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REDESCRIPTION AND CHOROLOGY OF *DENDROBAENA LUSITANA* (OLIGOCHAETA: LUMBRICIDAE) IN MACARONESIA *

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With 1 figure

ABSTRACT. The main morphological features of *Dendrobaena lusitana* GRAFF, 1957 are examined here, including a number of important new findings as regards the reproductive apparatus. Hitherto unplublished data on ecology are also given. The species is recorded for the first time from Madeiran Archipelago, and thus its distribution area in the central-western enclave of Macaronesia is increased.

RESUMO. No presente trabalho são analisadas as principais características morfológicas de *Dendrobaena lusitana* GRAFF, 1957 e descritas algumas descobertas relativamente ao seu aparelho reprodutor. Dados inéditos e colhidos até à data são também publicados. A espécie é assinalada pela primeira vez para o Arquipélago da Madeira, sendo assim alargada a sua área de distribuição na Macaronésia.

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INTRODUCTION

During studies of the different biotopes of Madeira and the Canary Islands, the present author has collected earthworms in large numbers, and in particular 18 specimens of lumbricids attributed to *Dendrobaena lusitana*, a species described by GRAFF (1957, p. 303) on the basis of one sole adult specimen from Oeiras (Portugal).

To date, and despite other subsequent recordings (BOUCHE, 1973; TALAVERA, 1987; TRIGO et al. 1990) no new description of *D. Lusitana* based on a large number of specimens has been published. This fact, together with the dearth of bibliographical references concerning the distribution of the species in Macaronesia, motivated the present research, in wich priority has been given to taxonomic and chorological aspects.

Material and Methods

The 18 specimens wich served as the basis for the present paper came from samples located in only 6 sites (see material examined) of the 600 prospected over the last decade the length and breadth of the Madeiran and Canarian Archipelagos.

The methodology for the collection and handling of the earthworms and of the soil samples where they were found was described in detail in TALAVERA (1987). The protocol drawn up includes the redescription of *D. lusitana* together with some ecological and chorological considerations based on the results obtained and the bibliography consulted. Details of the material examined include references to the site of origin, Universal Transverse Mercator (coordinates U.T.M.) of 1x1 km, date of sampling, and number of specimens collected.

Results

Family: Lumbricidae RAFINESQUE-SCHMALTZ, 1815

Género: Dendrobaena EISEN, 1874

Dendrobaena lusitana GRAFF, 1957

(Fig. 1)

Description. - Subcylindrical body with deep reddish pigmentation which takes on gradually paler tones towards the ventral area. Length 19-26 mm, mean 20.91 mm. Diameter 1-1.17 mm. Average number of segments in adults was 90, each with four pairs of widely-paired setae. The distance between the setal lines **ab** was generally greater than that of the **cd** lines. Nephridiopores all situated at same level and arranged in rows near the setal lines **b**. Slightly rounded epilobic prostomium and tiny mouth opening. Dorsal pores and genital markings absent. Female pores imperceptible. One pair of male pores setae **bc** of segment 15, lacking glandular lips and closer to setae **b**. Voluminous saddle-shaped clitellum with no tubercula pubertatis and always taking up segments (1/n 21), 21-27; shows intersegmentary furrows, neprhridiopores and setae wich seem rather more swollen than the others.

First septum on 4/5, and posterior septa show very little swelling. Very small and

adiverticulated calciferous glands in segment 10 and a large one with lamellae in 11. Crop in segments 15-16, and bilobulated gizzard in 17-18. Simple typhlosole. Whitish seminal funnels, two pairs, wich are projected from segments 11 and 12 and cover most of 10 and 11. Seminal vesicles in 11 and 12, anterior pair markedly smaller than posterior pair. Spermathecae absent. Ovaries and ovaric funnels in segment 13, and one pair of ovisacs on 14.

Collecting sites.- MADEIRA: Queimadas, 28RCV2130, 3-X-1992, 3 specimens (2 adults). TENERIFE (Canarias): Barranco Hondo, 28 RCS6842, 3-X-1982, 1 specimen adult; Cuadras de Don Benito, 28 RCS7357, 3-VI-1982,1 specimen adult; Barranco Hondo, 28 RCS6942, 6-III-1983, 1 specimen immature; Palo Blanco, 28 RCS4437, 5-III-1985, 9 specimens adults. LA PALMA (Canarias): Barlovento, 28RBS2692, 17-XII-1983, 1 specimen adult; Cumbre Nueva, 28RBS2376, 4-IV-1985, 2 specimens (1 adult).

