

Lovenula (Neolovenula) alluaudi (Guerne and Richard, 1890) in the Canary Islands (Copepoda: Calanoida: Paradiaptominae)

Stygofauna of the Canary Islands, 19

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Abstract

Lovenula (Neolovenula) alluaudi is widespread on Lanzarote, where it occurred at 22 of the 105 stations. On Fuerteventura it was found at only 2 of the 53 stations, both in the extreme north-west part of the island. It was also found in a reservoir on the south side of the small island of Alegranza. Samples collected at several hundred stations in the other Canary Islands failed to yield a single calanoid, supporting the belief that the eastern islands are fragments of the African continent that drifted to deeper waters.

Males outnumbered females in about 2/3 of the samples, often heavily.

Résumé

Lovenula (Neolovenula) alluaudi est largement répandue à Lanzarote, étant trouvée à 22 des 105 stations échantillonnées. A Fuerteventura, l'espèce a été trouvée dans seulement 2 des 53 stations, les deux à l'extrémité nord-ouest de l'île. Elle a été capturée aussi dans un réservoir d'eau à la partie méridionale de la petite île Alegranza. Aucun Calanoïde n'a été trouvé dans des centaines de stations échantillonnées dans les autres îles des Canaries, ce qui fait penser que les îles orientales sont des fragments du continent africain déplacés vers des eaux plus profondes. Dans environ 2/3 des échantillons, les mâles dépassent en nombre – souvent très nettement – les femelles.

Introduction

In May 1985, as part of a planned survey of the groundwater fauna of the Canary Islands, samples were taken of the groundwater on 3 of the eastern islands, Graciosa, Lanzarote, and Fuerteventura,

by Jan H. Stock and Brigitte L.M. Rondé-Broekhuizen, of the Institute of Taxonomic Zoology, University of Amsterdam. Details of the collection methods and station locations are given by Stock & Rondé-Broekhuizen (1986). The calanoid copepods from these samples were sent to me by Prof. Stock for study. One sample from Lanzarote (Sta. 85–88) has been deposited in the Smithsonian Institution (USNM 242456); the remainder has been returned to Amsterdam.

Results

A single species of calanoid was collected, *Lovenula (Neolovenula) alluaudi* (Guerne & Richard, 1890). It was most common on Lanzarote, where it was taken at 22 of the 105 stations occupied. The positive stations were widely scattered over most of the island (fig. 1). All were wells or cisterns, 18 of them covered. Depths to the water surface in the wells ranged from 0.2 to 11 m, and water depths in the wells ranged from 0.25 to 4.75 m. Water temperatures ranged from 16.1°C to 27.9°C, and measurements of conductivity were from 0.252 to 17.16 mS/cm.

On Fuerteventura *L. (N.) alluaudi* was found at only 2 of the 53 stations, both in Tostón, on the northwest coast of the island. One station was the cistern of Faro, with a salinity of 1‰; the other was an open well near the seawater distillation plant. The salinity in the well water was 32‰. I



Fig. 1. Lanzarote and Graciosa showing locations of groundwater samples collected in 1985. Open circles, samples containing *Lovenula (Neolovenula) alluaudi*. Solid circles, other samples. Star, type locality of *L. (N.) alluaudi*

questioned this because this was a surprisingly high salinity for a diaptomid copepod, but Prof. Stock assured me that it was correct.

On the small island of Alegranza, which lies about 15 km north of Lanzarote, *L. (N.) alluaudi* was collected in January 1986 from a man-made reservoir with a rain catchment, maximum depth 2 m, on the south side of the island. The conductivity was 2.38 mS/cm.

