ADDITIONAL COMMENTS ON REPRODUCTION IN THE WOOLLY OPOSSUM (*CALUROMYS DERBIANUS*) IN NICARAGUA

Interest in the biology of New World marsupials has increased markedly in recent years, resulting in reports on such varied subjects as morphology, physiology, reproduction, systematics, and cytology (see, for example, Biggers *et al.*, 1965; Biggers and DeLamater, 1965; Biggers, 1966, 1967; Enders, 1966). Even so, surprisingly little has been published concerning the natural history of the woolly opossums of the genus *Caluromys*, which occur from southern Mexico southeastward into the northern half of South America.

In the past 4 years field parties from the Museum of Natural History, The University of Kansas, have collected vertebrates and their ectoparasites in Nicaragua. As a result of these efforts, more than 70 specimens of *Caluromys derbianus* have been obtained from the western part of that country. The reproductive condition of 17 adult females was determined in the field and data thus accumulated are available for analysis. Additionally, 28 of the specimens are pouch young, which are stored in alcohol. All specimens discussed herein are from three localities in west-central Nicaragua—5 km N Sabana Grande, 45 m; 15 km NW Masaya, approximately 100 m; and 3 km N, 4 km W Diriamba, 600 m.

According to Enders (1966: 198), the breeding season of *Caluromys* begins in Panama with the onset of the dry season (February) and generally coincides with the breeding season of *Marmosa*. Biggers (1967: 680) recently reported that *Caluromys* breeds in western Nicaragua "throughout the dry season of the year (January to June), and into the early part of the season of heavy rains (July to December)." A summary of the reproductive condition of adult females in our collection is given in Table 1. As can be seen in the table, we obtained females that were carrying pouch young in February, March, May, June, July, and August. Additionally, Biggers (1967: 679) reported a pregnant female trapped in January and a female with pouch young in September.

Variation in size (and therefore difference in age) of pouch young of different litters is noteworthy (see Table 1). For example, in three litters examined in the middle of July the length of head and body of pouch young ranged from 32 to 69 mm, and in three litters examined on three successive days in August this measurement ranged from 19 to 74 mm. Our data for *Caluromys* suggest, therefore, that periods of peak reproductive activity may not occur in the months listed in Table 1. Instead, females evidently may be reproductively active throughout at least the period January into September.

Biggers (1967: 680) suggested that the breeding season of *Caluromys* in western Nicaragua lasts only until the early part of the rainy season. However, we have examined young woolly opossums obtained in July that were about one-third grown judging from size and dentition. If the rate of dental development in young *Caluromys* approximates that found in *Didelphis* (Petrides, 1949: 373–374), the July-taken juveniles could well have been born in December. Furthermore, since parturition is known to occur in the first 2 months of the rainy season (July and August) it seems likely that woolly opossums breed also in the last 4 months of the year in western Nicaragua.

Litter size in *Caluromys* ranges from one to six according to Enders (1966: 199), "with an average of between three and four." The range was two to three in four litters from Nicaragua reported by Biggers (1967: 680). In 13 litters for which we have data, the number of young ranged from two to four with an average of 3.3.

Although the pouch in marsupials obviously offers some protection to young, Enders (1966: 202) has stated that in *Caluromys*, *Didelphis*, and *Philander*, "the older the litter the smaller the numbers [of young] in spite of the protection offered by the pouch." Numbers, and in some instances the average length of head and body of young from 13 litters of woolly opossums are given in Table 1. Size and degree of development are indicative of relative age of these young. By way of example, the smallest individuals (33 mm or less) are naked, cannot be sexed, and their hind feet are stubby, lack pads, and the toes are only barely formed; the largest are partially furred, and have nearly fully

TABLE 1.—*Reproductive condition of 17 adult females of* Caluromys *from west-central Nicaragua.*

KU catalogue number	Date	Weight (g)	Reproductive condition (sex of young given where known)	Average length of head and body of young (mm)
96200	12 February	243.5	3 pouch young	no meas.
96204	15 February	383.0	3 pouch young (2♂♂, 1♀)	40.0
96209	5 March	324.5	4 pouch young	no meas.
96211	5 March	—	4 pouch young (4♂♂)	55.0
96213	5 March	341.0	4 pouch young	no meas.
70158	27 May	—	3 pouch young (1♂, 2♀♀)	67.0
105906	16 June	342.0	4 pouch young	58.0*
97358	2 July	208.0	no embryos or pouch young	
105904	5 July	287.2	no embryos or pouch young	
110682	11 July	366.8	2 pouch young (1♂, 1?)	39.0
97362	14 July	272.2	2 pouch young (1♂, 1♀)	69.0
97369	18 July	279.3	4 pouch young	33.0
97376	27 July	270.0	no embryos or pouch young	
97377	27 July	281.6	no embryos or pouch young	
110675	11 August	335.5	4 pouch young (3♂♂, 1♀)	70.0
110679	12 August	328.5	3 pouch young	20.0
110668	13 August	318.5	3 pouch young	26.0

* Crown-rump length.

developed hind feet. We compared numbers of young in older litters with those of the youngest litters. No evidence was found to indicate that litter size decreases with age of young, at least in the period of development represented in our material.

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