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Aspects of the ecology and behaviour of the thick-tailed bushbaby Galago crassicaudatus

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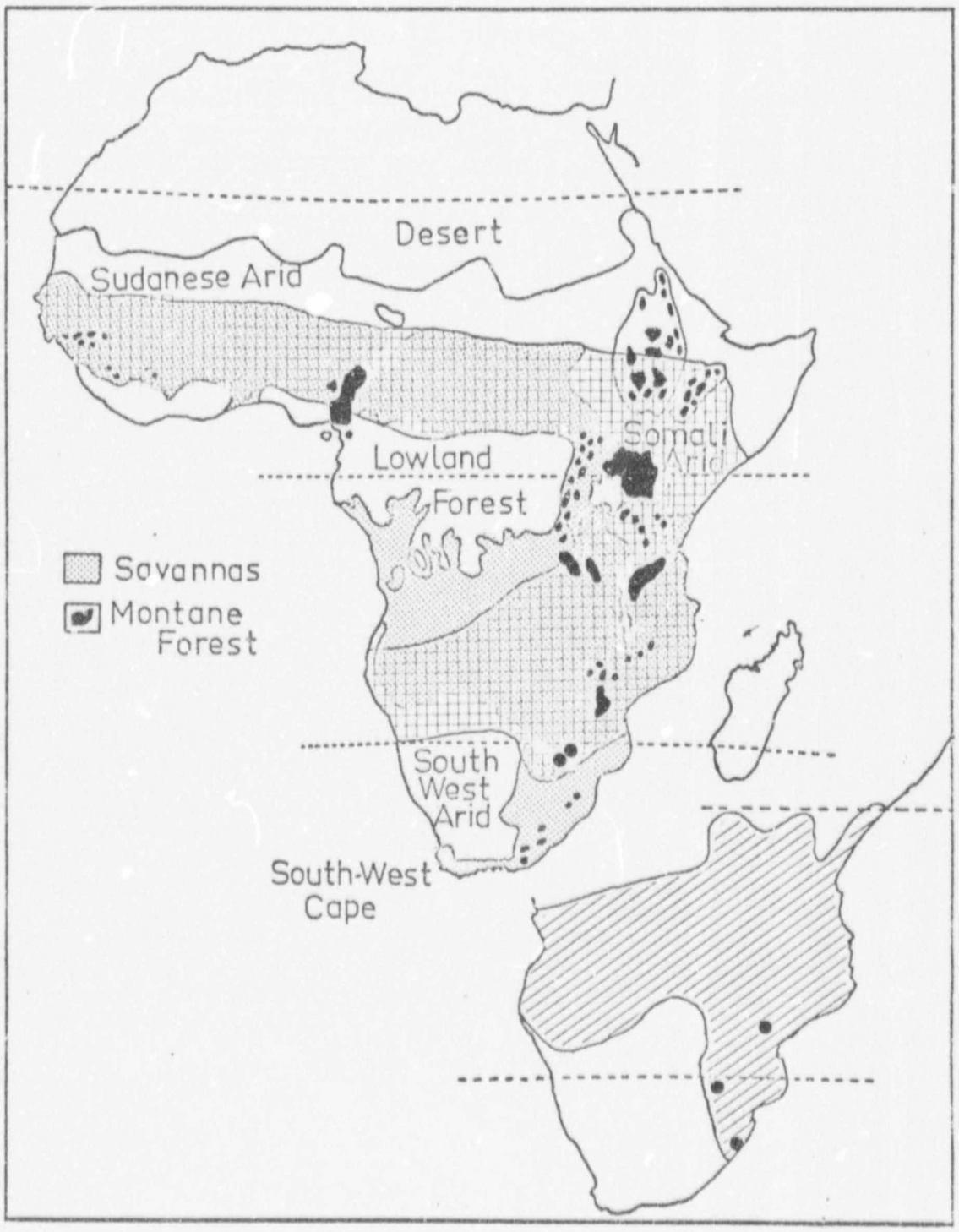

Figure 4. Map showing the approximate distribution of G. crassicaudatus (hatched) compared with G. senegalensis (squares) in relation to broad zones of vegetation. The study areas are marked by circles. (Modified after Hill, 1953)

4. HABITAT

4.1 Vegetation and Topography

In South Africa and Rhodesia G. crassicaudatus were found between sea level and a height of 1 800 metres. They were commonly encountered in dense evergreen indigenous forests and tracts of evergreen bush and occasionally in open woodland or parkland. They were also seen in stands of timber trees such as Blue Gum, Back Wattle or Pine (see appendix 2), but only where these adjoined natural bush. Suitable vegetation occurs in the well-watered coastal regions or inland as montane forest in steep-sided valleys, or as riparian bush flanking the beds of mountain streams and the rivers which they supply. Much of this habitat has been exploited by man in the past and replaced by cropland or comparatively sterile timber plantations. Despite this, a number of Government-protected forest areas still remain where bushbabies thrive.

The discontinuous nature of the forest vegetation in the Eastern Transvaal and Natal is generally reflected by the patchy distribution of G. crassicaudatus. Yet some isolated forests which provide suitable habitats did not contain bushbabies. This indicates that the forest belt was never continuous or that forests became separated at an early stage before the spread of bushbabies. A similar localized distribution is known for G. senegalensis which, although they extend into semi-arid regions, are restricted by open or relatively treeless areas and are completely absent from Zululand despite the presence of suitable habitats (Bearder and Doyle, 1974a). Similar distribution and habitat types have been described for G. crassicaudatus in other parts of Africa by Buettner-Janusch (1964); Haddow and Ellice (1964) and Smithers (1968)

4.2 Climate

G. crassicaudatus show a tolerance of marked seasonal and diurnal variations in temperature from minus 2,8^{o}C to an extreme maximum of 41,9^{o}C. The winter months from June to September are usually dry and sunny with a large daily temperature range (up to 17°C). There is a considerable dying-back of vegetation during the winter and leaf growth begins again

before the first good rains, with severe consequences if they are late. The hot summer rainy season occurs between September and April, but rain may be recorded in any month. Thunderstorms contribute a large proportion of the total precipitation and long dry spells may occur between them, while periods of continuous rain are also recorded. The distribution and annual total rainfall is highly variable from year to year. The climate is affected by the varied local topography and aspect. Valleys are subject to winter temperature inversions and the daily temperature range may cause marked changes in the relative humidity with dew occurring in the autumn following rain (Marker, 1971). Climatic data are recorded separately for each study area in section 7 and appendix 1.

5. ANIMALS STUDIED

Observations were made on three sub-species of G. crassicaudatus according to Hill (1953) in three different habitat types.

(i) G.c. umbrosus Thos. Transvaal Dusky Galago. This sub-species is distinguished by its brown colouration which is particularly dark on the dorsal surfaces of the hands and feet. Eight per cent of the study population was melanistic, having a slightly darker overall hue and black tips to their tails. A dark female, however, gave birth to lighter offspring with tails of a uniform colour similar to the adult male with which they associated. The limits of distribution of this race are undetermined. It is found in the Drakensberg foothills of the North Eastern Transvaal.

(ii) G.c. garnetti (Ogilby) Garnet's or Black Galago. The common name is misleading as this is another brown race, only the digits being blackish and with eighty per cent of the study population having black tips to their tails. This sub-species is found in Natal and Zululand but limits of the range are unknown.

(iii) G.c. lönnbergi Schwarz. Lönnberg's Galago. A light-coloured variety, somewhat smaller in size than the previous two sub-species. There is no dark colouration on the dorsal surfaces of the hands and feet and none of the study population had black tips to their tails. It occurs in South East Africa from the Zambesi in the north and as far south as the Limpopo. The exact western limit of its range is undefined.

6. BIOMETRIC DATA

The method of trapping and handling the animals without the use of drugs did not permit detailed measurements or an extensive physical examination. Such measurements as were made are presented in table 1. They show that there was a considerable variation in the weights of adults, with the largest male weighing 1,82 kg and the smallest female 0,91 kg. There was also a large variation between individuals of the same sex which were known to be reproductively mature (females with infants; males with a well-developed scrotum). Female L.T./6 weighed as much as 1,32 kg while male L.T./10 weighed as little as 1,25 kg. The tail was invariably somewhat longer than the head and body together. Measurements taken from photographs of twelve individuals of G.c. umbrosus and G.c. lönnbergi, in addition to the data on table 1, indicate that the proportion of head plus body length to tail length may vary between 1:1,16 and 1:1,38. The sizes and weights of four adult individuals in captivity were greater in all respects than for those in the wild, which may be related to their different diet and lack of exercise.