Discussion

The distribution of *L. (N.) alluaudi* is summarized by Dussart (1967) as “relatively rare and circum-Mediterranean, it has been observed in the Canary Islands, Morocco, Egypt, Syria, in the Balkans, in Romania, in southern Hungary, in Spain (up to the Ebro River), and in Portugal” (my translation). It also has been found in the central Sahara of Algeria, near the Tropic of Cancer (Kiefer, 1958a,b) and in

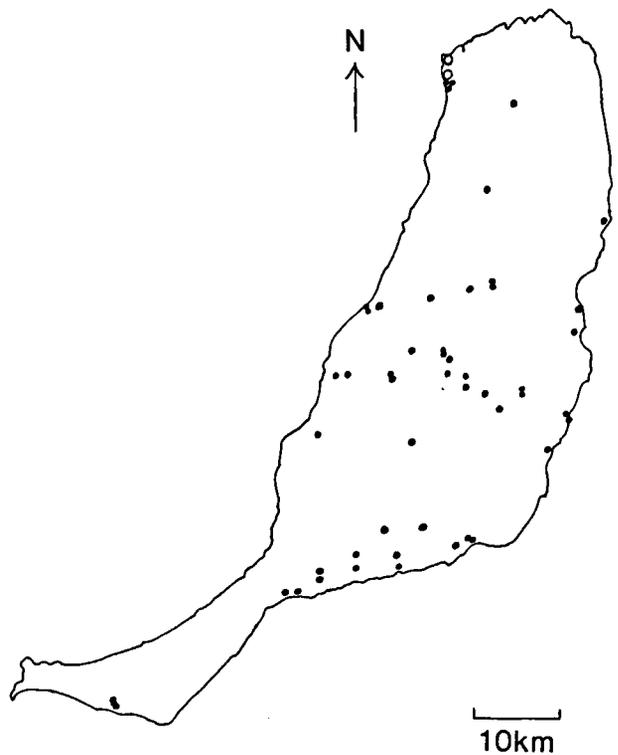


Fig. 2. Fuerteventura, showing locations of groundwater samples collected in 1985. Open circles, samples containing *Lovenula (Neolovenula) alluaudi*. Solid circles, other samples.

the Ennedi Mountains of northeast Chad (Dussart, 1968). A map showing its known distribution is given by Kiefer (1958a). The type-locality on Lanzarote, shown in Fig. 1, is a freshwater reservoir in Teiguise (Guerne & Richard, 1890).

Subsequent to the 1955 survey, in 1986/87 hundreds of groundwater samples were collected in most of the other Canary Islands, but not a single calanoid was found in them. Evidently *L. (N.) alluaudi* occurs only on the eastern group of islands (“Purpuraria”) and is not found on the western islands (“Macaronesia”). This distribution supports the proposition, discussed by Stock & Broekhuizen (1986), that the eastern islands are fragments of the African continental plate, whereas the western islands arose *de novo* from the oceanic crust by volcanic activity. *Lovenula* must have inhabited the East Canaries block before its detachment. Separation may have occurred during the initial rifting between North America and Africa in the mid-Trias-

Table I. Sex ratios of *Lovenula* (*Neolovenula*) *alluaudi* in the Canary Islands

Lanzarote Station	N	% ♂
85-66	1	100
85-68	4	75
85-69	2	50
85-70	3	0
85-71	5	60
85-74	1	100
85-88	392	82
	119	85
85-89	137	85
85-90	41	90
85-91	11	100
85-92	9	78
85-93	15	80
85-94	4	75
85-140	2	50
85-143	14	36
85-144	10	50
85-145	6	67
85-146	83	43
85-147	46	48
85-149	17	59
85-150	11	27
Fuerteventura		
85-267	6	100
85-268	15	80
Alegranza		
85-583	80	31

sic, or more probably in the early Cenozoic (Dietz & Sproll, 1970).

An unexpected finding was the high proportion of males in the samples, summarized in Table I. Males outnumbered females in 14 samples, females were more numerous in 5. In large samples ($N > 40$), males made up an average of 85.5% in the 4 samples in which they predominated. In the 2 samples with more females, the males averaged

45.5%. This preponderance of males is surprising because in most populations of calanoids the numbers of females equal or surpass, sometimes greatly, the numbers of males. A possible explanation is that in the groundwaters sampled via the wells that reached them, males do not predominate, but in search of mates they swim more actively than the females and thereby enter the wells in greater numbers.

Acknowledgments

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