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NOTA BREVE:

Abnormalities in some species of oribatid mites (Acari, Oribatida) from Burgos (NW Spain)

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Abnormalities in some species of oribatid mites (Acari, Oribatida) from Burgos (NW Spain)

Julio Arroyo & Juan Carlos Iturrondobeitia

Abstract:
During a survey of soil systems of NW Spain, some abnormalities were observed in adult oribatid mites. They appeared in individuals belonging to *Zygoribatula hispanica* Subías *et* Arillo, 1998, *Neoliodes theleproctus* (Hermann, 1804) and *Oribatula tibialis* (Nicolet, 1855), and affected external structures (sensilla, rostral setae and anal setae). The number of aberrant individuals was very small. The abnormalities are described here.
Key words: abnormalities, Acari, oribatids, Spain.

Anomalías en especies de oribátidos (Acari, Oribatida) de Burgos (Noroeste de España)

Resumen:
En una investigación llevada a cabo en sistemas edáficos del noroeste español, se observaron algunas anomalías en ácaros oribátidos adultos. Dichas teratologías aparecieron en individuos de las especies *Zygoribatula hispanica* Subías *et* Arillo, 1998, *Neoliodes theleproctus* (Hermann, 1804) y *Oribatula tibialis* (Nicolet, 1855) afectando estructuras externas (sensilos, setas rostrales y setas anales) El número de individuos aberrantes fue muy escaso. Las anomalías son descritas en esta nota.
Palabras clave: anomalías, Acari, oribátidos, España.

Introduction

Teratology is the science concerned with malformations or teratogenesis (abnormalities or deviations from the normal). In other words, clear teratologies are an obvious abnormality, i.e. anything that extends beyond normality Many authors have previously recorded abnormalities among the Phylum Arthropoda with temperature effects being a well known causative factor of these morphological anomalies. Caballero & Iturrondobeitia (2000) summarized information on abnormalities in mites, using the works of Grandjean (1971, 1973, 1974) on malformations observed in *Heminothrus (Platynothrus) peltifer* (Koch, 1839) during its ontogenetic development as a source of their research. Grandjean distinguished the term of "*écarts*" within "*vertitions*"as changes due to the presence or absence of structures with an evolutionary significance and "*anomalies*" as duplication setae or loss of structures, among others.

This note describes abnormalities found in oribatid mites from edaphic systems of Burgos province (Spain). The objectives were to report on abnormal specimens.

Material and methods

In spring and autumn of 2000, 20 sampling plots with different land use types (e.g., crop land and pasture), were sampled. The biota was collected using Berlese´s funnels with soil samples of 1000 cc per plot. They were taken at 5 cm depth using a soil corer. The arthropods were stored in 70 % ethanol or slide-mounted using Hoyer´s medium. The oribatids were all identified to species level.

Results and discussion

A total of 2.543 adult oribatids were collected in the study and, of these, only three showed abnormalities (0.117 %). The malformations are described as follows:

Neoliodes theleproctus (Hermann, 1804): one individual out of three. collected in pasture had an extra seta an $_{x}$ anterior to the position of an $_{1}$ on the right valve of the anal plate, i.e., 4 + 3 anal setae.

Oribatula tibialis (Nicolet, 1855*)*: one individual from an abandoned crop land of *Hordeum vulgare*, out of a total of 126 specimens collected in several land types, had one median rostral seta (*ro*) instead of the usual pair of setae had one median rostral seta (*ro*). This could have been due to an ontogenetic fusion process of both setae (Fig. 1).

Zygoribatula hispanica Subías *et* Arillo, 1998: one individual from a pasture, out of a total of 193 specimens collected in several land types, had a filiform sensillus (*ss*) on one side and a normal clavate on the other (Fig. 2)

As seen in *N. theleproctus,* variation in anal setation is commonplace in oribatid mites and has been described in many papers i.e. Fujikawa (1983) or Baran & Ayyildiz (2000) reported several abnormalities (extra setae and asymmetry) of anal and adanal setae in the species *Rhysotritia ardua* (C.L. Koch, 1841) collected in Turkey.

The abnormality in *N. theleproctus* expresses an asymmetry which is not a new phenomenon among oribatids even if it is a rare one, e.g., in the description of *Ameronothrus dubinini* Sitnikova, 1977, a setation asymmetry has been established. This species normally has 4 or 5 pairs of setae on the anal plate (Sitnikova, 1977) instead of the generic 2-3 pairs.

