the time of or just before ovulation in females (Vinegar, 1975*a*). The length of maximum testis maturity is reasonably short. This is comparable to that observed in *Sceloporus scalaris*, which also produces only one clutch of eggs per season (Newlin, 1976). The period of maximum testis activity in *Sceloporus virgatus* is much shorter than that observed for species producing multiple clutches of eggs (e.g., Michel, 1976; Schrank and Ballinger, 1973). Judging from the length of testicular activity, we would conclude that reproductive effort in male *Sceloporus virgatus* would be less than in multiple brooded species.

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Notes on *Phenacosaurus heterodermus* in the Sabana de Bogotá, Colombia

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Among the more bizarre anoline lizards are the three species of *Phenacosaurus*. They are confined to the northern Andes of Venezuela, Colombia, and Ecuador, where they are usually found well above the elevations inhabited by the closely related genus *Anolis*. *Phenacosaurus heterodermus* is the only species known to overlap with *Anolis*, and it does so only in a few localities in southwestern Colombia. Little is known of the ecology of these peculiar lizards. Previous studies of the habits of this species have been based on captive animals (Dunn, 1944; Jenssen, 1975; Kästle, 1965; Osorno-Mesa and Osorno-Mesa, 1946). Osorno-Mesa and Osorno-Mesa (1946) reported that the incubation period for the single-egg clutches of this species was one year, longer than any other known squamate reptile (Fitch, 1970) and similar to that *Sphenodon punctata* (Crook, 1975). *Phena-*

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cosaurus heterodermus is found in moderate to high population densities in roadside habitats in the Sabana de Bogotá in the Cordillera Central of Colombia. My brief observations did not permit me to investigate the population ecology of *P. heterodermus,* but I will summarize some aspects of the general ecology of this species based on short-term field studies in 1973 and 1974.

The population I studied was located 6 km SW of the village of Tenjo, Departamento Cundinamarca, Colombia, at an elevation of approximately 2600 m. The habitat consisted of pasture broken by fence lines heavily overgrown with shrubby vegetation. The dominant shrub was a variety of "mora" (*Rubus* sp.) that grew in dense tangles up to ca 2 m in height. There were a few trees up to ca 8 m tall, but most of the shrubs were fully exposed to the sun. All of the lizards I saw were in this narrow strip of dense shrubbery, which was nowhere more than 3 m deep. My observations were made between 1100 and 1600 h on 18 and 19 August 1973 and from 30 August to 1 September 1974. I attempted to capture all lizards seen, which were then measured, marked, and released. Body temperatures and air temperatures (1 cm above perch, shaded bulb) were measured with a Schultheis thermometer.

The mean snout-vent length (SVL) of males in the sample was 63.4 mm; the mean SVL of females was 62.7 mm (Fig. 1). Examination of preserved specimens in the Museum of Comparative Zoology indicates that females reach sexual maturity at ca 55 mm SVL (size of smallest female with mature oviducal eggs). As is the case for many other mainland anoline lizards, the strong sexual size dimorphism characteristic of many West Indian anoles is absent in *P. heterodermus* (Andrews, 1979; Fitch, 1976). Lack of significant dimorphism may be due to a difference in foraging strategy. Observations of captive phenacosaurs indicate that they are searchers rather than sit-and-wait predators like most other anolines (Dunn, 1944; Kästle, 1965). Schoener (1969, 1977) predicted that sexual size dimorphism is less likely in predators that search for their prey than in species that wait for prey to appear and then pursue it.

Perhaps the most striking aspect of living phenacosaurs was the extreme color and pattern variation in the population. The phenacosaurs I saw did not change color or pattern, except for minor darkening when they were handled. Although Dunn (1944) and Osorno-Mesa and Osorno-Mesa (1946) reported that *Phenacosaurus richteri* (=*P. heterodermus*) is capable of color change, my observations suggest that the degree of such individual change is limited. The extraordinary range of colors and patterns in the population appears to represent polymorphism and intrapopulational variation.

The variation was complex. Both basic ground color and pattern seemed to vary independently and bore no apparent relation to sex. There were three basic ground colors, each present in approximately equal numbers in my sample: dark brown, tan, and green. Within each of these basic color categories individuals could show a dorsal pattern consisting of large lateral blotches (either red, dark brown, or black), or a midvertebral stripe (either brown or green; narrow or broad; with or without a contrasting border); some specimens were unpatterned. The venters ranged from green to brown to cream, with or without dark brown or bluish-grey mottling. Any combination of these colors and patterns seemed possible, and it appeared as though no two individuals shared the same pattern.

