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Compass orientation of *Lycosa tarentula fasciiventris* nests in central Spain

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Introduction

Spiders of the species *Lycosa tarentula fasciiventris* Dufour build tubular nests in the soil with a certain slope in relation to the surface, and with an opening to the exterior. This opening may sometimes be surrounded by a cylindrical structure built in the upper part of the nest using fine material such as silk and grass (Fig. 1; Ortega, 1986).

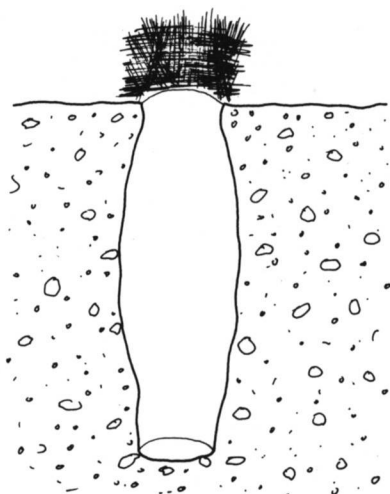


Fig. 1: Schematic drawing of a *Lycosa tarentula fasciiventris* nest.

The depth and diameter of these nests have been described by Ortega (1986), calculating the correlation coefficients between the product of the width and length of the prosoma as a body parameter of the spider and the depth and diameter of the nest. However, in this previous study compass orientation was not considered. This parameter could be important in the biology of the spider. Humphreys (1987b) has shown that *L. tarentula* (Linn.), studied in northern Greece, modifies its position within the nest according to the ambient temperature. The compass orientation of the nest could modify the amount of insolation that the nest (and the spider) receives during the day and therefore, the temperature range found inside it.

In this paper we present the results of a study of the compass orientation of a population of 34 nests of adult individuals of *L. tarentula fasciiventris* in the central region of Spain.

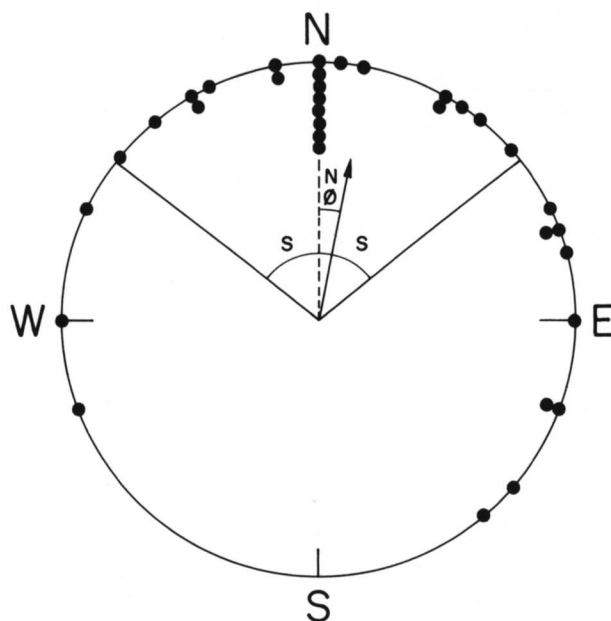


Fig. 2: Orientation of nests with a deviation (s) of 52.71° from the azimuth to the left and the right. Each dot corresponds to one nest. The arrow indicates the mean vector being the length (r) = 0.57 and the mean angle from the azimuth (θ) = 13.00° .

Material and methods

Nests were measured at Sierra de Guadarrama (Central Spain), 15 km north of Madrid during July-August 1987. The present study was carried out on a total of 34 nests of adult *L. tarentula fasciiventris*. We measured the compass orientation for each nest by inserting a cylindrical rod 26 cm long and 0.5 cm in diameter down the nest, and measuring the clockwise angle (0-360°) from magnetic north (azimuth), using a magnetic compass.

Since this variable is circular, the mean vector (r , θ) and the angular deviation (s) have been calculated (Batschelet, 1981). The Rayleigh test (Mardia, 1972) was carried out to determine whether there is a preferred direction.

Results

The analysis of the variable gives the following results (Fig. 2): the mean vector (r , θ) = (0.57, 13.0°) and the angular deviation s = 52.71°. With n = 34, r = 0.57 and a level of significance α = 0.05 we therefore reject in the Rayleigh test the hypothesis of random direction of orientation with p < 0.001. This shows that there is a single preferred compass orientation towards the north.

Discussion

It seems that at least during the months of July and August there is a preferred compass orientation towards the north. We would like to emphasise that only five nests of the total sample showed a compass orientation towards SW or SE, i.e., the orientations with higher insolation characteristics. We consider that the absence of an important number of nests oriented towards the south is probably an additional mechanism of temperature regulation besides those described previously for lycosids (Humphreys, 1987a, b).

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