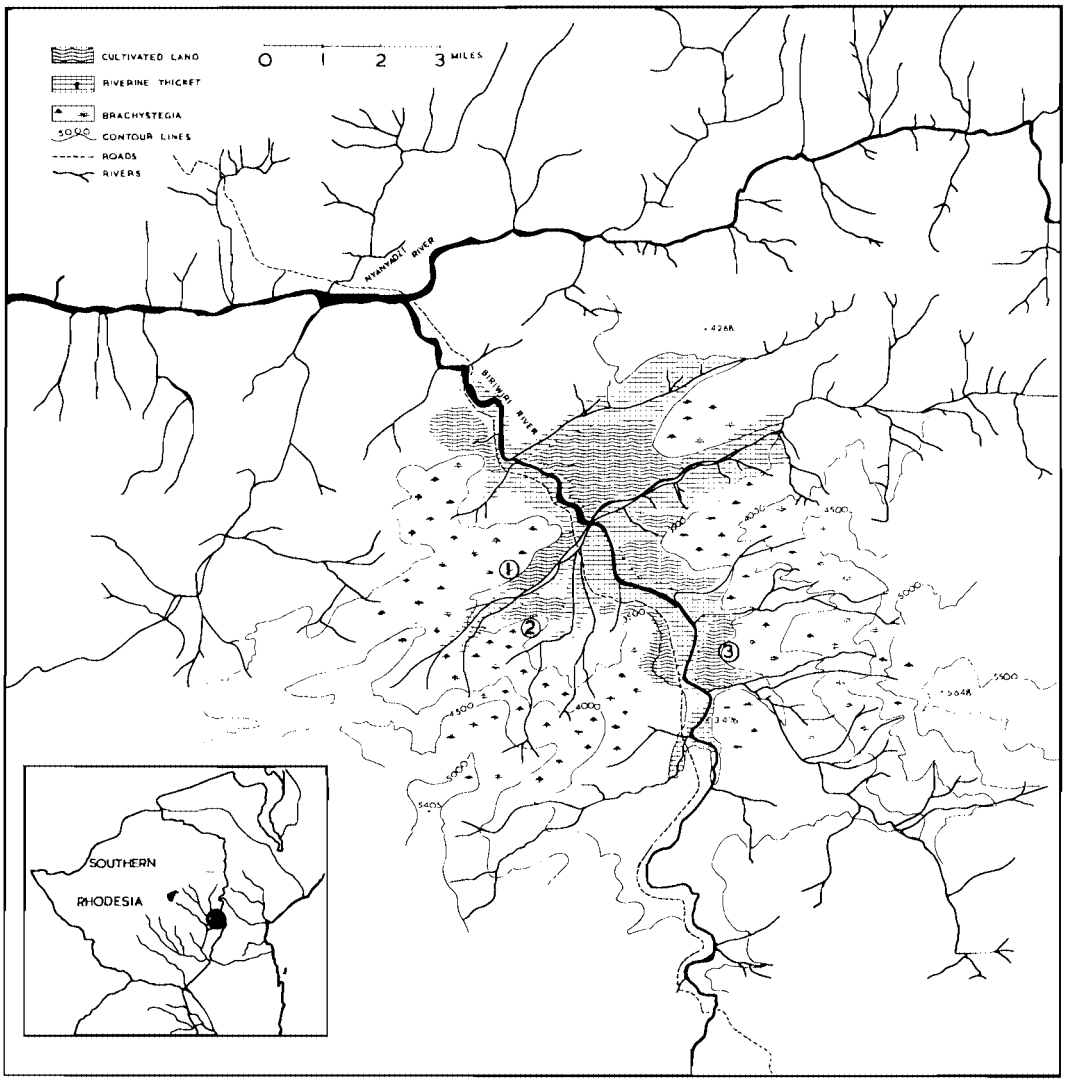

FIGURE 3. Map of Biriwiri River region showing observation areas.

In all cases the burrow is situated in an area with plentiful shade and cover.

The elephant shrews do not feed close beside their burrows but may travel 15–20 yd. or more to their feeding areas, which are usually sunny, open zones with dappled shade and little cover, either in sparse scrub or in grassed areas rich in grasshoppers and other insects. Feeding areas may also be located under fruit-bearing trees, near active termite mounds, or near fallen decaying logs containing grubs.

The shrews leave easily discernable trails in the bush in contact zones between the burrow and feeding areas. Each trail consists of a series of patches, produced by the jumping run characteristic of these animals and is in as straight a line as possible.

The animals are capable of very rapid movement. When disturbed they tend to make for their burrows via their trails—only detouring when prevented from using them. Most trails are easily distinguishable from rodent trails, although not always as well defined.

N. b. brachyrhynchus is never found in large colonies, although on any given hillside several families may be present. Generally, one pair with perhaps one or two young, will live in a territory which includes a burrow and one or more trails and feeding areas. There are usually not more than three feeding areas per family and often there appears to be only one such area in use at any given time. Aggressive behaviour is displayed to other members of the species which intrude on the family territory. Steep sites, exposed to the morning sun, appear to be favoured and very few territories were found in localities deep in shade in the mornings.