The recognition of age and sex in those bushbabies which were not trapped was often made possible by noting the presence or absence of four characteristic features, apart from relative size: a pronounced saggital crest; a bald patch on the chest; development of the scrotum or extensive bald areas on the abdomen. The saggital crest is formed by fusion of the two temporal ridges and was noticeable only in adults, and particularly in adult males, where it appeared as a median line between the ears (figure 3a). Adult males and females possessed a narrow longitudinal bald patch in the mid-line of the chest which again was most obvious in the males (figure 3a). Also in adult males, the posterior part of the scrotum was hairless, pink in colour and somewhat roughened as in Perodicticus potto and Arctocebus calabarensis (Sanderson, 1940). However, it often remained concealed in the fur and was not easily seen (figure 3a). Finally, lactating females could frequently be recognised by the loss of hair in patches along the ventro lateral walls of the abdomen, in line with the mammae. It is most likely that these resulted from the suckling activities of the infants.

Table 1. Size and weight measurements for G.c. Umbrosus captured in the North Eastern Transvaal (* = recaptured; † = captured together; DT = dark tip to the tail; LT = uniform, light coloured tail).

Date (1971)	Age/sex class	Group & index numbers	Head/body length	Tail length	Weight
23 Jan.	Juvenile female	A-LT / 2	18,6 cm	23,3 cm	0,51 kg
25 Jan.	Juvenile male	B-LT / 5	20,4 cm	26,5 cm	0,53 kg
28 Jan.	† Adult female	C-LT / 6	29,5 cm	38,5 cm	1,32 kg
28 Jan.	Juvenile male	C-LT / 7	19,0 cm	25,2 cm	0,51 kg
24 Mar.	Adult female	B-LT / 8	27,9 cm	38,1 cm	1,00 kg
24 Mar.	*† Juvenile male	B-LT / 9	22,9 cm	31,5 cm	0,54 kg
24 Apr.	Adult male	A-LT / 1	30,5 cm	35,6 cm	1,82 kg
27 Apr.	† Adult female	A-DT / 1	27,5 cm	37,8 cm	0,91 kg
27 Apr.	Juvenile female	A-LT / 3	23,5 cm	28,9 cm	0,68 kg
29 Apr.	Juvenile male	A-LT / 4	24,0 cm	29,5 cm	0,70 kg
19 May	*† Juvenile male	B-LT / 9	23,5 cm	32,0 cm	0,57 kg
19 May	Adult male	B-LT /10	33,0 cm	41,9 cm	1,25 kg

7. STUDY AREAS

7.1 North Eastern Transvaal ($23^{o}80'S$; $30^{o}15'E$)

The sub-species G.c. umbrosus was observed in the forest areas and riparian bush of the Drakensberg foothills near Tzaneen. Rivers and streams from the escarpment drain across the lowveld to the east and it was along these water-courses that the animals were most easily found (figure 5a). Timber is cultivated in the wetter parts of the region which lies between 600 metres and 1 850 metres above sea level. Local farming includes the cultivation of tobacco, cotton, tea, coffee and a variety of sub-tropical fruits (see appendix 2). Grass fires are common during the winter and they may burn for several days at a time, but they do not usually encroach upon the dense evergreen bush. Forest fires may also occur which are more devastating in their effects. A list of indigenous tree species is given in appendix 3.

Temperatures range between $-2,8^{o}C$ to $41,9^{o}C$ with an annual absolute mean of $19,5^{o}C$. 81 mm of rain was recorded between April and September 1970, while 854 mm fell before the following April. During this time the vegetation became lush and almost impenetrable. Climatic data are recorded in more detail in appendix 1.

Other primates in the region are the lesser bushbaby, Galago senegalensis; the vervet monkey, Cercopithecus aethiops; the samango monkey, Ceropethecus mitis and the chacma baboon, Papio ursinus.

7.2 Zululand ($28^{o}53'S$; $31^{o}28'E$)

The sub-species G.c. garnettti was found in the dense coastal dune forest at Mtunzini, said to be the only viable dune forest in Natal (Dr E. Moll, personal communication). It consists of sub-tropical vegetation with a continuous canopy ten to twelve metres high and a dense understorey of Isoglossa sp. (figure 6b). Areas which have been disturbed by man are invaded by climbers, which provide ideal sleeping places for bushbabies. A list of the predominant trees is given in appendix 4. Further observations were made in a similar coastal forest at St. Lucia and in the Hlinze forest of Eshowe at an altitude of 336 metres (figure 6a). The latter is a

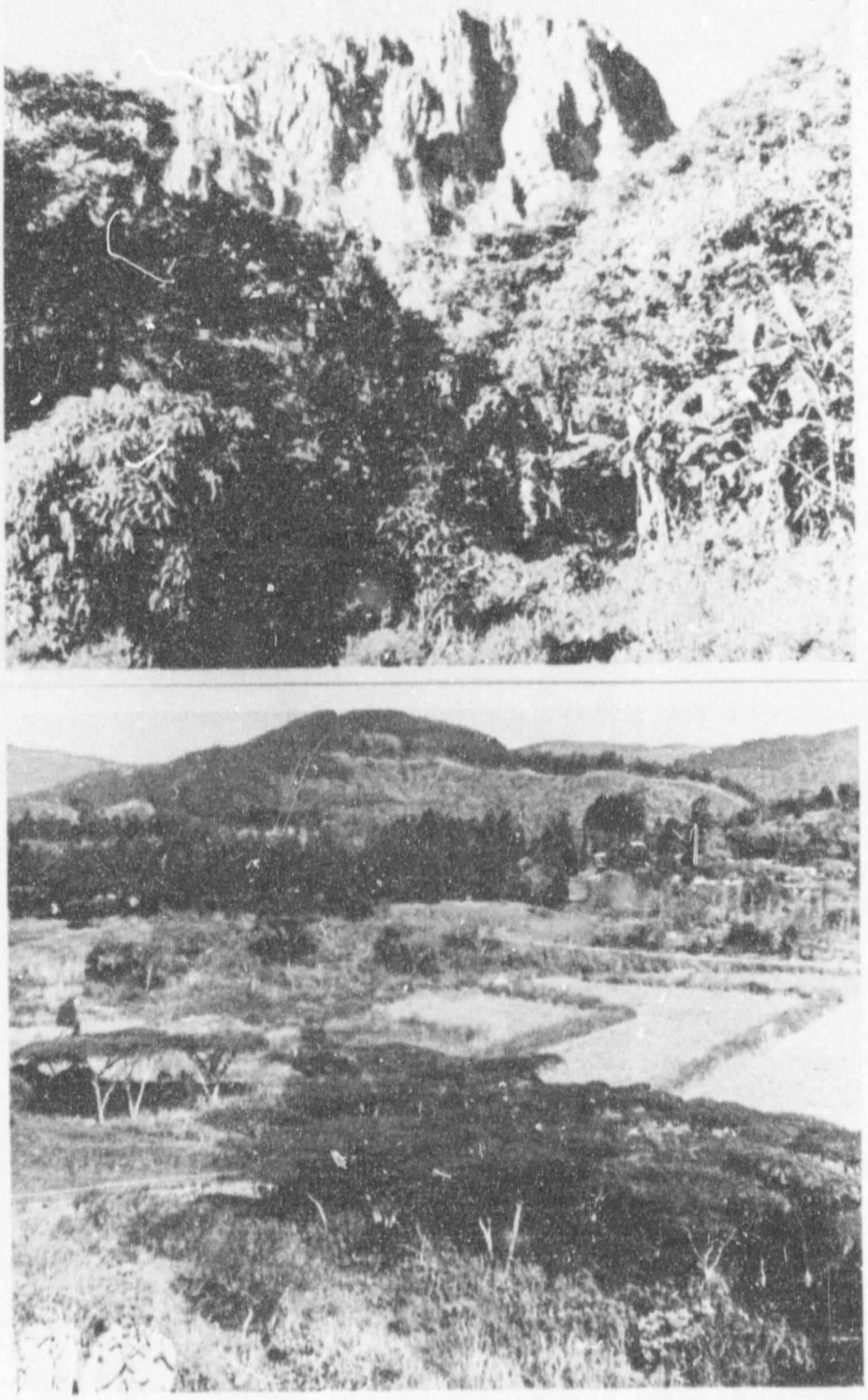

Figure 5. Examples of habitats in the study areas. (a) Tropical fruit trees and indigenous bush in the N.E. Transvaal. (b) Flat-crowned Acacia abyssinica and exotic vegetation in E. Rhodesia.