In a paper about the distribution and ecology of *A. dubinini* in Finland (Laine et al., 1988), an asymmetry in the anal plate is shown, although the authors do not refer to this in the text. The asymmetry consists of an anal plate with 3 + 4 setae. This asymmetry looks similar to that which we observed in *N. theleproctus*.

Although both examples are the same in the external appearance, in our specimen we think that the asymmetry represents a gain of a seta by an addition processes in comparison with the normal formula of the genus. However, we do not know if the extra seta was present in the pre-adult stages.

The abnormalities found in *O. tibialis* and *Z. hispanica* are more interesting to be described but as well as in *N. theleproctus*, we have no certain knowledge if the abnormalities existed in the immature instars of the individuals and we have not found similar abnormalities in previous reports.

Behan-Pelletier (*com. pers*.) reported unusual lamellar structure on *Diapterobates siccatus* Behan-Pelletier, 1988 and possible fusion of some prodorsal setae in other species (data not published).

Moraza (2004) describes setation changes during the ontogenic development of Mesostigmata mites, making reference to extra setae or deletion of setae in the ontogenic processes in this suborder. The author (*com. pers*) reports that the absence and/or the duplication of setae at the end of the development process are relatively common in some Gamasida groups, producing an asymmetry.

To see if the abnormalities we observed in the current study are the result of addition or suppression processes, ontogenic studies must be undertaken, but we do not have the relevant juvenile stages for such an examination.

Gross abnormalities in Acari have been attributed to temperature (e.g., Southcott, 1997) and humidity (Buczek, 2000). However, we think that no such environmental factors caused the abnormalities due to their low frequency and the uniform seasonal climatic factors in the area where the mites were collected.

All aberrant individuals are deposited in the Department of Zoology and Animal Cellular Biology, University of Basque Country.

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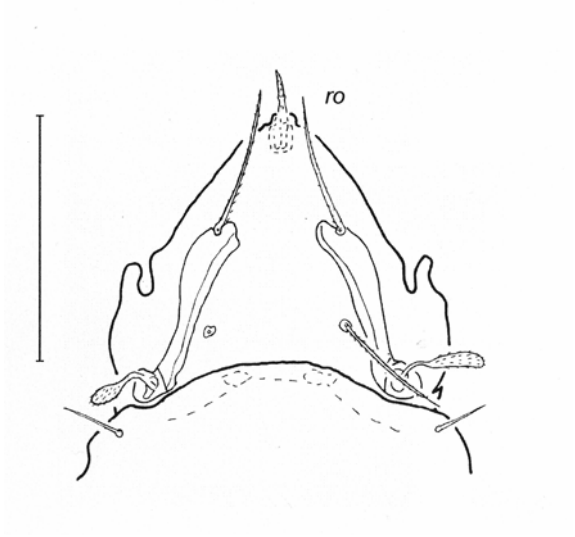


Fig. 1: *Oribatula tibialis* (Nicolet, 1855). Single rostral seta (*ro*) placed in a middle position. Scale lines: 100 µm.
Fig. 1: *Oribatula tibialis* (Nicolet, 1855). Única seta rostral (*ro*) en una posición mediana. Escala: 100 µm

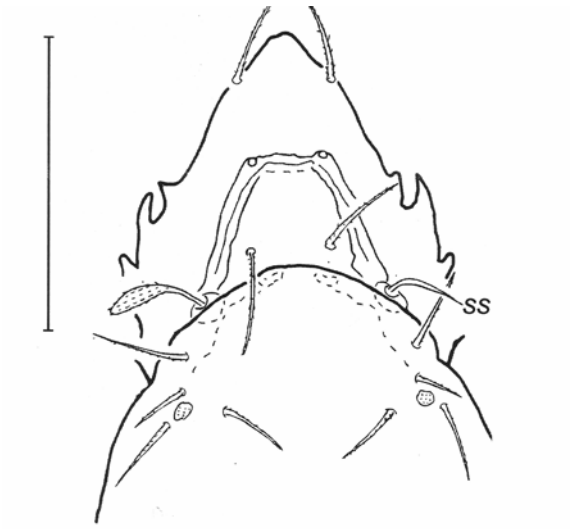


Fig. 2: *Zygoribatula hispanica* Subías *et* Arillo, 1998. Different morphology of sensilla (*ss*). Scale lines: 100 µm.
Fig. 2: *Zygoribatula hispanica* Subías *et* Arillo, 1998. Sensilos (*ss*) de diferente morfología Escala: 100 µm