American Museum Novitates

PUBLISHED BY THE AMERICAN MUSEUM OF NATURAL HISTORY
CENTRAL PARK WEST AT 79TH STREET, NEW YORK 24, N.Y.

NUMBER 1972 OCTOBER 29, 1959

Results of the Archbold Expeditions. No. 80 Observations on the Biology of the Yellow-footed Marsupial Mouse, *Antechinus flavipes flavipes*

BY B. ELIZABETH HORNER[1] AND J. MARY TAYLOR[2]

INTRODUCTION

The yellow-footed marsupial mouse, *Antechinus flavipes* (Waterhouse), is included in the family Dasyuridae along with other marsupial "mice," or phascogales, the larger native "cats," the Tasmanian devil, and the large and possibly extinct marsupial "wolf," or thylacine. The family Dasyuridae is generally considered to be the most primitive of the families of Australian marsupials, and *Antechinus flavipes* is one of the least specialized members of this family (fig. 1). Indeed, F. Wood Jones (1923, p. 98) stated: "the Yellow-footed Pouched Mouse is an animal of great interest from a zoological point of view, since in the whole of its anatomy it shows itself to be a remarkably generalized animal. It represents a marsupial base form, its general anatomy being but little modified from a basal mammalian plan, and it stereotypes the simple creature that could be ancestral to most of the marsupial radiations." Later, Tate, in his revision of the Dasyuridae (1947, p. 112), placed *Antechinus* as one of the least specialized members of the family. The genus shares about 80 per cent of the characters that he listed (*loc. cit.*) for the hypothetical primitive dasyure.

[1] Department of Zoology, Smith College, Northampton, Massachusetts.
[2] Museum of Vertebrate Zoology, University of California, Berkeley.

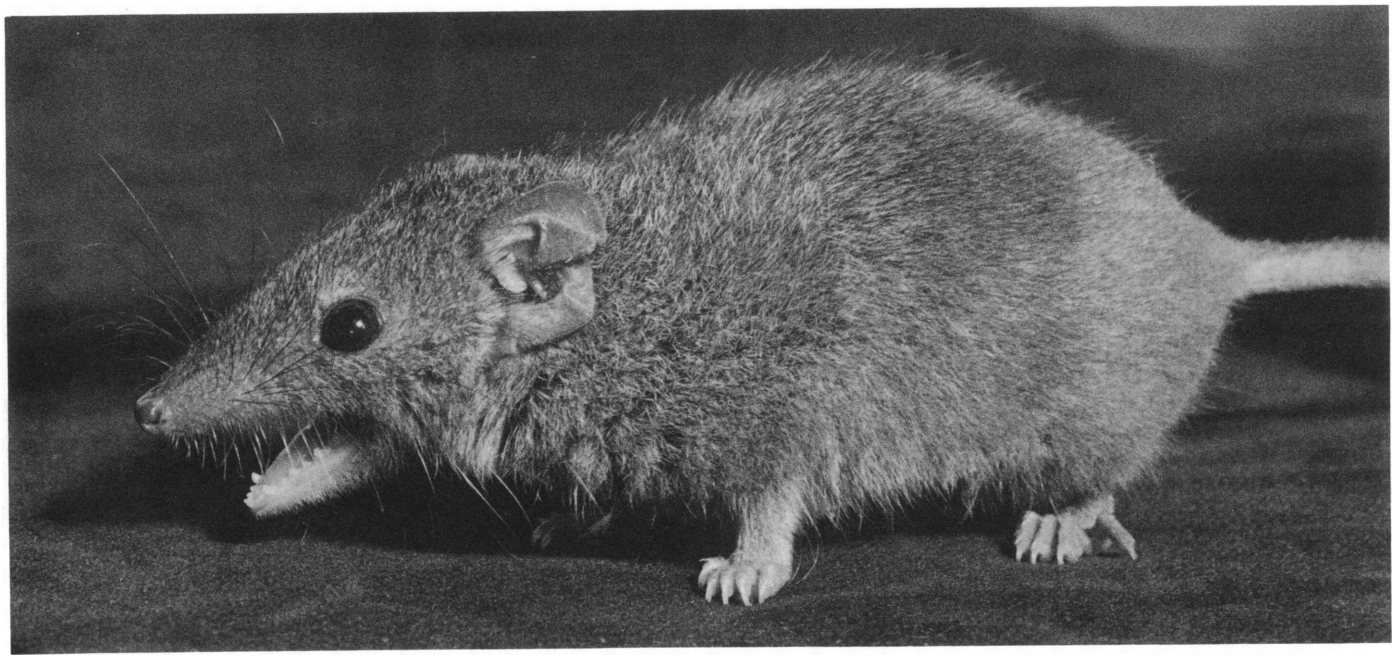

FIG. 1. *Antechinus flavipes flavipes*. Adult female from Waterfall, New South Wales, taken about June, 1954. Photograph courtesy of Dr. A. Gordon Lyne.

Tate (1947, pp. 126–133) recognized nine species of *Antechinus* in New Guinea, Tasmania, and continental Australia. According to this revision *Antechinus flavipes* is restricted to the Australian continent and represented there by four subspecies. Later Tate (1952) reduced one of the nine "species" (*A. godmani*) of his revision to subspecific status under *A. flavipes*, thus making a total of five recognized subspecies for this species, although *A. f. godmani* in some places occurs together with another subspecies, *A. f. adustus*. The systematic position of *A. f. godmani* is therefore equivocal.

Our observations were made on the typical subspecies, *A. f. flavipes*, in New South Wales. Marlow (1958) has reported details of its occurrence in this state. Our study area was in coastal eucalyptus forest at Pearl Beach, in Gosford Shire, about 30 miles northeast of Sydney (fig. 2).

Little has been published on the habits of this marsupial, in spite of the fact that it has a wide distribution. It is an insectivorous and carnivorous, semi-arboreal animal, chiefly nocturnal and so secretive that it is seldom seen by local human residents except when brought in by house cats. We undertook our study of *Antechinus flavipes* because of the paucity of published information concerning this primitive marsupial.

Although this study chiefly concerns the biology of a single population of *A. f. flavipes*, museum specimens of this subspecies and of *A. f. godmani* have been analyzed by external dimensions to illustrate the degree of sexual dimorphism found within this group.