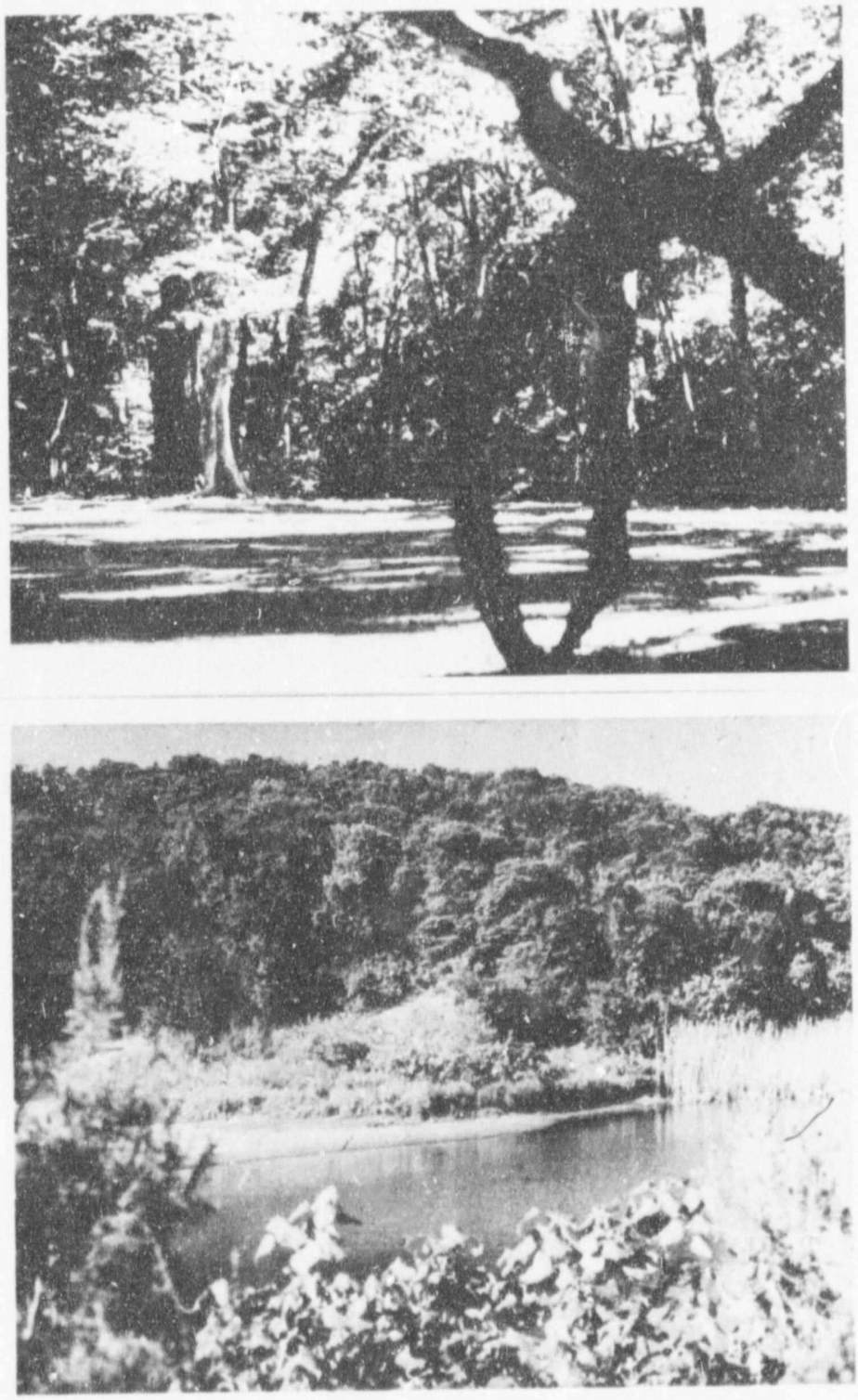

Figure 6. Examples of habitats in the study areas. (a) The Hlinza forest, Eshowe, Zululand. (b) A view of the coastal dune forest, Mtunzini, Zululand.

a more open temperate forest with a canopy twenty to thirty metres high. Once again the understorey is dense and difficult to penetrate during the summer months. Local farming involves almost a monoculture of sugar cane with some citrus and avacado orchards.

Temperatures vary between 10°C and 40,6°C with an annual absolute mean of 21°C. The total annual rainfall is in the region of 1292 mm and the relative humidity averages 84%. Full climatic data are given in appendix 1.

The only other non-human primates in the area are Cercopithecus aethiops and C. mitis.

7.3 Eastern Rhodesia (18°90'S; 32°05'E)

The sub-species G. c. lönnbergi was studied in relatively open woodland near Umtali which contrasts strongly with the dense vegetation of the previous study sites (figure 5b). The area lies between 1 128 metres and 1 372 metres above sea level and comprises a broad valley with timber plantations on the hillsides, interspersed with indigenous bush and scrub. The floor of the valley is mainly devoted to agriculture, including maize and livestock, but the river banks are flanked by flat-crowned Acacias, shrubs and reeds. Other parts are laid out as gardens with lawns and exotic trees, including a number of sub-tropical fruits (see appendix 2). A representative list of indigenous trees is given in appendix 5.

Temperatures range from 5°C to 39°C with an annual absolute mean of 18°C. The mean annual rainfall is 1 270 mm and the relative humidity 78%. Climatic figures are given in appendix 1.

The Eastern Highlands of Rhodesia are similar to the North Eastern Transvaal in that they provide a variety of habitats in which all the local primate species can be found, namely, G. crassicaudatus, G. senegalensis, Cercopithecus aethiops, C. mitis and Papio ursinus.

8. POPULATION DENSITY

On the basis of direct counts made over several consecutive nights in each of the study areas it was possible to establish the number of G. crassicaudatus within a certain area and thereby calculate the population densities of the species. These have been compared with the densities of G. senegalensis (Bearder and Doyle, 1974a) in table 2.

Table 2. The population densities of G. crassicaudatus and G. senegalensis (Bearder and Doyle, 1974a) in different localities, including areas where they are sympatric.

G. crassicaudatus

Area	Habitat	Density / km^2
Zululand	Dune forest	125
Zululand	Temperate forest	112
Rhodesia	Mixed woodland and plantations	110
N.E. Transvaal	Lowveld: riparian bush and savannah	72
N.E. Transvaal	Escarpment: riparian bush and scrub	88

G. senegalensis

Area	Habitat	Density / km^2
N. Transvaal	Acacia thornveld	200
N. Transvaal	A. Karoo thickets	500
N. Transvaal	Wooded valley	275
Rhodesia	Mixed woodland and plantations	87
N.E. Transvaal	Lowveld: riparian bush and savannah	103
N.E. Transvaal	Escarpment: riparian bush and scrub	95

In open bush it proved possible to count practically all the members of a population within a limited area due to the extremely reflective nature of their eyes. Additional clues to the number of animals present were gained from knowledge of the movements of individuals; the number and spacing of sleeping sites and the distribution of loud calls at night. In forest habitats regular counts were made along transect lines which coincided with forest paths. In these cases an allowance was made for the effective scanning area of the torch beam in relation to the density and height of the vegetation. The estimation of population density is considered in appendix 8.

The calculations indicate the density of bushbabies in areas where the vegetation was of a uniform type. In these cases bushbaby groups were found at regular intervals. Often, however, suitable habitats were interrupted and the distribution of bushbabies was correspondingly patchy. Both situations are shown in figure 7.