Remarks.- This species is a typical epigeic species of the subhumid mountain zone where it was located beneath the laurel forest and heather *(Erica arborea)* leaf-litter compost. It shares its ecological niche with *Allolobophora rosea rosea* (SAVIGNI, 1826), *Dendrobaena byblica* (ROSA, 1893), *Dendrobaena cognetti* (SAVIGNI, 1826), *Eisenella tetraedra* (SAVIGNI, 1826), and Lumbricus rubellus (HOFFMEISTER, 1843). Coexistence would appear to cause problems of competitiveness, in wich *D. lusitana* comes off second best and thus its relative scarcity in the study area could be due to the considerable selective pressure to wich it is subject by species exploiting the same resources and which are more plentiful in the area.

D. lusitana is thought to be present in significant numbers in dark microhabitats with vegetable remains, in northern and north-western parts of Madeira and the Canary Islands, at altitudes of between 500 and 1.100 metres. Its presence in a garden at 150 m above sea level (Barranco Hondo) is purely accidental and in all likelihood was transported there by man among mountain soil which is regularly added to the soil of the southern side of Tenerife to enhance its fertility.

Most of the soils inhabited by *D. lusitana* present high relative humidity (above 19%), wich is indicative of the species water requirements; the soils also tend to be well oxygenated neuter soils (pH of between 6.4 and 7.3) with an abundance of organic matter. In Queimadas (Madeira) for example, the percentage was aproximately 11.4% while in Palo Blanco (Canaries) it was as high as 17%. BOUCHE (1973) cited *D. lusitana* in Monte de las Mercedes (isle of Tenerife), although he did not furnish autoecological data and hence the details given here are completely new.

As regards geographical distribution, *D. lusitana* is known only from Portugal and Macaronesia, where it has been found on Tenerife (BOUCHE, 1973; TALAVERA & BACALLADO, 1983), has well as on La Palma and Madeira, where the species has been recorded for the first time. This represents not only a new finding but also means that its current area of distributuion is enlarged considerably.

Discussion

A comparison of the results countained in the present paper and those obtained by

GRAFF (1957) reveals that the Canarian specimens are larger (19-26mm) and have more segments (91-94) than the adult on which the original description of *D. lusitana* was based; however, the differences cannot be viewed as being relevant given that, as TRIGO (1987) rightly indicates, the description in question may well have been based on an amputated off specimen, which would not have been very representative as regards length (a mere 18 mm) and number of segments (just about 60). It is worth stressing that there was a great deal of coincidence between the Canarian specimens and those collected in Portugal (TRIGO, op. cit.). There is no mention of a seminal funnel in the original description, whereas in the material examined we detected two whitish pairs that pushed septa 10/11 and 11/12 forward, taking up part of segments 10 and 11. The initial position of the funnels appears to be in 11 and 12, respectively, which is rare in Lumbricids. Moreover, the original description refers to the presence of a large calciferous gland in segment 10 and another small one in 11 (early stage of development?). In the Canarian specimens this was found to be the other way round.

From the results obtained and the bibliography consulted it can be deduced *that D. lusitana* is found in only a few parts of the world, namely, in some specific areas of Macaronesia (BOUCHE, 1973; TALAVERA & BACALLADO, 1983) and south-east and south-west Portugal (GRAFF, 1957; TRIGO et al., 1990) where, according to the last authors in question, it inhabits meadows, edges of streams, alder groves, and near deciduous trees. This contrasts starkly with the microhabitats chosen by the species in Madeira and the Canaries, where it is generally found in areas where perenial vegetation predominates.