HABITAT

The study area lies within the Hawkesbury sandstone series, a Triassic deposit which in this locality is highly vulnerable to erosion by wind and water. The Hawkesbury River lies to the south and Broken Bay to the east, both forming major faunal barriers. From a distance the terrain appears undulating and, except for occasional sandstone exposures and areas conspicuously denuded by recent bush fires and human settlements, densely covered with forest vegetation. The apparent uniformity of vegetation and terrain is at once lost, however, beneath the upper canopy of eucalypts. Water has cut large gullies, some of which are filled by rushing streams during heavy rains. Covering the hilltops and other exposed areas is sclerophyll forest, while in the gullies and other protected places a less xeromorphic vegetation pertains. Wind and water have carved numerous caves in the sandstone exposures, and many of the caves are further elaborated with honey-

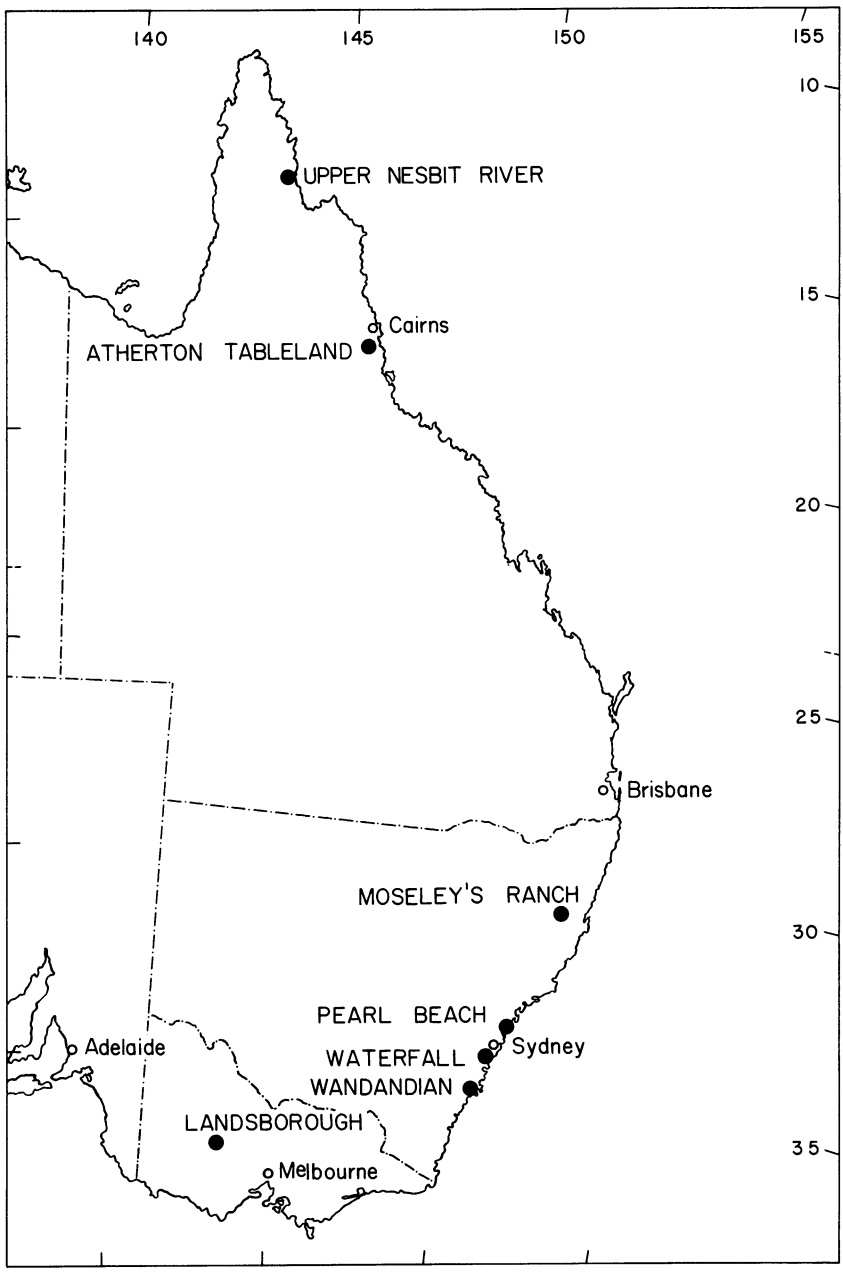

FIG. 2. Map of eastern Australia, showing the localities of the *Antechinus* referred to in this paper.

combed walls and roofs. Beneath the large *Eucalyptus* and *Angophora* trees occurs a second major vegetational stratum which may be described as a tall shrub layer. It is composed largely of members of the families Proteaceae, Leguminoseae, Myrtaceae, Epacridaceae, and Rutaceae. Cabbage palms, *Livistona australis*, follow the larger stream beds, and numerous ferns cling to the sides of watercourses and other moist areas, adding to the usually dense undergrowth near wet situations.

Average temperature records for the Sydney district vary from a mean minimum of 56.3° F. to a mean maximum of 71.1° F. (Commonwealth of Australia, 1954). Locally, temperature conditions varied during the trapping period from a minimum of 33° F. (August 6, 1955) to a maximum of 101° F. (January 3, 1955). Average yearly rainfall for the Sydney district is 44.80 inches (Commonwealth of Australia, 1954), an amount that one might expect would support a generally moister vegetational type than sclerophyll forest (Harris, 1956). However, the rainfall is often torrential; evaporation is high; and the soil, although sandy, is also very shallow and retains little moisture.

METHODS

The live-trapping program was carried out from September through December of 1954 and during April, May, July, and August of 1955. It represents 107 days in the field and 6753 trap nights. By means of selective rather than pattern trapping, an attempt was made to sample as many types of habitat situations as possible in an area of approximately 22 acres. Although it was physically impossible to trap more than one or two segments of this area at a time, one segment, chosen because of the proportionately high yield of small mammals, was represented throughout most of the trapping period. This small area, ¼ acre in size and bordering a permanent stream, is represented by 96 days in the field and 3623 trap nights.

The traps used were of three sizes according to inside measurements: (a) 9 by 3 by 3½ inches, (b) 8½ by 3 by 3 inches, and (c) 8 by 2½ by 2½ inches. The largest trap was made of sheet metal, while the other two were of pressed wood except for the metal trap door at one end. The bait used most extensively was a mixture of rolled oats, peanut butter, and honey or raisins. Sunflower seeds and nesting material were occasionally supplied. Trap sizes were selected at random.

Measurements of the marsupial mice were taken in the following manner: The hind foot was measured from the heel to the tip of the claw, and the ear measurement was taken from the notch to the tip

of the ear. The crown-rump length of pouch young was taken in the manner diagrammed by Lyne and Verhagen (1957, p. 173, fig. 5) for the marsupial *Trichosurus vulpecula*. Weight determinations of the pouch young from Pearl Beach were made to the nearest 0.01 gram on a torsion balance (Torsion Balance Co., Style No. 269). Adults were placed in a fine net bag and then weighed to the nearest gram on pan field scales.

A system of ear markings was used to make it possible to recognize retrapped individuals. One to several small holes were placed in the pinna of either or both ears with a poultry punch, each animal receiving a different arrangement of punches.

RESULTS

Captures

Fifteen marsupial mice (six males and nine females) were trapped a total of 30 times. Twelve of the captures were made in the large metal traps (representing 1338 trap nights) and 18 in the large pressed-wood traps (representing 2947 trap nights). The difference in the number of captures in these traps of similar size but of different materials is not of statistical significance (chi-square equals 0.70 with one degree of freedom). In no instance was the smallest of the three types of trap (represented by 2468 trap nights) effective in catching the marsupial mice, although it was identical with the larger pressed-wood trap except for size. Comparison of the number of captures in the small traps with the number of captures in each of the large types of traps by Yates adjustment of the chi-square test (Simpson and Roe, 1939) gives a significant difference in both instances (chi-square equals 19.26 with one degree of freedom for large metal versus small wood traps and 13.25 with one degree of freedom for large wood versus small wood traps). When all large traps are compared with all small traps the effectiveness of the large trap is likewise highly significant (chi-square equals 15.69 with one degree of freedom). This strongly suggests that the size of the traps constituted a very important factor in the capture of *Antechinus*, even though the small traps provided ample room for the animal.