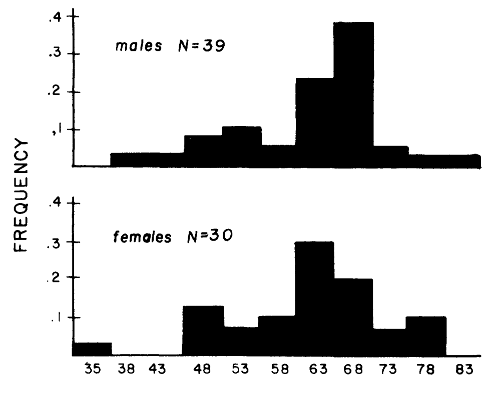

FIG. 1. Size-frequency distribution of *Phenacosaurus heterodermus.* Data from 1973 and 1974 combined. Females reach sexual maturity at 55 mm SVL.

The extraordinary range of color and pattern in the single population I observed is unrivalled by any other anoline of which I am aware. Since there are no closely related sympatric species, selection for species recognition signals involving color and pattern can be relaxed with no danger of mistaken identity. However, this species also exhibits considerable intrapopulational variability in scale characters (Lazell, 1969), which have no obvious adaptive significance. The great variability in pattern may be an individual recognition signal; even if it does not function as such for the lizards it may prove useful for herpetologists interested in carrying out extended field studies of this unusual lizard.

Phenacosaurs appeared to have two predator-avoidance responses. Immobility was the most frequent behavior. They generally made no attempt to move out of sight when approached and probably depend on their cryptic patterns to avoid predators. Some individuals first seen perched on exposed tree trunks lowered their bodies against the trunk, thereby decreasing their profile and becoming less conspicuous. The other avoidance tactic was falling. They did not leap, as many anoles do, but simply dropped off their

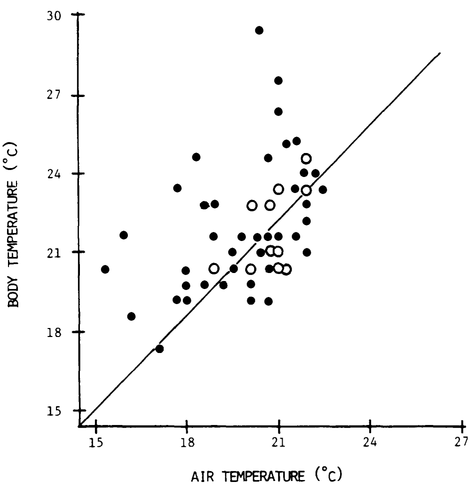

FIG. 2. Plot of body temperatures vs. air temperatures for *Phenocosaurus heterodermus*. Diagonal line indicates body temperature equals air temperature. Open circles indicate multiple observations.

perches and became lost in the thick tangle of vegetation below.

Phenacosaurs were seen most frequently on two types of perches; tree trunks (14% of 77 observations) and small twigs and branches (75% of observations). There were a few isolated observations of individuals on the ground (apparently in transit from one patch of bushes to another) and on barbed wire strung through the bushes between trees. Eighty-seven percent of the phenacosaurs were first seen within 1.2 m of the ground and 61% were on branches less than 2 cm in diameter. Their apparent preference for small diameter perches near the ground may be an artifact, as the vast majority of available perches fell within this range, but their preference for brushy thickets is probably real because tree trunks were not utilized unless there were bushes nearby.

Most of the observations were of lizards perched in more or less exposed positions. The tangled interior of the thickets was impossible to scan thoroughly and I suspect that a large proportion of the population could have remained hidden from sight at any given time. On 31 August 1974, 14 individuals were captured and marked by toe-clips but only 1 of 13 individuals captured the next day was marked. This low recapture rate was typical, and in the short time available it was impossible to estimate population density.

Temperature data were obtained from 63 individuals (Fig. 2), all assumed to be active at the time of capture. Although all temperatures were taken during midday hours when air temperatures were fairly uniform, body temperatures showed a wide range (17.1°–29.6°C). Phenacosaurs were never observed actively seeking basking positions; those individuals exposed to the sun when it appeared did not seek shade, and their body temperatures were as much as 6°C higher than those of adjacent individuals perched in the shade.

Phenacosaurus heterodermus appears to be eurythermic, with active body temperatures spanning at least a 12°C range. Despite the easy availability of basking sites when the sun was out individuals would not move even a few cm to take advantage of them, nor would they attempt to move into the shade if they were exposed to the sun. This apparent thermal indifference and the resulting eurythermy may be an adaptation for an environment that is thermally variable (Huey and Slatkin, 1976; Huey and Webster, 1975, 1976). The weather during the period of my observations fit this description as the periods of insolation were of short duration and sporadic occurrence. However, the weather I experienced may not be an accurate representation of the climate during the sunnier months and it would be interesting to compare their thermal strategies when insolation is more predictable.

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