OMODEO (1962) includes *D. lusitana* among European paleoendemism, as he does *Allolobophora moebii* (MICHAELSEN, 1895) and *Dendrobaena madeirensis* (MICHAELSEN, 1891), although these two latter species could well be considered being representative of the autochtonus fauna of Macaronesia. In the case of *D. lusitana*, given that it is found in only very feew places in the world it is quite possible that it represents the vestiges of a fauna which survived the geological upheavals which occurred in Europe from the Tertiary period onwards, which would explain the fragmentary nature of its distribution and may be the role that Macaronesia played as a geographical refuge which managed to preserve a unique vegetation, namely, "laurisilva" (Pruno-Lauretalia order). Another question which proves difficult to solve is that of how *D. lusitana* was introduced in Madeira and the Canaries. For the time being, the present author, albeit with some reservations, rules out the transportation routes used by man in his trade (export-import) links with Portugal as a possible means of dispersion. These routes were much more widely-used within the Iberian Peninsula and yet the distribution of the species is limited to the areas mentioned in the present paper.

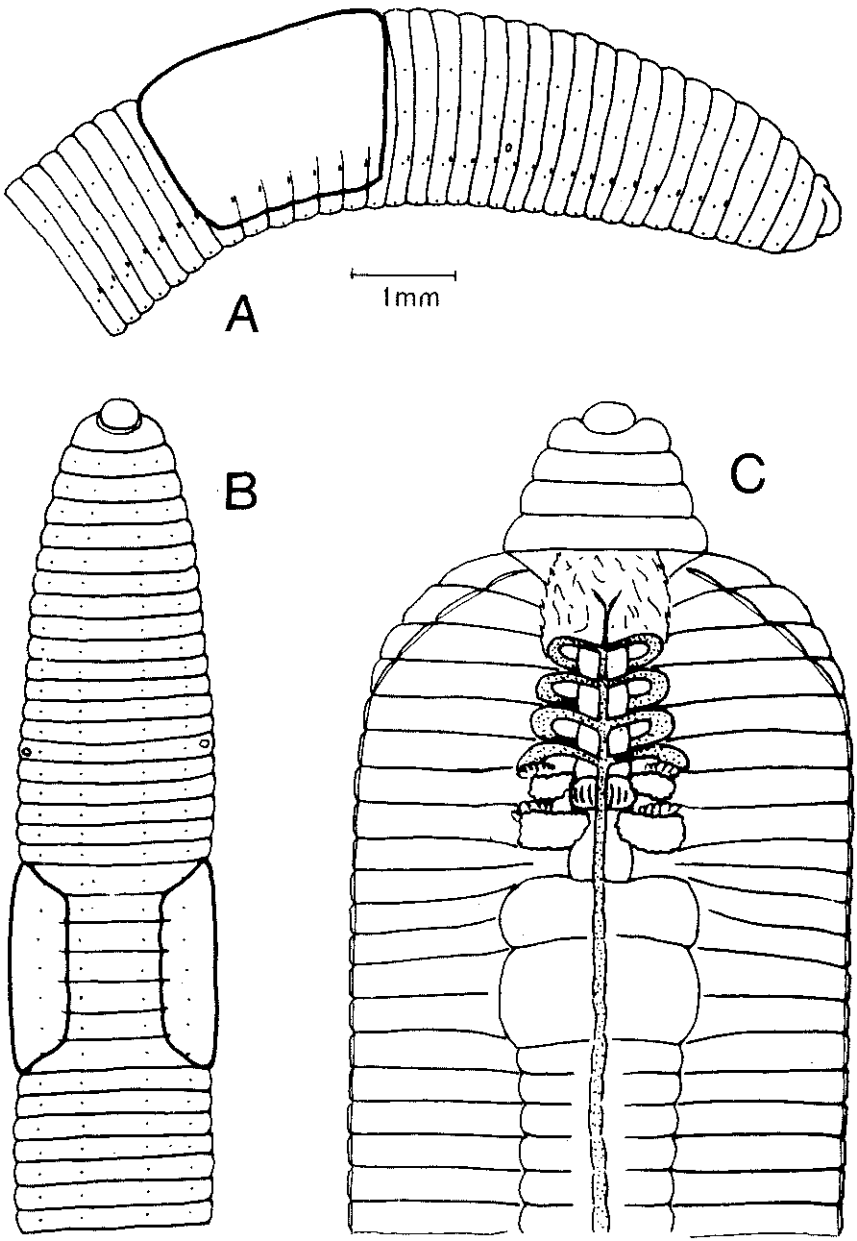

Figure 1 - *Dendrobaena lusitana*. External morphology (A= lateral view; B= ventral view). General dissection (C= anterior region).

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