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ON THE FREQUENCY AND EXTENT OF NATURALLY
OCCURRING FOOT INJURIES IN *TROPIDURUS*
TORQUATUS (SAURIA, IGUANIDAE)

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Non fatal injuries resulting in mutilation are a frequent occurrence in many lizards. A high proportion of individuals in many populations have lost and regenerated tails. In certain species, at least, some individuals survive despite the loss of toes which are not regenerated. This is not only of intrinsic interest but is of importance because the removal of one or more toes is a standard method of marking lizards for field identification.

A large series of *Tropidurus torquatus* in the Museu Goeldi collected by the Instituto "Evandro Chagas" in the vicinity of that city during 1962 and 1963, provided an opportunity to assess the frequency of missing toes in a natural population of lizards. I was able to examine these lizards through the kindness of the Director Dr. Dalcy Albuquerque and the curator of reptiles Oswaldo Rodrigues da Cunha. Toe damage and sex could be confidently determined in 164 of the lizards. A toe was considered damaged if the claw was missing and no distinction was made between cases in which only the claw and those where the whole toe was absent. No lizards with fresh unhealed foot injuries were included. The chi-square tests for significance and confidence intervals cited below were calculated for me by Dr. P. E. Vanzolini, Departamento de Zoologia, who also kindly read and commented on the manuscript.

Table 1 shows the position and extent of foot damage in the sample. Front feet are damaged about as frequently as are hind feet. The longest toes, toe III on front foot, toe IV on hind foot, are damaged somewhat more frequently than are the shorter toes. The position of the missing toes does not seem to be related to the size or sex of the lizard. The most frequent damage is the loss of a single toe, the most severe was the loss in one lizard of all the toes on both hind feet and 4 on one and 2 on the

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the latter difference is very close to this level. The differences between the small and intermediate females is not significant (5% level) but the difference between intermediate and large females is significant (1% level).

The confidence intervals (Table 2) show that though the differences between size class are real the samples are too small to give more than a very rough estimate of the frequency of damage in any one class.

In both sexes the difference between large and intermediate size classes is greater than between intermediate and small classes. This is true even though the large females are the same actual length as the larger intermediate males and have significantly more toe injuries (5% level). Apparently increased frequency of toe damage is not a function of size itself but more probably of age.

There seems to exist no correlation between sexual maturity and frequency. The smallest female with oviducal eggs is 65 mm long and the size above which all males show adult male coloration is 75 mm, in both cases well within the intermediate size classes.

Why toes are missing is unknown. Since frequency increases with size, many at least must be injuries acquired during life and not congenital deformities. Since they are about equally common in males and females and females show very little aggressive behavior they are probably not the results of intraspecific fighting.

There are no data to decide between the remaining possibilities: unsuccessful attacks by predators and accidents. Both may be factors.

That the largest lizards, both males and females, show a much greater increase in frequency of toe damage over the intermediate class than do the intermediate classes over the small classes is unexplained. It may be due to an increasing ability to escape from predators and accidents with only minor injuries rather than loss of life; to a marked decrease in growth rate when larger size is reached, combined with a long life span, so that large individuals have more time to accumulate injuries; or it may be that for some unexplained reasons large individuals are more frequently exposed to situations which result in foot injuries than are smaller ones.

The absence of one or more toes in between 30 and 40 percent of the large *Tropidurus torquatus* in a sample from a natural population shows that this is a quite common occurrence in this species and that many lizards survive successfully and grow to large size despite the damage which is sometimes much more extensive than any inflicted in marking experiments.

Table 2. Frequency of *Tropidurus torquatus* with missing toes

Snout-Vent Length	Males			Females		
	Total	With missing toes	95% Confidence Interval	Total	With missing toes	95% Confidence Interval
50-59 mm	5	0	0-52.2%	8	0	0-36.9%
60-69	10	1 (10.0%)	3-44.5%	23	1 (4.3%)	0.1-19.0%
70-79	19	2 (10.5%)	9.8% 1.3-33.1%	27	1 (3.7%)	0.1-21.9%
80-89	22	2 (9.1%)	1.1-29.2%	13	5 (38.5%)	13.9-168.4%
90-99	28	6 (21.4%)	8.3-41.0%			
100-113	9	3 (33.3%)	24.3% 7.5-70.1%			
Total	93	14 (15.1%)	11.8-41.2%	71	7 (9.9%)	