The usual procedure was that each captured animal was examined carefully, weighed, measured, ear-marked, and then released where caught. Eleven of the 15 individuals were trapped not more than 150 feet from the creek in the aforementioned ¼ acre. This stream is the only permanent water known to exist in the 22-acre area, although temporary streams were abundant during periods of rain. Vegetation

was dense on each side of the stream and was composed largely of *Xanthorrhoea arborea, Banksia serrata, Macrozamia spiralis, Casuarina* sp., *Livistona australis,* and bracken. The vegetation here was not of markedly greater density than in many drier areas, but a characteristic of the stream banks not common to the remaining tract was the comparatively rich and loamy soil thickly covered with leaf litter. This type of soil might well be expected to yield a far greater supply of insects and other small invertebrates, which serve as food for marsupial mice, than would the shallow sandy soil of drier locations.

Of the 15 animals trapped, eight (four males and four females) were live-trapped only once, three (three females) were found dead in the trap, and four (two males and two females) were recaptured. The greatest distance recorded was by a female caught on August 10, 1955, and next caught 350 feet away on August 14, 1955. Data obtained on distances traveled from points of last capture are shown in table 1. The creek bed, which in dry periods carried little more than a trickle of water but which was 20 feet or more from bank to bank, was not known to be crossed by these marsupial mice.

TABLE 1

DISTANCES (IN FEET) TRAVELED BY *Antechinus flavipes flavipes* FROM POINTS OF LAST CAPTURE

	0–100	100–200	200–300	Over 300
Males	3	2	1	0
Females	3	2	2	1
Total	6	4	3	1

BREEDING

The field data suggest that birth of the young occurs in August and possibly September and that the pouch area, in lactating individuals, remains conspicuous and sparsely haired at least through October. Some forms of the genus *Antechinus* possess a true pouch, but, because in this species the pouch is considerably reduced, the term "pouch area" is here used to describe the region surrounding the teats.

Two adult females were trapped in May, 1955. In neither was the pouch area grossly distinguishable, except for the presence there of white hairs, from the rest of the venter (fig. 3). The teats were not apparent.

One of these same animals was recaptured on August 4, 6, 10, 14,

FIG. 3. Ventral view of the *Antechinus flavipes flavipes* in figure 1 to show the well-furred pouch area of a non-breeding female. Photograph courtesy of Dr. A. Gordon Lyne.

and 15. The pouch area remained inconspicuous throughout this period, although four pairs of tiny, symmetrically arranged teats could be located in the white-furred area. Five other adult females were also taken in August. One, taken August 15, was closely similar in development of its pouch area and eight nipples to the animal just described. The other four were more conspicuously modified in the pouch region. One of these, caught on August 4, was described in the field notes as follows: ventral pelage pale reddish buff with white-haired pouch area; anterior pouch hairs longer than other ventral hairs; pouch area oval and measuring 15 mm. broad and 22 mm. along the anteroposterior axis; four pairs of nipples symmetrically arranged. Two other females, trapped August 11 and August 20, respectively, were closely similar to each other, the teats being well developed and located individually in deep pits and concealed among the long, silky, white hairs. The remaining female was taken on several occasions. On August 8 the pouch area had small nipples well hidden in white fur, with the white hairs of the anterior and lateral periphery being the longest. On August 9 the situation was visibly unchanged. On August 13, when the animal was next taken, the teats appeared to have elongated, and their bases were sunk into tiny pits. On August 15 and 16 the hair in the central part seemed to be thinning out, the whole pouch area increasing in size, and the teats becoming still more conspicuous, partly, no doubt, because they showed up more clearly through the sparser covering of hair.

On September 5, 1954, an adult female was caught with four young attached to her teats, three on the left side and one on the right side (fig. 4). The mammary formula was not ascertained, for, although four teats were clearly visible on the left side, the right side showed two teats plus obliterative wrinkling of the tough pouch skin where other teats would have been expected to occur. The completely exposed pouch area appeared simply as a large (diameter 22 mm.), relatively hairless, leathery area of skin located ventroposteriorly and including the teats well within its confines.

The female, very feeble when taken from the trap, died within a few minutes. The four young remained alive and firmly attached to the teats for six and one-half hours following her death, at which time they were detached, weighed, measured, and placed in alcohol. Each measured about 8 mm. in crown to rump length and weighed approximately 0.1 gram. Their bodies possessed the "transparent look" common to many newly born rodents, and no hairs had erupted (fig. 5). The eyes appeared as darkly pigmented areas beneath a covering

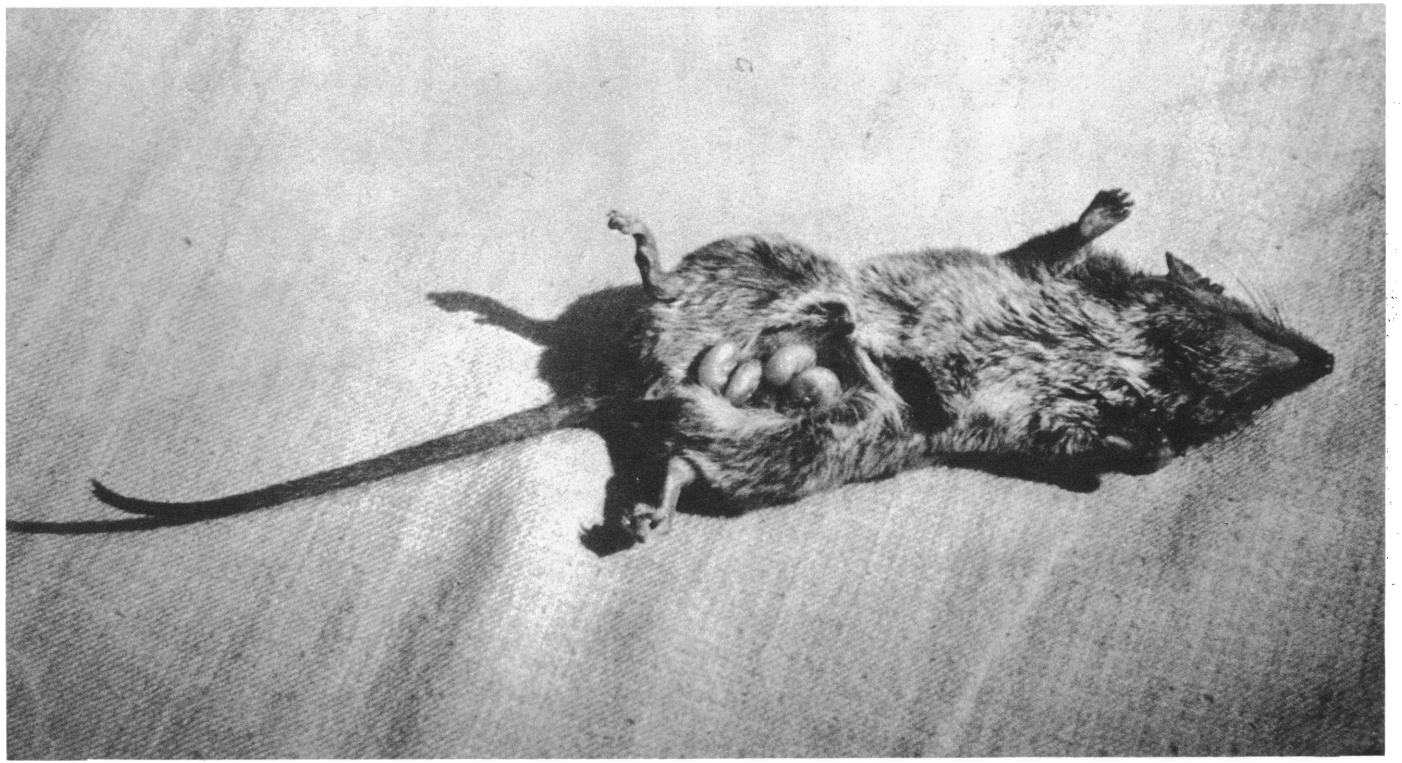

FIG. 4. Adult female *Antechinus flavipes flavipes* caught September 4, 1954, with four pouch young.

