Vieraea 18: 99-102
Junio 1990

ISSN 0210-945X

Vocalization in *Crocidura canariensis* (Mammalia: Soricidae)

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(Aceptado el 18 de Noviembre de 1987)

HUTTERER, R., & LÓPEZ-JURADO, L. F., 1990. Vocalization in *Crocidura canariensis* (Mammalia: Soricidae). *Vieraea* 18: 99-102

ABSTRACT: Defence calls of Crocidura canariensis were recorded and analyzed. The calls are high-pitched and show a tonal structure with a mean frequency of 15.4 kHz, thus differing considerably from the homologous calls of C. russula from Europe. Rather, the call structure of C. canariensis is in good accordance with certain West African species of Crocidura. These findings support the specific distinctiveness of the Canary shrew and point to an African origin of the species.
Key words: Soricidae, Crocidura canariensis, call structure, systematics.

RESUMEN: Los sonidos defensivos de Crocidura canariensis fueron registrados en cautividad y analizados. Estos sonidos son de alto tono y muestran una estructura tonal con una frecuencia media de 15.4 kHz; diferenciandose así de los sonidos homólogos de C. russula de Europa. Por el contrario hemos comprobado que le estructura de éstos sonidos de C. canariensis son más acordes con los de ciertas especies africanas del mismo género. Estos resultados apoyan la diferenciación específica de la musaraña canaria y señalan hacia un origen africano de ésta especie.
Palabras clave: Soricidae, Crocidura canariensis, sonagrama, sistemática.

INTRODUCTION

The recent discovery of shrews in the Canary Islands (LOPEZ-JURADO 1984; MARTIN, HUTTERER and CORBET 1984) at once raised the question about their origin: were they introduced into the islands by man, or do they represent a native species? MARTIN, HUTTERER and CORBET (1984) argued that the shrews were not a recent introduction but may have reached the islands sometime since the Pleistocene, and

they were tentatively identified with the Northern African subspecies of Crocidura russula (Hermann), to which they are very similar in external and cranial morphology. However, a subsequent study of the karyotype, behaviour, reproductive biology (HUTTERER, LOPEZ-JURADO and VOGEL 1987), and a complete revision of the Northern African taxa of Crocidura (HUTTERER 1987) revealed that the species determination was not correct: the Canary shrew could not be identified with C. russula, nor with any other species known from Europe or Africa. Crocidura canariensis, as it was consequently named, must therefore be considered a native mammal of the Canary Islands, and apparently is the only native land mammal that has survived until Present.

As the call structure has been found to be a useful taxonomic character in African Crocidura (HUTTERER and VOGEL 1977), it was planned to include into our study of C. canariensis also an analysis of the vocalization. However, a pair of shrews kept and observed by R. H. for one year did rarely vocalize and it was not possible to record a single sound. This was different in other animals recently observed in captivity at Las Palmas and Bonn. These shrews did vocalize although their calls were of low intensity. As a supplement to the previous study (HUTTERER, LOPEZ-JURADO and VOGEL 1987), this note presents the first analysis of the call structure of C. canariensis, and a discussion of its systematic implications.

MATERIALS AND METHODS

Observations were made on a laboratory colony of C. canariensis, for which parental animals were live-trapped in 1985 near Tiscamanita, Fuerteventura. A juvenile pair was brought to Bonn in March 1987 and sound recordings were made during three consecutive nights. A tape recorder Uher Report 4200 Stereo and a directional microphone Sennheiser MD441N were used. Registration speed was 19 cm per second, and registration distance 25 cm. The recordings were then transmitted with a quarter of the original speed to the sonagraph; this procedure allowed the analysis of frequencies up to 28 kHz. Sonagrams were made by use of a Voiceprint Model 4691A in wide band display (300 Hz). Parameters taken from the sound spectrograms were mean frequency (kHz) and call duration (milliseconds). Sound recordings of C. russula (from Bonn, Germany, recorded July 1976) were used for comparison as well as the recordings of African species published by HUTTERER and VOGEL (1977).

RESULTS AND DISCUSSION

The main vocalization of C. canariensis is a rather faint and high-pitched defence call (Fig. 1). It is uttered by the submissive animal during aggressive encounters. Compared to other shrews, these sounds are of low intensity. It seems also that young shrews tend to vocalize more readily than adults.

