

Body size-dependent effects on the distribution patterns of phoretic mites of the multi-symbiont *Rhynchophorus ferrugineus* (Olivier, 1790) host

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Abstract

Phoretic mites have been found attached to different body parts of red palm weevil (RPW), *Rhynchophorus ferrugineus* (Olivier, 1790), to disperse. However, the question of how the patterns of attachment sites are formed remains intriguing. Here, we conducted the first study of RPW-associated phoretic mites in Portugal, particularly in the districts of Viana do Castelo, Braga, Porto and Aveiro in Northern Portugal (macrohabitat), and investigated the patterns of mite distribution on six body parts of RPW (microhabitat). At the macrohabitat level, we detected seven phoretic mite taxa actively using RPW host in each of the four studied districts, all documented for the first time in association with this invasive exotic species in Portugal. However, their relative abundance (species evenness) varied between districts, as did species diversity. All examined weevils carried mites, and the prevalence of the different taxa did not differ between districts or sex of weevils. Measured by mean abundance and degree of aggregation, Centrouropoda sp. proved to be the common dominant taxon, while Acarus sp. and C. rhynchoporus were considered common subordinate taxa and Uroobovella sp., Mesostigmata, N. extremica and Dendrolaelaps sp. sparse taxa. At the microhabitat level, all taxa were present in all body parts of the RPW; the highest abundance was in a region encompassing the inner surface of the elytra and the membranous hind wings (subelytral space). Analysis of niche overlap revealed that the distribution patterns of phoretic mite taxa on the RPW were not randomly structured. In the subelytral space, interspecific coexistence of mites increased as a function of body size difference with the dominant Centrouropoda sp. We conclude that the distribution patterns of RPW-associated phoretic mites show body size-dependent effects that resulted in the dominant taxon displacing similar size taxa and accepting taxa with which it has the greatest size difference as co-habitants.

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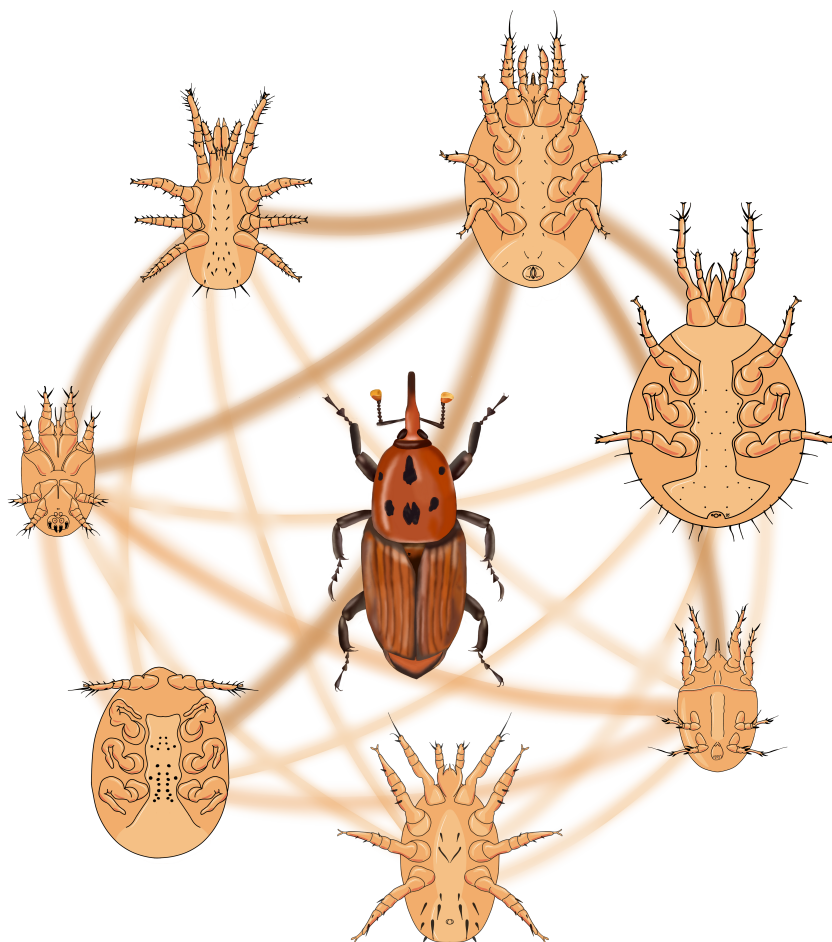
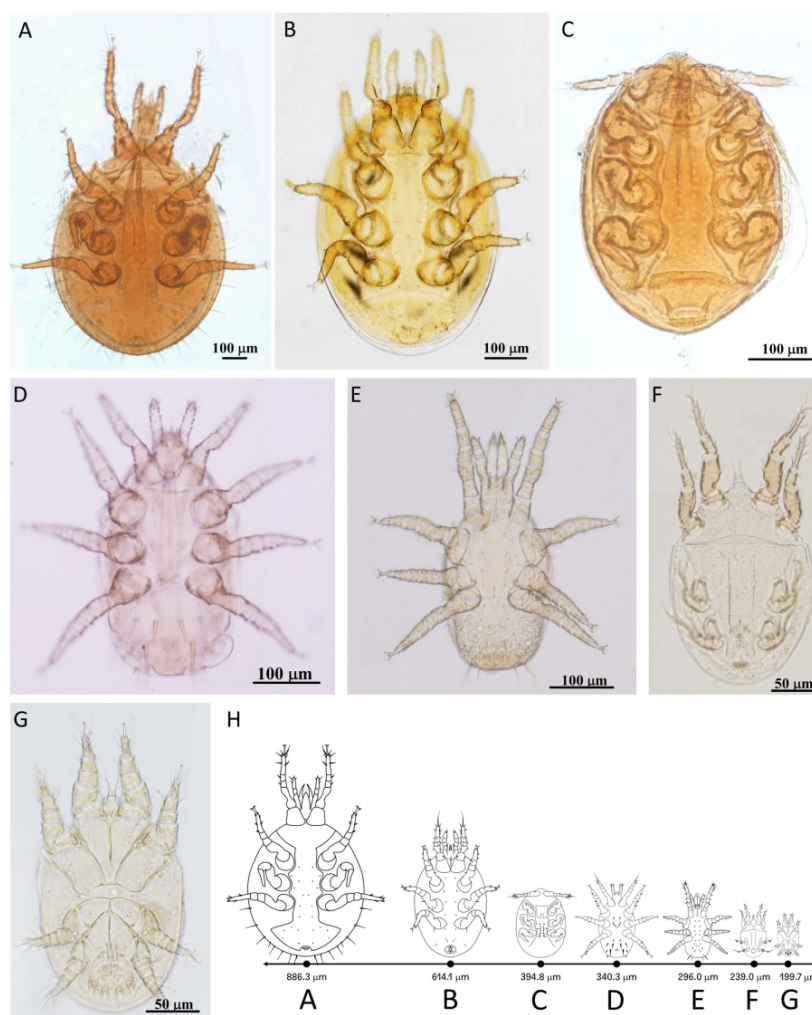


Figure 1



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