Bonn. zool. Beitr.	Jg. 36	H. 3/4	S. 513—515	Bonn, Oktober 1985

Microevolution of the lizard *Gallotia galloti* within the island of Tenerife

by

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Introduction

The geographic variation in the colour pattern of *Gallotia galloti* within the island of Tenerife has been recognised by several authors (Carnero & Perez Padron 1977; Bings 1980; Bischoff 1982). However, the nature of the geographic variation, that is whether it is clinal, categorical or mosaic etc. (Thorpe 1983), has not been critically studied but assumed to be categorical as reflected by the two subspecies recognised by Bischoff (1982).

The aim of this study is to critically consider the pattern of geographic variation in the scalation of *G. galloti* on Tenerife.

Materials and Methods

One hundred and eighty five lizards from seventeen evenly distributed localities were investigated (Fig. 1). The following meristic scalation features were recorded in the number of gular scales, collar scales, dorsal scales, ventral scales along the body, femoral pores and fourth toe lamellae.

Canonical variate analyses were carried out keeping the sexes separate. The pattern of geographic variation was elucidated by plotting the mean canonical variate score localities on the map and then contouring the surface change. Only the first canonical variates were used. The congruence between the pattern of geographic variation in males and females is taken as the correlation between group (locality) mean scores of the first canonical variate.

Results and Discussion

In both the canonical analysis of males and the canonical analysis of females the 'first' variate expresses almost all of the between-locality variation i.e. 99.9 %. There is statistically significant congruence ($r = 0.74$, $p > 0.001$) in the pattern of geographic variation between males and females. The canonical variate scores were subsequently standardized and combined on a 0 to 10 range and plotted on the map.

The change in scores over the area of the map is represented by contours at 2 unit intervals (Fig. 1). These contours reveal, what can broadly be described as, a north to south cline. At one extreme the 8—10 section of the range is remi-

niscent of the northers area occupied by Bischoff's *G. g. eisentrauti* (1982). However, to the south the scalation continues to change gradually over space so that the central and southern area is occupied by the 6—8 and 4—6 range and the extreme 0—2 range is found in the S.S.E. area around El Medano. It should be noted that the contours are not aggregated into a narrow band showing a sharp zone of transition between two racial categories.

Insofar at is goes the latitudinal pattern of geographic variation revealed in this study agrees with the north-south subspecies recognised by Bischoff (1982). However, the subspecies imply distinct racial categories, whereas this study reveals a more gradual, clinal, change. It should be remembered that the subspecies where largely based on colour pattern whereas this study is based solely on scalation. If the north-south differentiation is caused by primary differentiation of the populations in situ (Thorpe 1984a) in response to current selection pressures, then different character sets can have different patterns in response to different selection factors. There are very distinct climatic differences between the north and south of Tenerife which makes such an 'ecological' cause for the pattern, feasible. On the other hand, the transition could be caused by secondary meeting of previously separate populations. If this is the case then it is

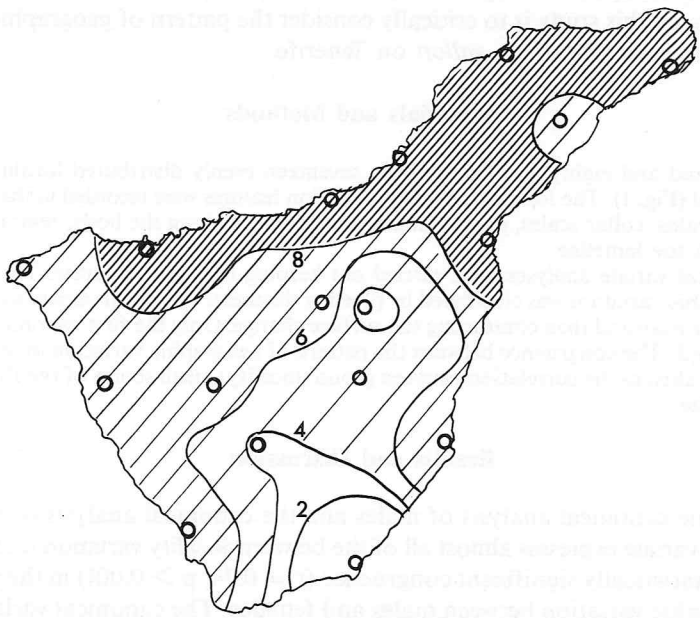

Fig. 1. Map of Tenerife showing latitudinal geographic variation in the scalation of *G. galloti*. The localities are indicated by open circles. The contours (levels 2, 4, 6 and 8) are based on the canonical variate scores expressing geographic variation in scalation on a 0 to 10 range (8—10 heavy shading, 6—8 medium shading. 4—6 light shading, 2—4 blank and 0—2 blank).

possible for the genes determining scalation to penetrate the transition zone if they are selectively neutral. This could result in a gradual transition in the scalation.

Two other explanations are also possible. First, the pattern depicted here could be unreliable. Second, the subspecies could simply reflect a sectioned cline, rather than genuine racial categories. This is a common problem with conventional subspecies (Thorpe 1980, 1984b). Recent studies by the authors indicate that altitudinal variation is superimposed on the latitudinal variation.

Zusammenfassung

Die geographische Variation von 6 Schuppenmerkmalen der *Gallotia galloti* von 17 Fundstellen der Insel Teneriffa wurde mit Hilfe der Kanonischen Varianzanalyse untersucht. Es besteht eine signifikante Übereinstimmung in der geographischen Variation der Beschuppung von Männchen und Weibchen. Die Abgrenzung der multivariaten Felder zeigt, daß die geographische Variation der Beschuppung einem Nord-Süd-Klin folgt.

Resumen

La variación geográfica de *Gallotia galloti* en Tenerife se investiga por análisis canónico de seis caracteres de las escamas observados en diecisiete poblaciones locales. Existe una congruencia significativa entre la variación geográfica de las escamas de los machos y de las hembras. Contorneando los resultados de los análisis de variables se demuestra que la variación geográfica de las escamas es una clina del norte al sur.

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