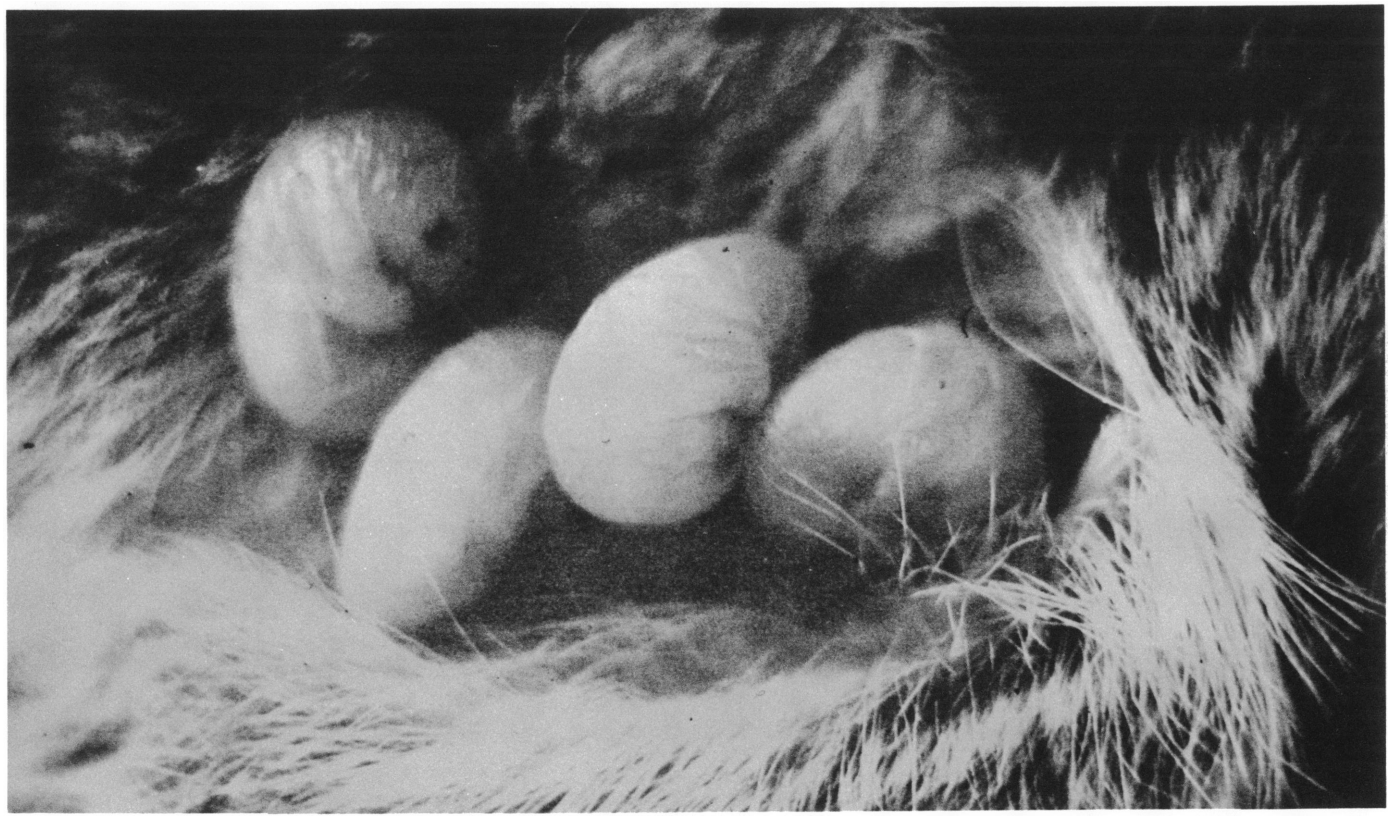

FIG. 5. Close-up of four pouch young of *Antechinus flavipes flavipes*.

TABLE 2

MEASUREMENTS (IN MILLIMETERS) AND WEIGHT (IN GRAMS) OF POUCH YOUNG OF *Antechinus flavipes flavipes*

Locality	Pearl Beach	Pearl Beach	Pearl Beach	Pearl Beach	Landsborough	Landsborough
Specimen number	1	2	3	4	X217	X218
Sex	?	?	?	?	?	♂
Head and body length	—	—	—	—	27.5	30.0
Head length	5.3	5.3	5.4	5.3	8.8	9.2
Crown to rump length	8.9	8.9	8.6	8.7	15.0	14.3
Ear length	—	—	—	—	2.0	2.0?
Forelimb length	2.6	3.0	3.0	3.1	—	—
Hind limb length	1.8	1.7	1.7	1.8	—	—
Manus length	—	—	—	—	2.5	2.5
Pes length	—	—	—	—	2.6	2.6
Tail length	2.2	2.3	2.3	2.1	4.3	5.0
Alcohol preserved weight	0.11	0.11	0.11	0.11	0.36	0.38