There is a wide difference between the population densities presented here and those of five other African lorisoids calculated by Charles-Dominique (1971) in Gabon. The smallest species studied Galago demidovii, reached a maximum density of 117 per kilometre^2, while the maximum densities of the other species were much lower. Charles-Dominique notes that the population densities of Lepilemur mustelinus and Microcebus murinus in Madagascar are considerably greater than for his study animals and he puts this down to the diversity of mammal species in Gabon which compete for food. In South Africa and Rhodesia G. crassicaudatus and G. senegalensis have few nocturnal arboreal competitors and their population densities are relatively high.

The density calculations illustrate that G. crassicaudatus is most successful in dense sub-tropical forest, while G. senegalensis thrives in the open Acacia thornveld. In areas where they are found together, the lower population densities of one or both species could be the result of interspecific competition. Alternatively, in these cases the vegetation may not represent an optimum habitat for either species.

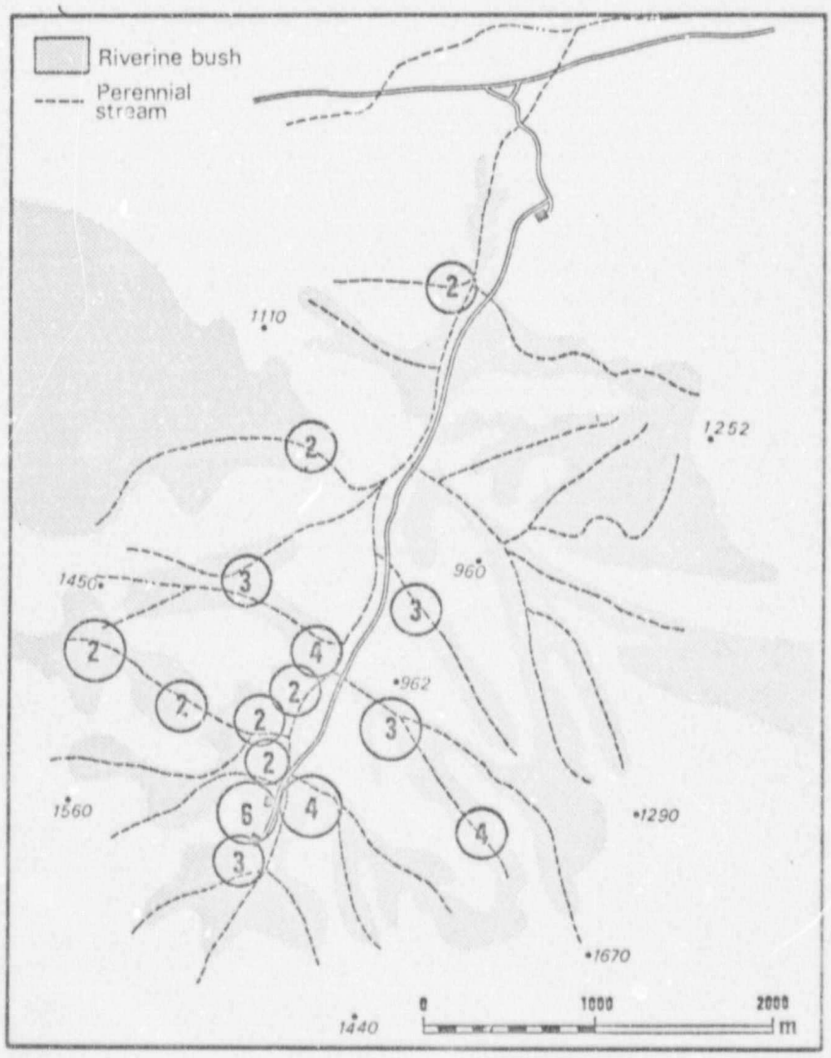

Figure 7. Map showing the distribution of G. crassicaudatus groups ir a valley system of the N.E. Transvaal. The circles represent the approximate limits of home ranges.

9. ACTIVITY PATTERNS

G. crassicaudatus are strictly nocturnal. They were not seen during the daytime except while asleep and it is considered that any diurnal activity would only be the result of unusual circumstances. Each night the bushbabies began and ended their activity with remarkable regularity and their behaviour during the active period appeared to conform to a broad pattern. Consequently these aspects were studied in more detail.

9.1 The Control of Activity

G. crassicaudatus were observed to leave a sleeping place on 104 occasions and to return on 103 occasions throughout the study period. In each case the time at which the animals moved away from the sleeping tree and the time at which they finally settled to sleep in the morning was recorded exactly. Ninety per cent of the readings taken on consecutive days did not vary by more than ten minutes. The difference between the remainder could be explained by particular circumstances.

(i) When weather conditions were overcast, bushbabies left early and returned late.

(ii) Bushbabies in shaded sleeping places became active earlier and returned later than those in exposed sleeping places.

(iii) Females with small infants occasionally left the sleeping place later than usual.

(iv) A juvenile which had become separated from a group at dawn remained restless and did not settle until late.

(v) Bushbabies which were timid of the observer left their sleeping places late and returned early.

The examples (i) and (ii) underline the significance of light intensity in triggering the onset and cessation of activity. This is further illustrated by comparing the times at which bushbabies left and returned to their sleeping places with the official times for sunset and sunrise at the latitudes of the study areas. A clear cut pattern emerges in which the bushbabies invariably left cover after sunset and returned before sunrise. The length of their nocturnal activity thus varied between nine hours thirty

minutes in the summer and twelve hours twenty minutes in the winter (in the main study area). The exact time after sunset at which they left the sleeping place, however, decreased progressively each month from twenty minutes in midwinter to only one minute in midsummer. Similarly, the time at which they settled before sunrise decreased from sixty-six minutes in midwinter to thirteen minutes in midsummer. These differences can only be explained by allowing for a gradual decrease in the amount of light penetrating the vegetation from winter to summer. In summer the extremely dense growth of leaves and climbers reduces the amount of light beneath the trees so that, in effect, it becomes dark earlier and light later than in winter.

Charles-Dominique (1971) demonstrated the importance of light intensity in controlling the activity of the galagos and lorises in Gabon. Using a light meter he showed that these species left their sites and returned to them when luminosity values fell within a fairly precise range, which differed somewhat between species. Charles-Dominique and Hladik (1971) showed a similar relationship between light intensity and activity in Lepilemur mustelinus. Likewise, Pariente (1974), testified to the remarkable vision of the sportive lemur (Lepilemur mustelinus leucopus) and the fork-crowned lemur (Phaner furcifer) which live at extremely low levels of illumination in the tropical forest of Madagascar, yet are capable of leaping several metres at night. Pariente illustrated that the timing of activity in these species was not governed by temperature variations, but by the precise adjustment of the animals to the daily cycle of the sun.

The importance of light alone is proved when bushbabies are brought into captivity where the onset of darkness can be changed artificially. The animals soon adapt to sleep throughout the light phase. Examples (iii), (iv) and (v) which are noted, however, indicate that there are a number of situations where the activity of the animal is evidently controlled by factors which override the effect of light. Observations on G. senegalensis (Bearder, 1969) showed that this species became active during the daytime in response to rainfall, changes in temperature and the availability of food. Charles-Dominique (1971) notes that the activity of his study species in captivity also varied according to the food supply.

9.2 Nightly Activity

Descriptions of the activity patterns of nocturnal animals in the wild are usually based upon aspects of behaviour which are most easily recorded. Lumsden et al. (1955) noted the frequency of bushbaby calls throughout the night as a guide to their general activity, although these may merely reflect a change in their social activity. Other authors, for example, Martin (1972a) on Microcebus murinus and Strühsaker (1970) on G. demidovii, based their impressions of activity on sightings at different hours of the night. Charles-Dominique (1971) was successful in attracting various nocturnal animals to special feeding places, where the frequency of their visits was recorded mechanically and the species identified from the marks of their teeth in the bait.

The activity of G. crassicaudatus on the other hand was recorded through direct observation. Representative examples of nightly activity during the year are shown graphically in figure 8. The horizontal lines represent periods during which the animals were not moving between trees. They could, however, be actively feeding or grooming and young animals might play within a single tree and thus the graphs illustrate only one aspect of activity, that of movement. Total nocturnal activity has been broadly divided into nine periods according to the following scheme:

(i) 'Toilet' activities after waking.
(ii) Direct movement to a food tree.
(iii) Active feeding.
(iv) Movement while foraging.
(v) Rest.
(vi) Movement while foraging.
(vii) Active feeding or rest.
(viii) Direct movement to a sleeping tree.
(ix) 'Toilet' activities prior to sleep.