The defence call is composed by two structural units: a very short and noisy sound with a frequency range from 4 to 24 kHz, followed by a long and narrow frequency band; the overall range of the second unit is 8 to 19 kHz but within one call the variation does not exceed an interval of 7 kHz. The mean frequency of 20 calls was 15.4 ± 1.5 kHz, and the mean call duration 66.9 ± 27.8 ms (range 35 - 150 ms). The long frequency band is only slightly modulated; harmonics are intimated in the initial part of the call (as in Fig. 1) but are lacking in most calls.

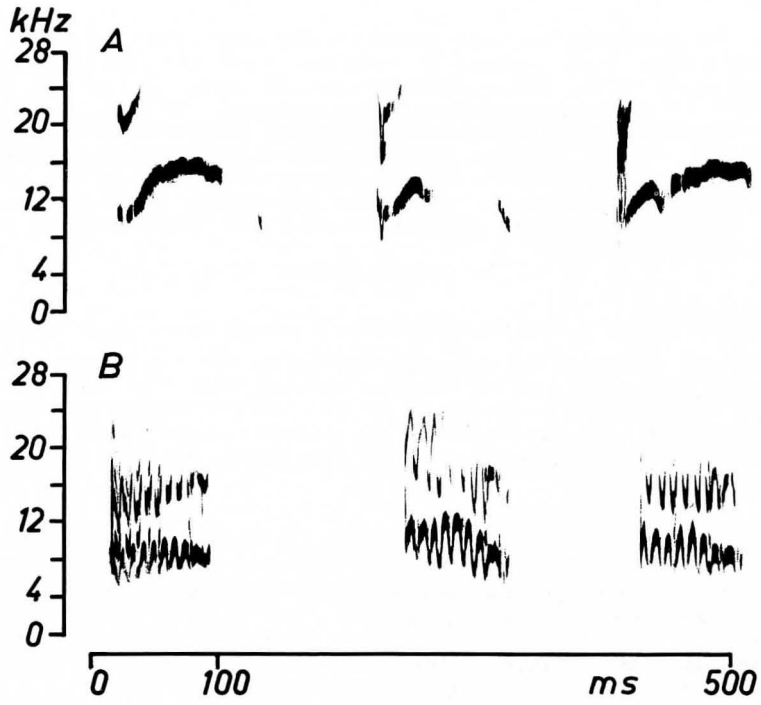

Fig. 1. Sonagrams of three defence calls of Crocidura canariensis (A) and of C. russula (B). In both cases a female shrew was oppressed by a male.

Besides the defence calls, two other vocalization types were heard but not recorded: (A) twittering sounds from shrews exploring an unknown territory and (B) chirps or whistles from nestlings. Other vocalization types certainly exist but have not been studied in detail yet.

In Fig. 1 three examples of the defence call of C. canariensis are confronted with three calls of C. russula. It is evident that the calls of both species differ in frequency modulation (single versus multiple and periodical), structure (one narrow frequency band versus harmonic composition), mean frequency (15.4 kHz versus 11.8 kHz) and mean call duration (66.9 ms versus 108.5 ms; data for C. russula from HUTTERER et al. 1979). Simplified, the call of C. canariensis may be described as 'IΩ', and that of C. russula as 'MMM'.

Unlike the calls of C. russula those of C. canariensis are composed of two structural units, as shown in Fig. 1. Similar structures have been found in three species of Crocidura from Ivory Coast, C. jouvenetae Heim de Balsac, C. theresae H. de B., and C. wimmeri H. de B. and Aellen (HUTTERER and VOGEL 1977). These species occur in the tropical savanna of West Africa. Some calls of C. theresae and C. wimmeri are very similar to those of C. canariensis in Fig. 1.

The analysis of the call structure supports the previous conclusion that C. canariensis is a species different from C.

russula. In addition we now hypothesize that the ancestor of C. canariensis came from a stock of tropical West African species. This group includes also three species which today occur in Western Sahara and in southern Morocco: C. lusitania Dollman, C. tarfayaensis Vesmanis and Vesmanis, and C. viaria (Geoffroy). Two of them, C. lusitania and C. viaria, have a wide distributional range from southern Morocco to Eastern Africa, where they live in dry savanna. Looking at their range it is easily imaginable that the ancestor species of C. canariensis once came via the West African savanna into the Canary Islands.

ACKNOWLEDGEMENTS

We are grateful to Susanne Lenné for her assistance with the sound recording, and to Dr Gustav Peters for his help with the analysis. This work is included in the CAICYT subproject no. 608-211: "Evolucion en condiciones de insularidad: islas y lagunas endorréicas espanolas" developed by the Museo Nacional de Ciencias Naturales of Madrid.

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