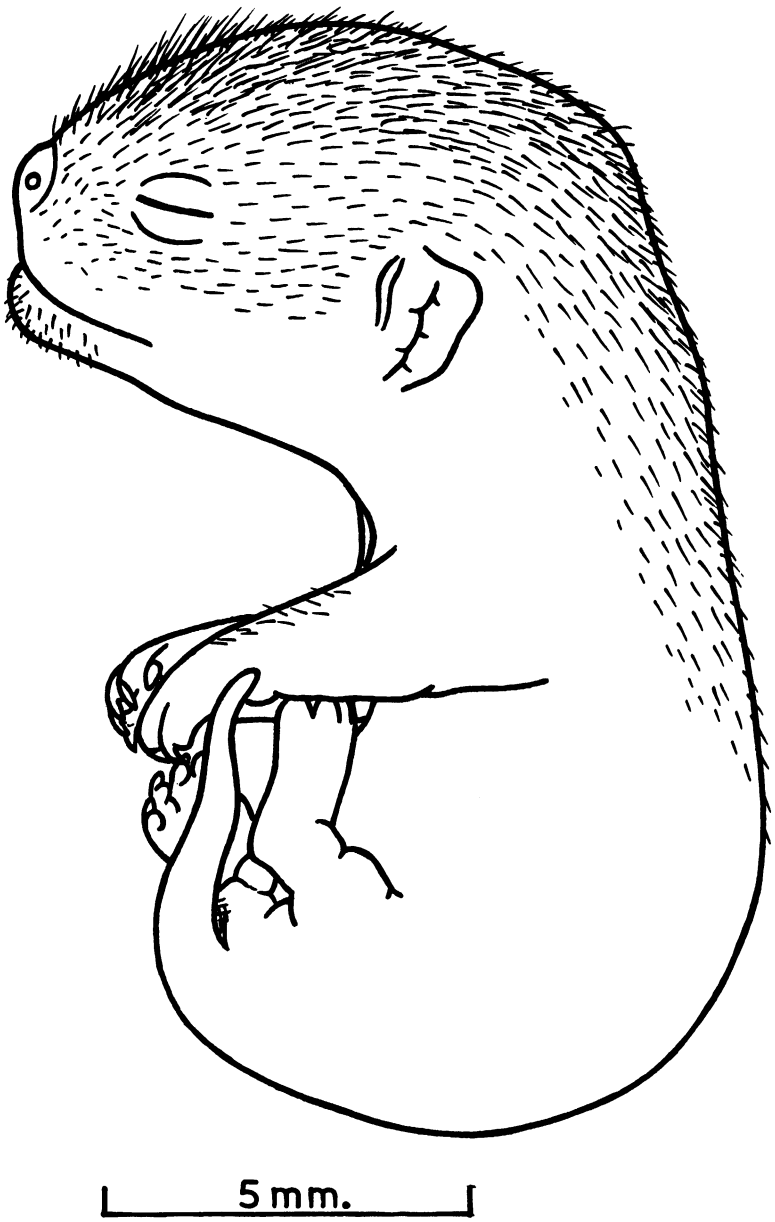

FIG. 6. Drawing of pouch young of *Antechinus flavipes flavipes* to show anteroposterior gradient in the emergence of pelage hairs. Drawing courtesy of Dr. A. Gordon Lyne.

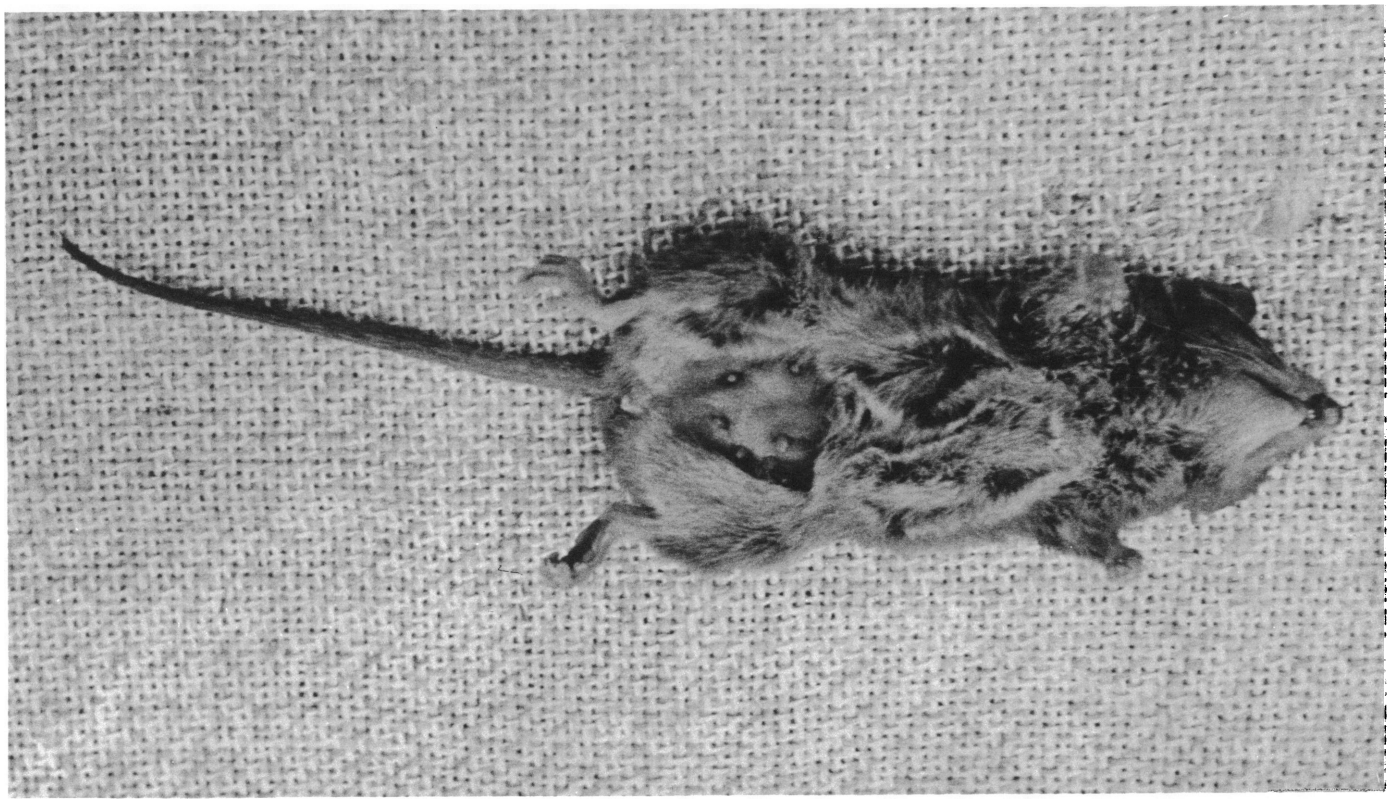

FIG. 7. Adult female *Antechinus flavipes flavipes* caught October 24, 1954, with conspicuous pouch area.