These periods are considered in more detail below, while many of the behaviours mentioned are described in subsequent chapters.

After G. crassicaudatus awoke each evening there was a period of five to thirty five minutes in which little or no movement between trees was recorded. During this time the animals groomed themselves and one another, scratched and urine washed. Juveniles sometimes played together in the sleeping tree or trees adjacent to it. Similar behaviour has been recorded by many

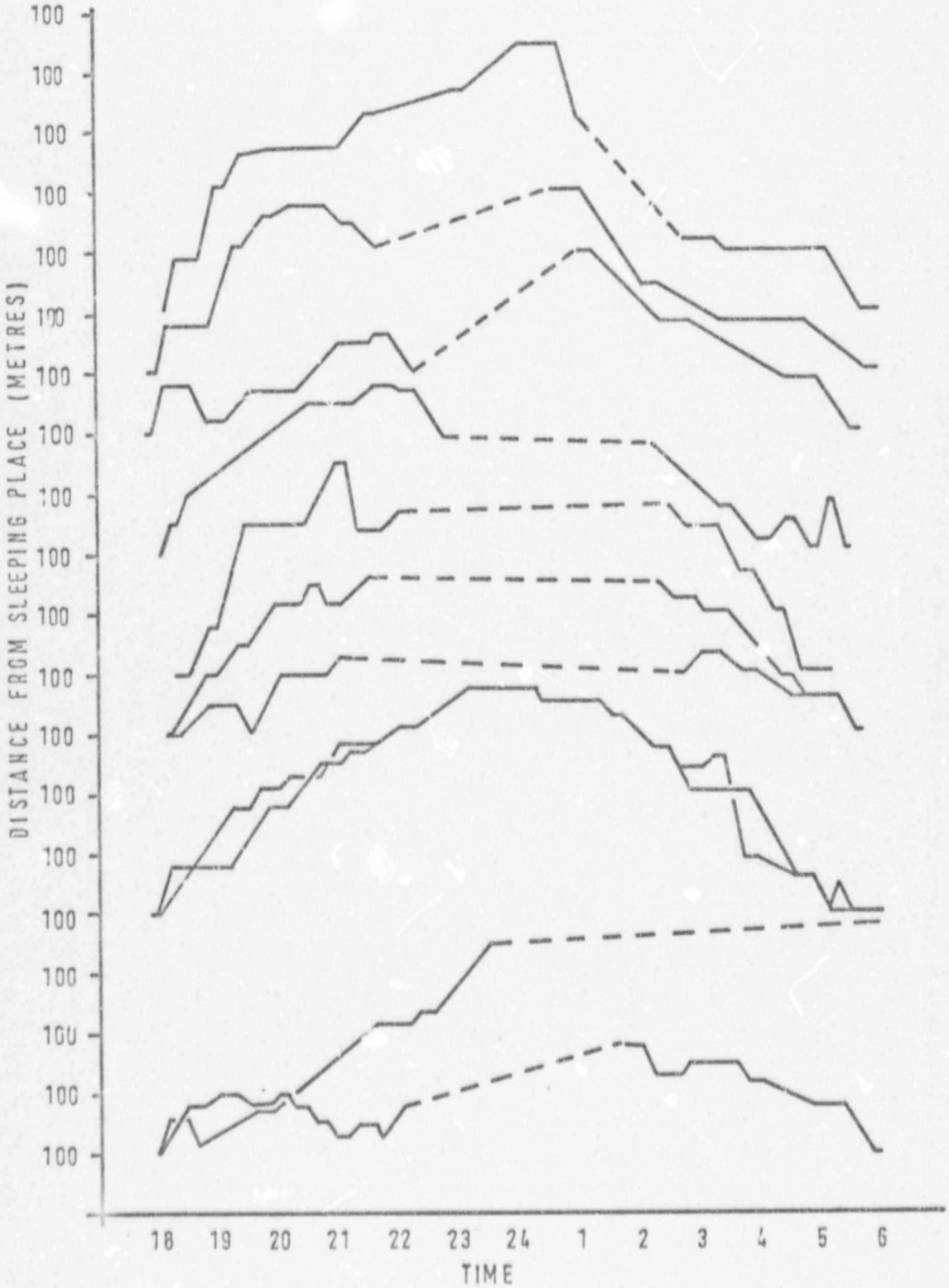

Figure 8. Diagram showing examples of nightly movement and rest by G. crassicaudatus in the main study area. a) to e) Female group. f) Adult male (above), juvenile (below). g) Adult male with female group. h) Adult male moving to a new sleeping place (above), female group (below). Broken lines represent periods without observation.

authors and seems to be a common characteristic of many mammals after sleep. The time spent on toilet activities increased to a maximum in the summer months and decreased again towards winter. This cannot be explained as a response to light intensity, which has been shown to be relatively lower in the summer, but it may be related to the ambient temperature or the availability of food.

The initial activity was usually followed by a rapid and direct progression to a food tree. The use of different trees varied during the year as they came into flower or fruit, but generally a tree near to the sleeping place was favoured. Particular trees which were productive throughout the year ('gum' trees) were used first on almost every night when the animals slept closeby. Direct movement to a food tree compares with that described for G. crassicaudatus in East Africa by Jolly (1966a) and for G. senegalensis by Sauer and Sauer (1963) and Beardor (1969).

Bushbabies spent a third period of ten minutes to more than an hour actively feeding within a single tree. They also autogroomed, allogroomed or played, depending on the number and age of animals together. Subsequently they moved away from this tree, stopping here and there to feed or groom and visiting favourite spots in a fairly regular circuit night after night. The most characteristic pattern of activity during this time was the 'stop-go' nature of the movement. After a period of up to two hours spent in a particular tree, or moving slowly between trees, the animals would make a sudden spurt of movement before slowing again or stopping. In this way, during the first third of the night, the bushbabies generally increased their distance away from the sleeping place.

The middle of the night was a period of comparative inactivity, with rest, grooming and occasional sleep. It was spent at points which were usually furthest away from the sleeping place. Particular trees were favoured for resting purposes and used regularly. These were often the largest trees in the home range and they presumably gave the animals protection against predators, while providing a vantage point from which to view the surroundings.

The last third of the night was more or less a repetition of the first third, but in reverse. It usually began with a period of feeding and movement in the general direction of the sleeping place. Many of the food sources which were used earlier were revisited and, as before, the animals

spent long periods in particular places and moved quickly between them. During this time there was a marked increase in social activities which continued until dawn and this was reflected by an increase in the frequency of certain vocalizations (see section 15.4.2).

From approximately thirty minutes to one hour before dawn the bushbabies moved to their preferred feeding or resting trees close to the sleeping place, where they engaged in social activities or feeding. As it began to get light there was a short period of direct movement back to the sleeping tree. If group members had become separated they usually rejoined one another at this time. Finally, before moving into the concealment of the sleeping site, the animals frequently autogroomed, allogroomed and, when juveniles were present, they played once again for a time which varied with the season.

It can be seen that G. crassicaudatus has a broadly bimodal pattern of activity characterised by long spells of relative inactivity followed by sudden movements. This contrasts with G. senegalensis which typically shows short bursts of activity during each hour of the night, superimposed by a slight overall biphasity of behaviour (Pinto, 1972). The difference in the activity patterns of these two species appears to be related to differences in their diets and feeding habits. Randolph (1971) and Pinto (1972) have shown that even captive prosimians retain a circadian activity cycle in which periods of movement and feeding are interspersed with periods of rest, grooming and play in a certain pattern. This occurs in the absence of ecological factors (food requirements, predation pressures etc.) to which it is presumably an adaptation. Evidently there is some sort of 'internal clock' which governs the general level of activity at any one time (Haddow and Ellice, 1964; Randolph, 1971). Randolph notes that it is light which appears to 'reset' the phasing of the active and inactive periods of the circadian cycle.