The elephant shrews feed actively from approximately 10 a.m. to noon and thereafter sporadically until about 4 p.m. or until their area of hillside is in dense shade. This period seems to present optimum conditions for feeding, perhaps because larger food insects such as grasshoppers are actively moving at this time. This habit has been utilised in the method of capture described below.

Examination of stomach contents confirmed the field observations that the type of food utilised depends largely on the character of the area occupied. For instance in the chihlahla/cultivation zone, fruits of *Strychnos*, etc., grain and grasshoppers predominated, whereas in the alluvial parkland/riverine forest thicket zone, food consists of cicadas, grubs found under decaying logs and smaller insects in the leaf mould. In the dry zones of either mopani or *Brachystegia* food is largely termites, occasional grasshoppers and fruits such as the mandudwe *Flacourtia indica.*

METHODS OF CAPTURE

Because these elephant shrews are suspicious of traps of any kind, it is difficult to capture them alive. Traps and baits of differing types have had limited success and smoking of burrows has been completely unsuccessful. The only method which has given consistent results to date is that which takes advantage of feeding habits. At an appropriate time, a careful and diligent search is made for trails. As soon as an elephant shrew is sighted, the observer signals his helpers, who spread out a 40-yd. hessian drive net in a semi-circle across the trail. The lower edge of the net is anchored by stones or other material on hand, and the upper edge is loosely

suspended by twigs. Two people remain behind the net near the ends, and the others move to a distance behind the animal and beat the bush, thus driving the elephant shrew towards the net. The animal generally runs along the net and can be captured by dropping the upper edge of the hessian over it, thus catching it by hand. Care must be taken in this process as these animals are delicate and easily injured.

The method is somewhat cumbersome but with practice the whole procedure from sighting to capture can be accomplished in 10–15 minutes, without frightening away the animal, as it will remain stationary if the observer does not approach it too closely.

After capture, the elephant shrews must be kept warm, especially during transport. In particular, the floor of the carrying cage must be covered with sawdust or other insulating material.

BEHAVIOUR IN CAPTIVITY

Elephant shrews studied in this department are kept in 8-ft. runs to provide exercise, with a shelter at one end. These animals, with their rapid jumping run, do not do well in small cages where they cannot obtain this type of exercise. The prescribed length seems to be the minimum necessary for well-being during captivity.

Elephant shrews must be kept at an even warm temperature, as they are highly susceptible to fluctuations in temperature and to cold. This appears to be a condition associated with captivity, as some of the captives were existing happily in a much wider temperature range in the wild. All newly captive elephant shrews had to be immediately transferred to warm cages to survive. In particular, it was found that the sand floor of the cage had to be kept warm. Heating tapes were therefore placed in the sand and kept at a constant temperature of 70° F until the animals had been in captivity for a few weeks. After this period it was possible to dispense with extra heating in the cage-floors.

The lighting in the animal room corresponded to the hours of daylight. New captives, however, appeared to respond favourably to an additional light placed immediately over their cage in the middle of the day.

The captive elephant shrews receive a diet of locusts, grasshoppers, mealworms, occasional oranges and bananas. Milk is also supplied daily. Since many other members of the elephant shrew group can eat meat, this was tried on *Nasilio* but, without exception, animals which ate fresh ground or whole meat thrived happily for a few days on this diet, but eventually became ill with an acute and ultimately fatal gastric disturbance.

The diet usually consists of two equal meals daily, together comprising five to seven locusts or grasshoppers, 24 meal worms and 20 ml. milk per animal. Occasionally the elephant shrews eat more grasshoppers than this, if offered. Insects such as cicadas which occasionally are brought in are relished. The food is always placed at the end of the run opposite the shelter since the shrews prefer a defined feeding area.

The young of *Nasilio* required adult food at a fairly early age, and several were lost before this was understood. It appears that whole insects and ground grain must be given after only seven to 10 days from birth.

N. b. brachyrhynchus bears one or two young at a time and most births have been recorded in the month of May. The newborn are covered with hair, are capable of running for short distances, and emit a sharp piercing cry when hungry or separated from their mother.

When pregnant females have been captured their young have been reared for a few weeks only, probably because of late discovery of the feeding requirements of these animals. In addition to births resulting from mating in the wild, we have been able to produce two young from a mating in the laboratory between a female from Locality 1 and a male from Locality 2. The twins lived for over three weeks, appearing healthy until the last day of life. They were able to lick milk from a dish two or three days before death but, on autopsy, it was noticed that the gut was practically empty.

Elephant shrews are very vocal, especially in the afternoon and evening, the call being extremely shrill and penetrating. When fighting they produce a series of sharp, high-pitched squeals.

ACKNOWLEDGEMENTS

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Identifications of trees were made with the assistance of Palgrave 1957, Mowbray 1955, and members of the College Botany Department staff.

SUMMARY

A description is given of the contact zones inhabited by the short-nosed elephant shrews, *Nasilio b. brachyrhynchus* (A Smith) in two regions of Southern Rhodesia. Behaviour in the natural habitat and in captivity is described and also the method used for capture. Cross-breeding has been achieved between the two ecological groups mentioned in this paper.

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