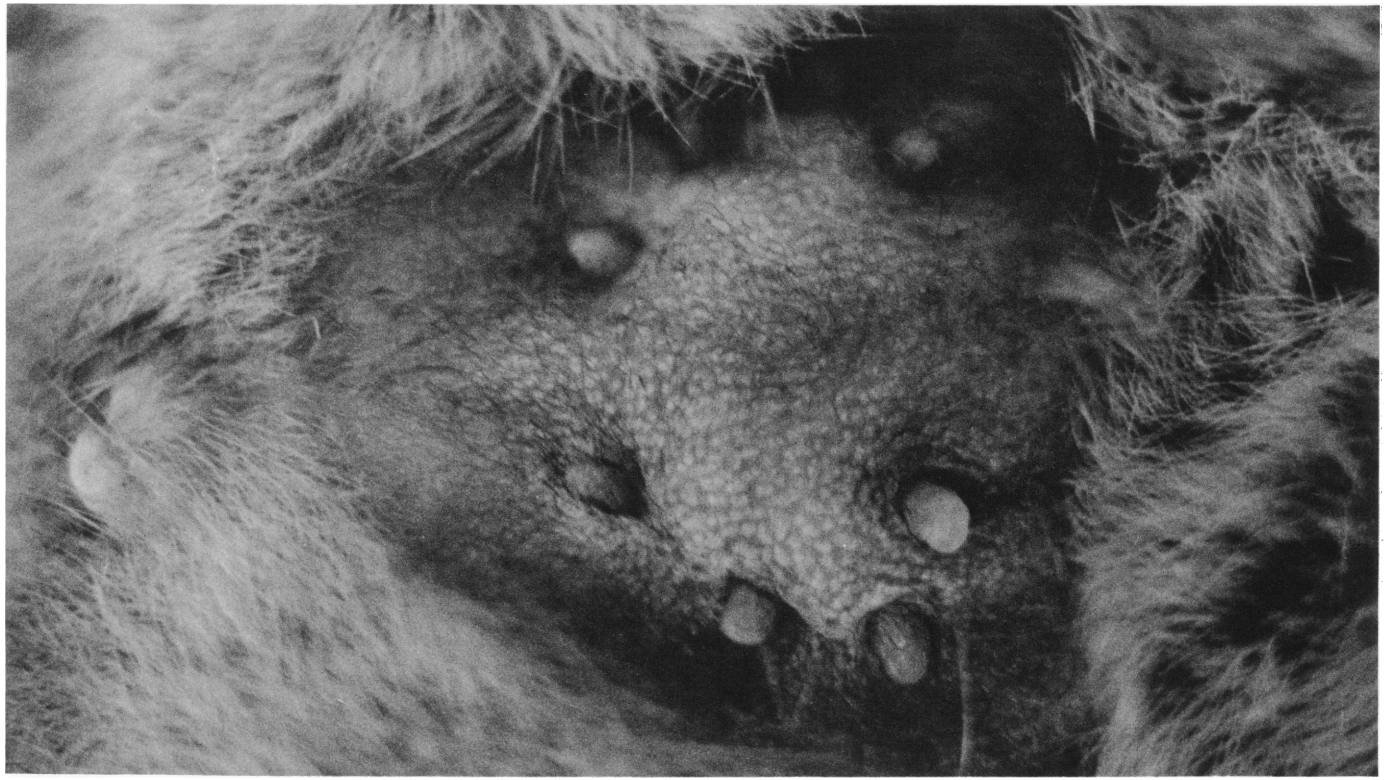

FIG. 8. Close-up of pouch area shown in figure 7 to show the arrangement of the eight teats.

of thin skin, and the external nares and circular mouth were readily distinguishable. No external indication of the ears was apparent. The five digits of each limb were represented by very small lobes. Additional measurements of body parts were taken after the specimens had been preserved in 70 per cent alcohol (table 2).

Measurements contributed by A. Gordon Lyne of pouch young from Landsborough, Victoria, represent an older stage when external ears are distinct and pelage hairs are emerging (table 2). There is a very marked anteroposterior gradient in the emergence of these pelage hairs (fig. 6). According to Fleay the young of *Antechinus flavipes* (subspecies not indicated) measure 4 to 5 mm. (crown to rump?) at birth and do not become separated from the teats until about 35 days later. At this time hair has erupted and the eyes open within a few more days; and at three and one-half months the young are independent (Fleay, 1949).

On October 24, 1954, another female was trapped, an adult showing a well-defined, leathery-textured, sparsely haired pouch area (fig. 7). The pouch hairs were mahogany red in color, while the hairs immediately beyond the periphery of the pouch area were grayish brown. The pouch area approximated a circle in shape, with a diameter of about 24 mm. Eight teats were present, symmetrically arranged in four pairs, and all of them prominent (fig. 8). The condition of the pouch area suggests that the female was nursing young which had become separated from the teats and were presumably left behind in a nest.

Troughton (1954) describes sandstone caves as a common nesting site for this species of marsupial mouse, with nests located in honeycombed crannies and made from eucalyptus leaves. In the present field study sandstone outcrops containing caves were common in the more exposed and drier parts as previously mentioned. Considerable effort was made to trap the animal in some of these caves and to find tracks and eucalyptus-lined nests. In no instance was evidence of marsupial mouse activity discovered here. As none of the caves examined was near a moist situation with ample leaf litter, it is possible that lack of an adequate food supply prevented use of the caves in this area.

Food

Over a 48-hour period of captivity an adult male consumed grubs, a milleped, a caterpillar 1½ inches long, another 3 inches long, several roaches up to 1 inch long, termites, and small chunks of steak and ground meat. Additional items offered but not eaten were a beetle 1½ inches long, a meat-flavored dog biscuit, and three land snails.

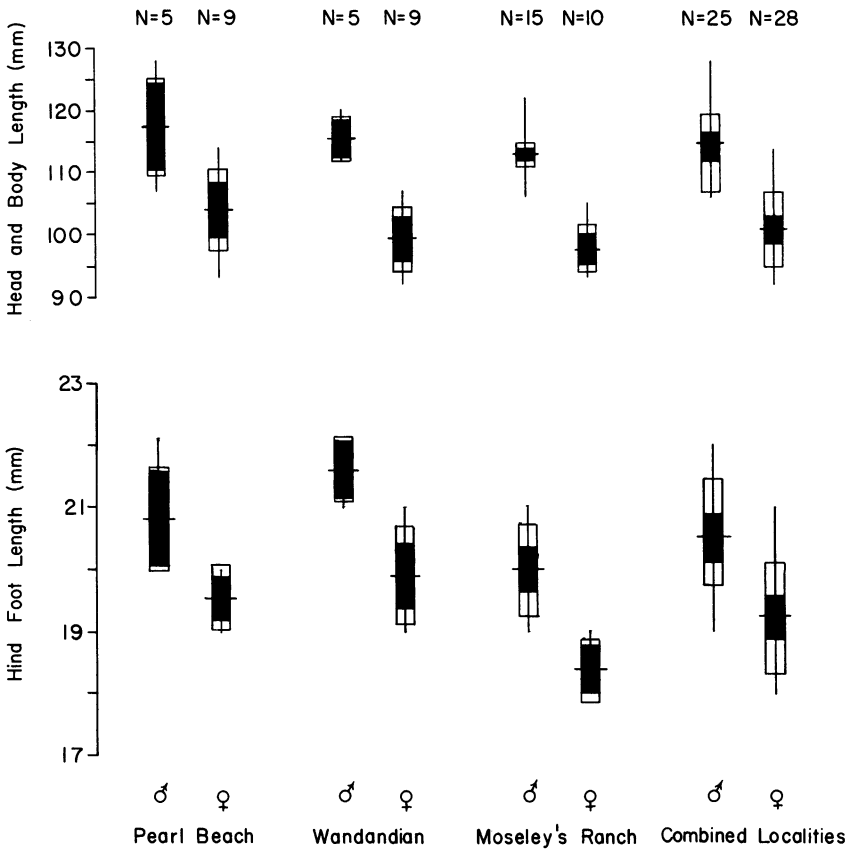

FIG. 9. Sexual dimorphism in adult *Antechinus flavipes flavipes*. The vertical line represents the variation of the sample; the hollow rectangle, one standard deviation on each side of the mean; the solid rectangle, twice the standard error on each side of the mean; and the horizontal line, the mean. Measurements are in millimeters.

All animals were offered alive, and feeding was done largely at night.