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10. FEEDING BEHAVIOUR

G. crassicaudatus in captivity are known to eat a variety of animal and vegetable foods including insects, fruits, vegetables, gum and small vertebrates (Haddow and Ellice, 1964). A similar omnivorous tendency has been reported for captive G. senegalensis (Lowther, 1939; Doyle and Bekker, 1967) and several other galagos and lorises (Charles-Dominique, 1971). Petter (1962c) reports omnivorous habits amongst the nocturnal lemurs (Cheirogaleinae) and it has been suggested by Martin (1972b) that this was most probably the type of diet of the common ancestor to lemurs and lorises.

In each species, however, there appears to be one or two predominant trends, or specializations, towards the consumption of particular foodstuffs. Wild G. senegalensis in South Africa fed mainly on insects and did not show any interest in vegetable matter apart from gum (Bearder, 1969). The diet of free-living G. crassicaudatus consisted of gum (sap), fruits, flower secretions, seed and insects in each of the study areas (see table 3).

The feeding habits of G. crassicaudatus were found to differ seasonally and from one area to another, largely depending upon the availability of each type of food. Figure 9 shows the percentage of different foods used each month based on 281 direct observations of feeding during one year in the main study area. Gum was utilised throughout the year, but to a lesser extent in the summer when other sources of food became available. The results indicate that gum represents approximately sixty two per cent of the total used of different foodstuffs (82% in winter and 49% in summer), fruit represents 21% (2,5% in winter and 33% in summer), flower secretions 8% (6% in winter and 9% in summer), seeds 4% (8% in winter and 1% in summer) and the remaining 5% includes insects and a few unidentified items (see appendix 8).

Table 3. Food items known to be consumed by G. crassicaudatus (from personal observation or a reliable source - *).

Indigenous plant species	Part(s) eaten	Study area
Acacia abyssinica	Gum	3
Acacia ataxacantha	Gum	1
Acacia karoo	Gum	1,3
Adina microcephala	Woody seed	1
Albizia versicolor	Nectar, Gum	1
Bridelia micrantha	Nectar, Fruits	1,3
Diospyros mespiliformis	Fruits	1
Ekebergia capensis	Fruits	1
Ficus spp.	Fruits	1,2,3
Mimusops zeyheri	Fruits	1
Pteralobium exosum	Nectar	1
Scotia brachypetala	Nectar	1
Scuta myrtina	Fruits	2
Syzygium cordatum	Fruits	1,2,3
Unidentified	Winged fruit	1

Exotic plant species (see appendix 2)	Part(s) eaten	Study area
Banana	Fruits, Resin	1,2,3
Cherry Guava*	Fruits	3
Grape	Fruits	1
Guava	Fruits	1,3
Mango	Fruits	1
Mulberry*	Fruits	3
Paw-paw*	Fruits	1,3

Table 3. (cont.)

Animal species	Part(s) eaten	Study area
Large and small insects (unidentified)	Usually consumed entirely	1,2,3
Birds		
Phasianidae (domestic fowls)	Brain eaten and blood licked only	A localized habit, not observed in the study areas
Numididae (Guinea fowls)	Birds taken from captivity	
Psittacidae (lovebirds)		
Threskiornithidae (ibises)		
Columbidae (doves)		

Key to Study Areas:

1 = North Eastern Transvaal
2 = Zululand
3 = Eastern Rhodesia

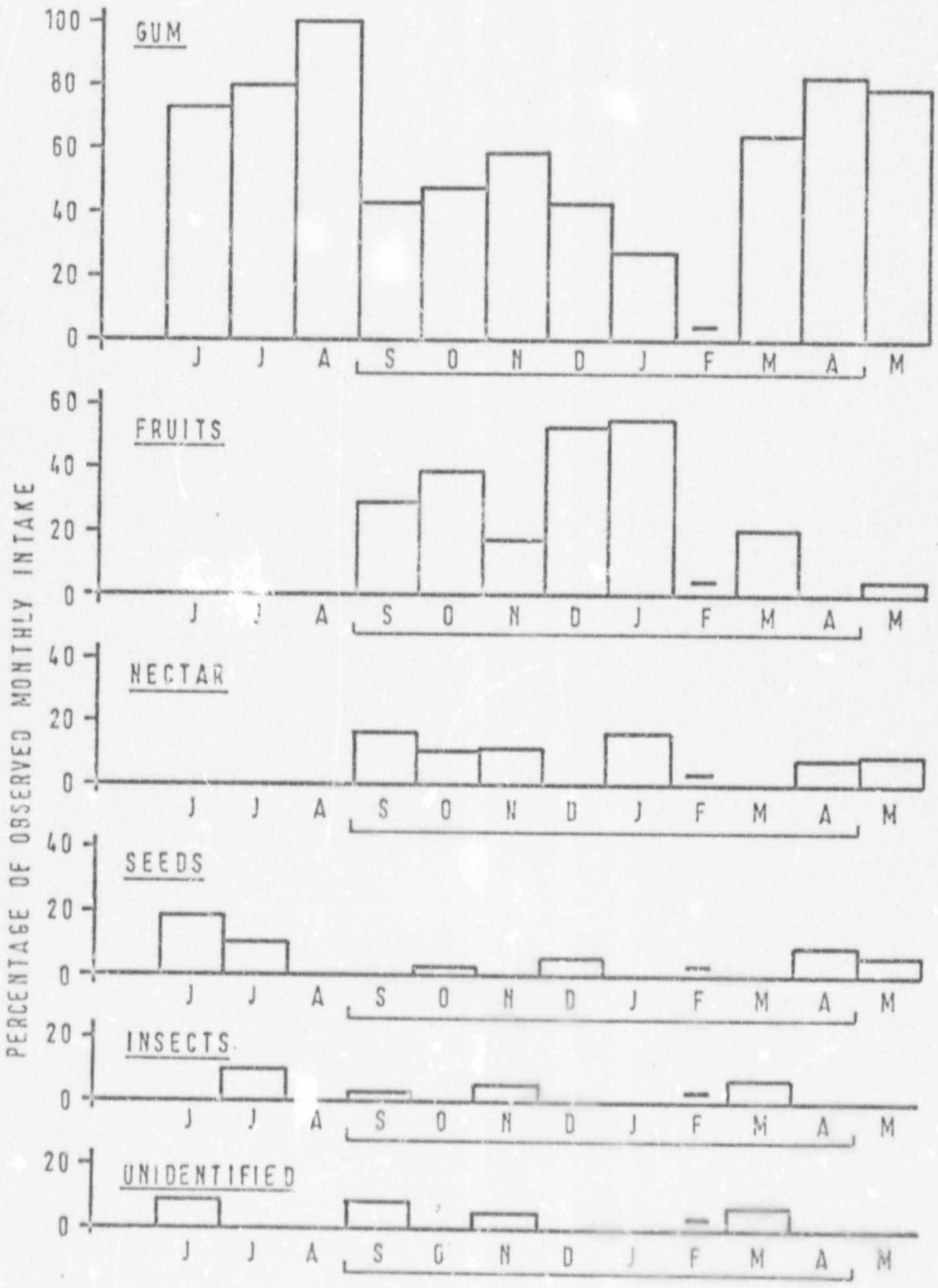

Figure 9. Histogram of the observed monthly intake of different food-stuffs* by G. crassicaudatus. The continuous lines represent months in which the average temperatures were above 18°C.
No observations were made during February.

* Food consumption is defined in appendix 8.

While feeding the animals adopted a variety of postures and used their hands and mouths in different ways to suit the type of food which was being tackled. They moved to almost any part of the tree or onto the ground in order to reach a desired food item.

10.1 The Use of Gum

G. crassicaudatus made regular use of the gum (or sap) of acacia trees which exuded from splits and wounds in the bark or from the holes made by boring insects. These sources of gum were most common at the base of the tree trunk, on the undersides of branches and in the axils of fine twigs but all these spots could be reached without difficulty. A number of gum licking postures were observed which are illustrated in figures 10 to 13. Many of the postures were similar to those of G. senegalensis (Bearder, 1969) and they have been compared in figure 14. The wide reach and extreme opposability of the digits in G. crassicaudatus may enable them to utilize gum licks on the undersides of broad branches and trunks which are inaccessible to food competitors, including G. senegalensis.