Van Deusen (personal communication) found that a northern subspecies, *A. f. adustus*, is definitely attracted to snap traps by bait consisting of raisins, rolled oats, peanut butter, and fat bacon. He also suspects that it will eat portions of trapped animals, as the shrew does, and has witnessed its attraction to a trapped dead bird (Tate, 1952, p. 579). The bait used in our study differed from that used by Van Deusen in that ours contained no bacon. Because the animals we captured consumed little, if any, bait in the live traps, it is im-

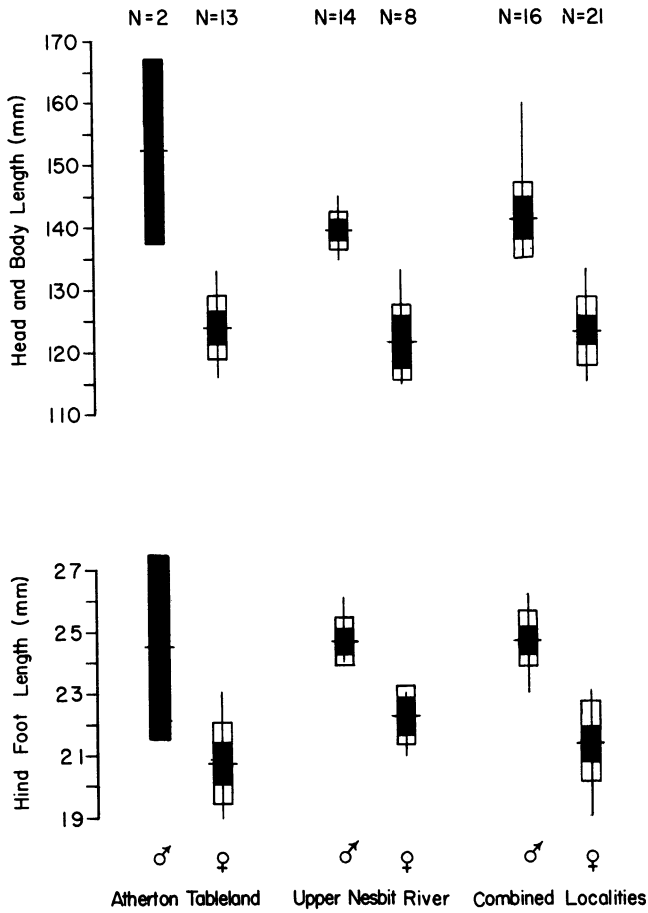

FIG. 10. Sexual dimorphism in adult *Antechinus flavipes godmani*. Measurements are in millimeters.

possible to tell whether the animals were attracted by the bait, or by insects that entered the baited traps, or whether they simply entered the traps in the course of general exploratory behavior. Insects appear to be a major component of their diet in the wild, as the feces of newly caught individuals contained a large quantity of insect remains.

BEHAVIOR

The marsupial mouse is fierce and extremely active when handled. When we made our examinations, we usually seized the animal firmly by the base of the tail, but often had to grasp it by the nape of the neck as well in order to control its struggles. When seized the animal

usually bared its teeth in a threatening attitude somewhat like that shown in figure 3, and often followed this display by biting at the observer's hand. These short bites were usually succeeded by a grip of such tenacity that the animal could be lifted by this hold. Such a grip would sometimes last for more than a minute. It was frequently difficult to extract the animal from such a grip without using considerable force in prying apart the jaws. In spite of the obvious fierceness of each of the animals handled, we never heard any of them utter a sound in these struggles.

In daylight hours and under artificial lighting at night an individual kept in captivity for two days remained hidden and motionless, except for rapid breathing movements, in the leaf litter of the cage. It was even possible to reach into the cage and seize its tail before the animal would stir. Then it would suddenly become very active and commence to bite the hand that caught it. Following an interval of darkness the cage soil would be well loosened, indicating that the animal had burrowed extensively. A distinct musky odor was retained by the soil even after release of the marsupial mouse. Dissection of another individual revealed two pairs of anal glands, one small pair anterior and adjacent to a slightly larger pair—glands that may be responsible for the musky odor and thus perhaps be of some function in social communication.

Actions of the marsupial mice upon release at the place where caught varied considerably. Some individuals remained motionless for half a minute or more before running away, but others darted away immediately. Most of the animals escaped on the ground or ran along the tops of fallen logs. Their movements through the leaf litter, however dry or abundant it was, were rarely audible to the observers. A few individuals ran up the trunks of trees before disappearing into a crevice or foliage. One individual ran up the short trunk of a grass tree (*Xanthorrhoea*) to disappear into the dense clump of leaves on its summit.

Ectoparasites

The marsupial mice commonly harbored mites in the more sparsely haired parts of the body. Frequently the mites were so abundant and tightly packed in the pinna of the ear as to bear semblance to an orange fungus growth. One marsupial mouse bore a similarly dense infestation of the moderately haired tail. One to several fleas were usually present in the denser portion of the pelage, and engorged adult ticks were common. The ectoparasites were preserved and will be discussed as part of a separate study.

Sexual Dimorphism

In the course of handling *Antechinus* in the field, we soon became aware that the males of our study area population were almost always larger than the females. Troughton (1954, p. 26) had mentioned that females averaged somewhat smaller than males in *A. swainsonii*, and Tate (1952, p. 578) stated "males are always much larger than females in *Antechinus*." This led us to examine museum specimens in an attempt to substantiate these observations with statistical treatment.

In addition to the 14 individuals measured in the present study, specimens from the Archbold Collections in the American Museum of

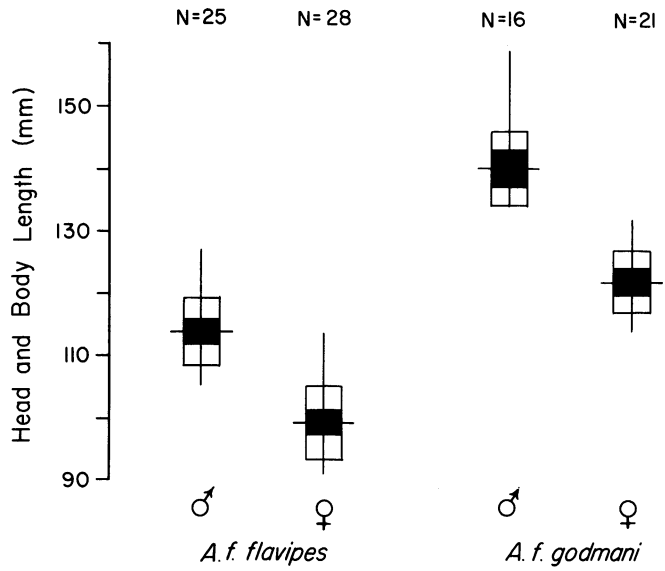

FIG. 11. Head and body length in adult *Antechinus flavipes flavipes* and adult *Antechinus flavipes godmani* to show the lack of significance of dimorphism when the two groups are compared. Measurements are in millimeters.

Natural History and others from the United States National Museum were also examined. Two subspecies (*Antechinus flavipes flavipes* of New South Wales, and *A. f. godmani*, occurring in Queensland) were present in sufficient number to permit statistical study. As mentioned above, the taxonomic status of *A. f. godmani* is questionable. Tate originally recognized it as a full species (1947) and only later reëvaluated it as a subspecies of *A. flavipes* (1952). The latter placement has left it in the biologically dubious position of being sympatric in at least one area (9 miles south-southeast of Ravenshoe) with another sub-

species of this species, *A. f. adustus*. We may be dealing therefore with two full species in this statistical treatment.

Measurements chosen to test for size discrepancy between males and females of both subspecies were body length (head and body exclusive of tail) and hind foot length (including claw). Fifty-three adult specimens of *A. f. flavipes* were examined, of which 25 are males and 28 are females. Thirty-seven adult *A. f. godmani* were examined, representing 16 males and 21 females. Measurements are those that were recorded by the collector.