When feeding in acacia trees the gum was usually licked away slowly for up to twenty or thirty minutes at a time. The use of the procumbent lower teeth for scraping was not observed although the bark was occasionally chewed away to expose more gum for licking. Old gum was sometimes chewed, but not once it had hardened. During long bouts of licking in an awkward position, the animals sometimes moved away to rest before continuing to feed. It was not uncommon for two or three bushbabies to lick simultaneously at one spot and this rarely led to squabbles. Occasionally a bushbaby was observed to sneeze and wipe its muzzle with a hand while licking, in order to free itself of ants.

When feeding on gum in Albizia versicolor, bushbabies were seen to bite pieces of bark with vigorous movements of the head while hanging beneath a branch. The bark was then held in one hand, licked and dropped to the ground in a similar action to that used when feeding on fruit.

The consumption of gum has been reported for several species of galagos, lorises and lemurs. Charles-Dominique (1971) found that Perodicticus potto and Galago demidovii ate more gum during the long rainy season when it formed quickly and ate less in the dry part of the year. Euoticus elegantulus, on the other hand, ate gum throughout the year in a very

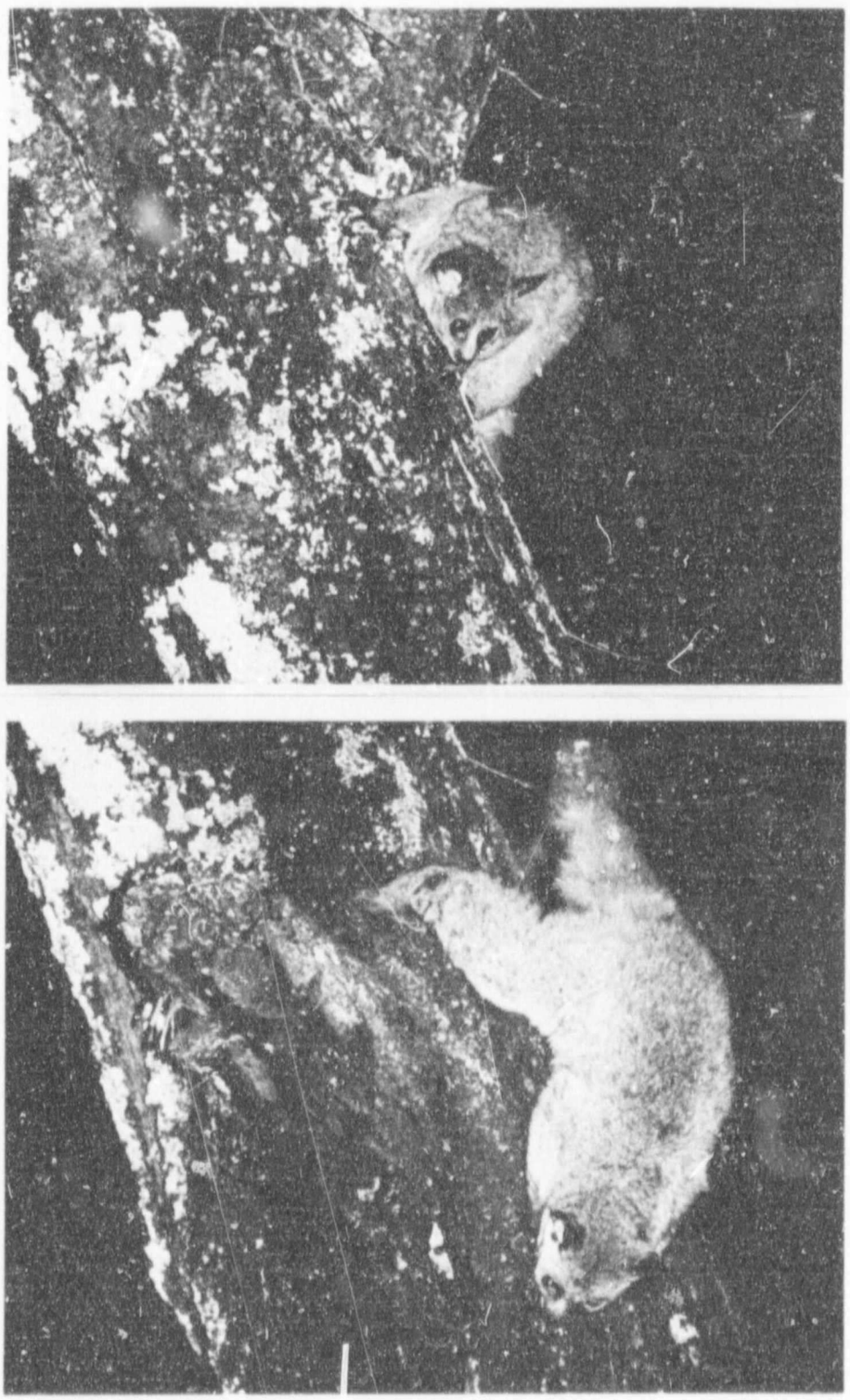

Figure 10. Photographs of a G. crassicaudatus at night as it descended an Acacia Karoo in order to lick gum. Note the extreme divergence of the hallux from the remaining digits of the foot in the lower photograph.

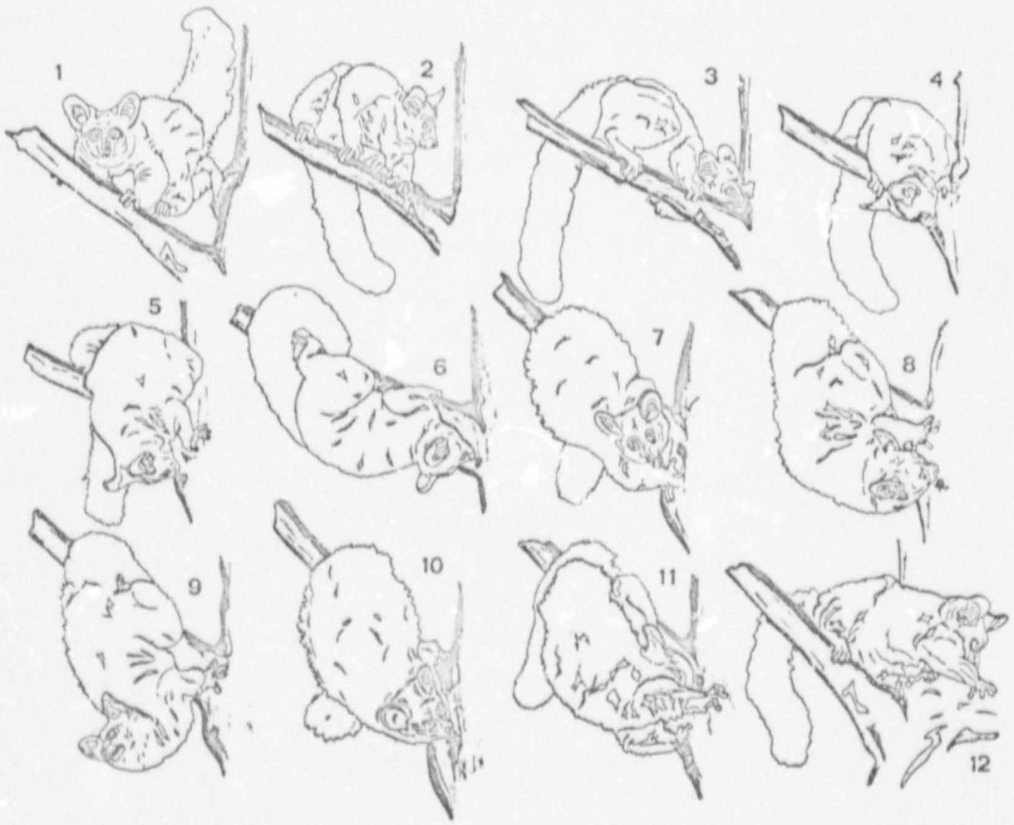

Figure 11. Drawings taken from photographs to show a variety of postures adopted by G. crassicaudatus at a single gum lick. The photographs were obtained over a period of several months and depict four individuals of a group.

similar way to G. crassicaudatus, often taking it from several well-known spots. The same behaviour was observed in G. senegalensis, where gum constituted a substantial part of the diet (Bearder, 1969). In the winter months when fruits were relatively scarce there were some nights when G. crassicaudatus ate only gum. Gums and resins appear to be equally important in the diets of Microcebus coquereli and Phaner furcifer (Petter et al., 1971) and to a lesser extent in Microcebus murinus (Martin, 1972a).

10.2 The Use of Fleshy Fruits

Many trees within the three study areas bore edible fruits and G. crassicaudatus returned repeatedly to these trees while they were in season

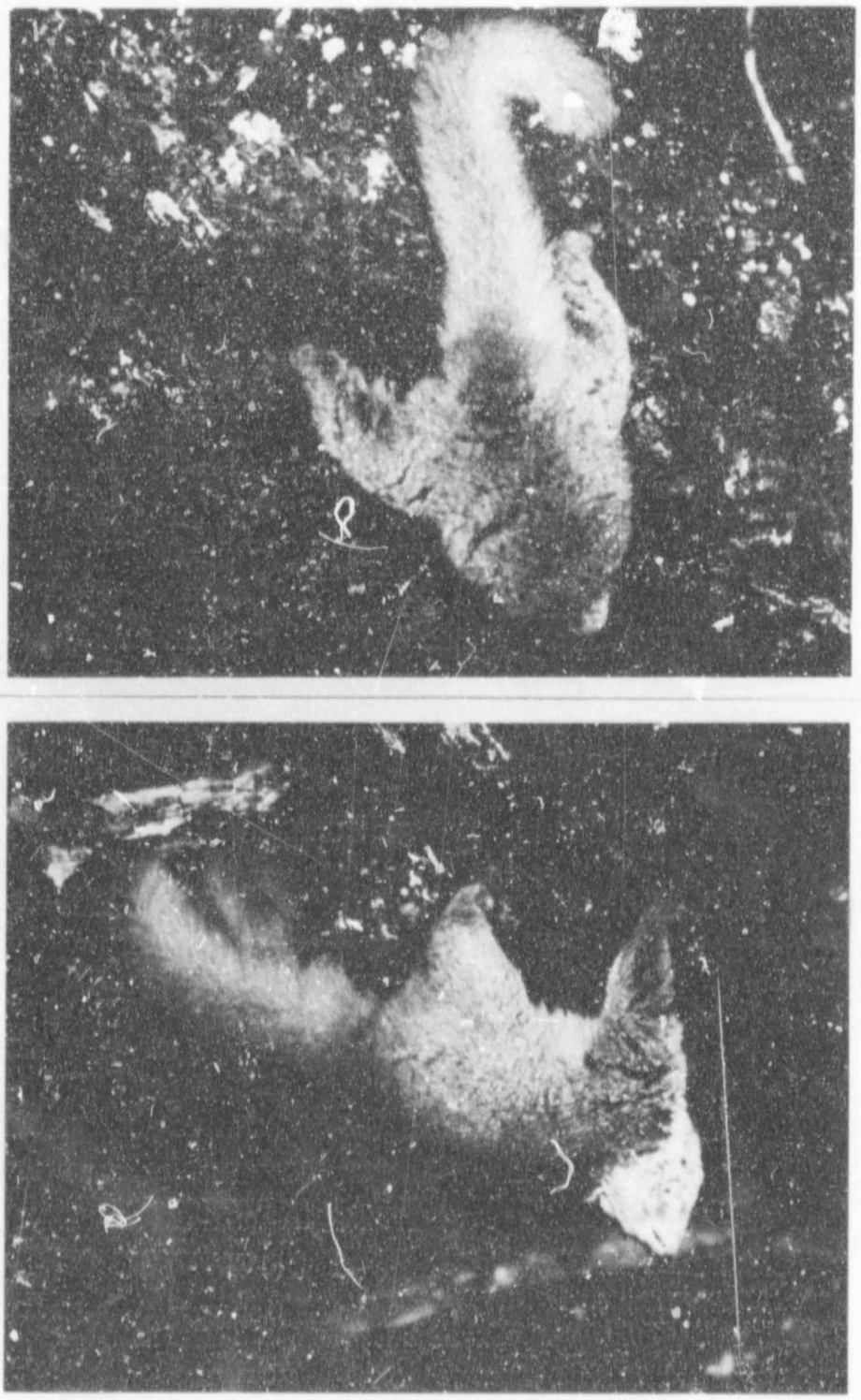

Figure 12. Photographs showing postures used by G. crassicaudatus to obtain gum from beneath a broad, overhanging, trunk. Note the uniform colour of the tails, one of which has been cut for identification.

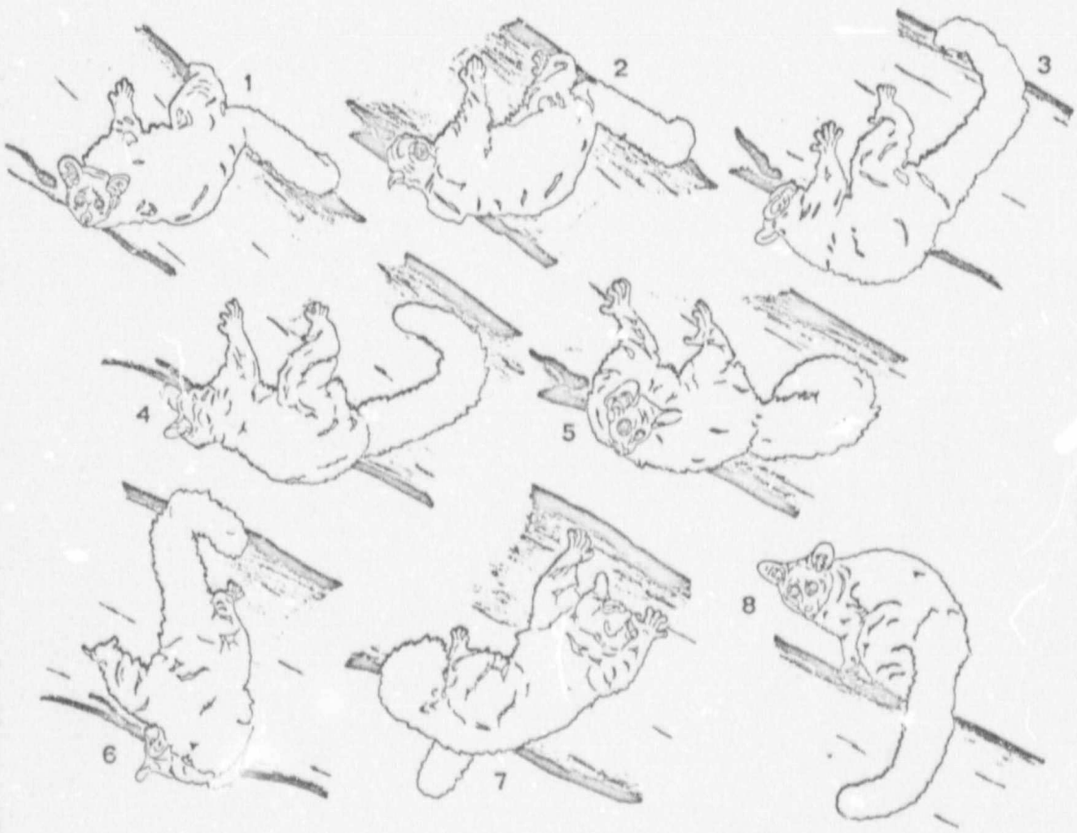

Figure 13. Drawings taken from photographs to show a sequence in the positions adopted by G. crassicaudatus while licking gum beneath an overhanging trunk. Note that the limbs are held wide apart with the body close to the tree. The tail appears to be important for maintaining balance.

(see appendices 3 and 4). Trees such as wild figs (Ficus spp.) or jackalsbessie (Diospyros mespiliformis) which carried a large amount of fruit, ripening over a long period, were of particular importance. Various fig trees came into fruit at different times throughout the summer and they were used in succession. At this time G. crassicaudatus consumed greater quantities of food than in the winter, when the condition of individuals was seen to deteriorate. Cultivated fruits were also taken with relish in regions where they were within access of natural cover.

Bushbabies fed noisily and often wastefully on hard-shelled fruits such as wild figs and guavas (see appendix 2). Certain individuals would



Figure 14. Drawings taken from photographs to show the similarities between the gum-licking postures of G. crassicaudatus (above) and G. senegalensis (below).

Author Bearder Simon Kenneth
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