Among the *A. f. flavipes* specimens examined, three localities (Pearl

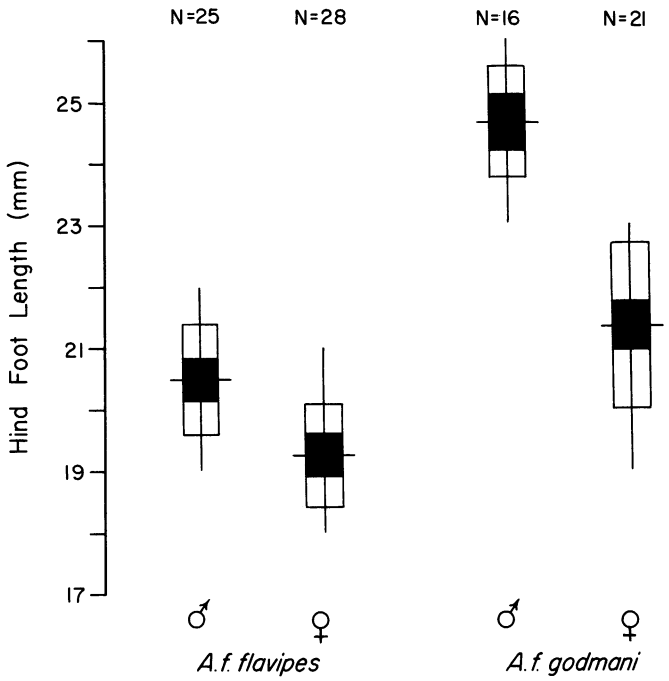

FIG. 12. Hind foot in adult *Antechinus flavipes flavipes* and adult *Antechinus flavipes godmani* to show the lack of significance of the dimorphism when the two groups are compared. Measurements are in millimeters.

Beach, Moseley's Ranch, and Wandandian) are represented by more than 10 specimens each (fig. 2). Figure 9 shows that in both body length and hind foot length the males average larger than the females in each of the localities. Likewise, when all 53 members of the subspecies are compared without regard to locality the males average larger than the females.

In the *A. f. godmani* series two localities, near stations 2 (Atherton Tableland) and 19 (upper Nesbit River) designated by Brass (1953, p. 152, fig. 1), are represented by more than 10 specimens each (fig. 2). It is seen here also that in each of the localities the male definitely averages larger than the female (fig. 10).

Comparison of the two taxonomic groups, as has been made in figures 11 and 12, reveals, however, that the size difference between the sexes is lost when the two groups are compared. In fact, the females of *A. f. godmani* are generally larger than the males of *A. f. flavipes.*

F. Wood Jones (1923, p. 56) remarks that sexual dimorphism is, in general, far less marked among the marsupials than among the placentals and gives the tendency for the females of carnivorous species of marsupials to exceed the males in size as one of the few examples of such dimorphism. In the present study size discrepancy is shown also for two subspecies of *Antechinus,* and it is of particular interest that the disparity is in the opposite direction, the males exceeding the females in size. Any possible selective advantage of such sexual dimorphism must remain, of course, purely speculative at present.

MUSEUM SPECIMENS EXAMINED

Antechinus flavipes flavipes

The American Museum of Natural History (Archbold Collections): Moseley's Ranch, New South Wales, 25, A.M.N.H. Nos. 65737–65745, 65747, 65748, 65750–65753, 65755, 65756, 65762, 65763, 65766, 65769, 65770, 65773, 65775, 65776.

United States National Museum: Wandandian, New South Wales, 14, U.S.N.M. Nos. 221221–221225, 221228–221230, 221232, 221234, 221235, 221237, 221238, 221487.

Antechinus flavipes godmani

The American Museum of Natural History (Archbold Collections): Atherton Tableland, Queensland, 15, A.M.N.H. Nos. 65794–65797, 65799–65804, 65807–65810, 65812; upper Nesbit River, Queensland, 22, A.M.N.H. Nos. 154287–154308.

SUMMARY

Fifteen individuals of the yellow-footed marsupial mouse, *Antechinus flavipes flavipes,* were trapped in the coastal *Eucalyptus* forest of New South Wales, Australia. In the 22 acres sampled all but four specimens were captured within 150 feet of a permanent creek bordered by loamy soil and dense leaf litter. Recapture data were obtained from four specimens, and the greatest distance between points of recapture was 350 feet. Trap size was found to be a significant factor

in the capture of this species. Seasonal changes in the pouch area and early stages of pouch young are described. The data suggest that birth of the pouch young occurs in August and possibly September. Food selection and behavior in captivity are described. The males of *A. f. flavipes* and *A. f. godmani* are shown to be significantly larger than the females of these respective subspecies.

ACKNOWLEDGMENTS

It is a privilege to acknowledge the enthusiastic interest in this project shown by the late Mr. F. J. Griffiths, Chief Guardian of Fauna of New South Wales, from whom we obtained our permit to live-trap small mammals in the area described. For his friendly advice and for permission to examine the *Antechinus* specimens collected by the Archbold Expedition, we are indebted to Mr. Hobart M. Van Deusen, Assistant Curator, Archbold Expeditions, Department of Mammals, the American Museum of Natural History. Dr. David H. Johnson, Curator of Mammals, United States National Museum, and Miss Viola Schantz, Zoologist, United States Fish and Wildlife Service, arranged for us to examine the *Antechinus* specimens of the United States National Museum. Dr. A. Gordon Lyne, Senior Research Officer, Commonwealth Scientific and Industrial Research Organization, Sydney, New South Wales, very generously supplied photographs and valuable data on pouch young. Dr. Seth B. Benson, Curator of Mammals, Museum of Vertebrate Zoology, University of California, Berkeley, has given many helpful suggestions regarding the manuscript. We wish to acknowledge the facilities of the Museum of Vertebrate Zoology for technical help in the preparation of the manuscript. Financial support for the field work was provided by the New Jersey State Fellowship awarded by the American Association of University Women to the senior author and by a Fulbright Grant awarded to the junior author.

LITERATURE CITED

BRASS, LEONARD J.
1953. Results of the Archbold Expeditions. No. 75. Summary of the Cape York (Australia) Expedition. Bull. Amer. Mus. Nat. Hist., vol. 102, pp. 139–205.

COMMONWEALTH OF AUSTRALIA
1954. Year Book. No. 40. Canberra, Commonwealth Government Printer.

FLEAY, DAVID
1949. The yellow-footed marsupial mouse. Victorian Nat., vol. 65, pp. 273–277.

HARRIS, THISTLE Y.
1956. Naturecraft in Australia. Sydney, Angus and Robertson, 264 pp.
JONES, F. WOOD
1923. The mammals of South Australia. Adelaide, British Science Guild (South Australian Branch), pt. 1, 131 pp.
LYNE, A. GORDON, AND A. M. W. VERHAGEN
1957. Growth of the marsupial *Trichosurus vulpecula* and a comparison with some higher mammals. Growth, vol. 21, pp. 167–195.
MARLOW, BASIL J.
1958. A survey of the marsupials of New South Wales. C.S.I.R.O. Wildlife Res., vol. 3, pp. 71-114.
SIMPSON, G. G., AND ANNE ROE
1939. Quantitative zoology. New York and London, McGraw-Hill Book Co., Inc., 414 pp.
TATE, G. H. H.
1947. Results of the Archbold Expeditions. No. 56. On the anatomy and classification of the Dasyuridae (Marsupialia). Bull. Amer. Mus. Nat. Hist., vol. 88, pp. 101–155.
1952. Mammals of Cape York Peninsula. *Ibid.*, vol. 98, pp. 567–616.
TROUGHTON, ELLIS
1954. Furred animals of Australia. [Fifth edition.] Sydney, Angus and Robertson, 376 pp.