

Oil gland chemistry as a source of novel taxonomic characters in glandulate Oribatida (Acari)

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Oil glands (syn. opisthonotal glands) constitute *the* major exocrine system in oribatid and astigmatid mites. These glands are present in many different character states in more than 15.000 species. According to current ideas, oil glands evolved only once in ancient oribatids several hundred million years ago and represent an important synapomorphic character of the “glandulate” Oribatida (= the four more derivative cohorts of Oribatida [Parhyposomata, Mixonomata, Desmonomata, Brachypylina] and the Astigmata). Moreover, oil glands produce multicomponent secretions that have been proven valuable complex data for phylogenetic studies on different taxonomic levels. 1) With respect to oribatid gross taxonomy, major evolutionary traits are reflected by oil gland chemistry: The (primitive) Parhyposomata are characterized by phenols and naphthols while distinct sets of terpenes and aromatics (so-called “Astigmata-compounds”) are considered to have evolved stepwise within ancient mixonomatans, now characterizing all rectant taxa above middle-derivative Mixonomata (i.e., higher Mixonomata, Desmononata, Brachypylina and the Astigmata). In these terms, the evolutionary origin of Astigmata within Oribatida is strongly supported by chemical data. In some of the groups mentioned above, the “Astigmata-compounds” have again been reduced and replaced by novel components such as iridoid monoterpenes in some Euphthiracaroida (Mixonomata) or by alkaloids in some groups of Brachypylina. 2) In addition, regarding oribatid alpha-taxonomy, species- or even population-specific secretion patterns have already successfully been applied to the delineation of phyletic lines within species complexes or even led to the discovery of cryptic species.

In all, about 100 different oil gland secretion components have already been identified. Another 200 - so far unknown - components await their structural elucidation. I here summarize the importance of oil gland secretions profiles as independent character sets for modern integrative taxonomic studies in the Oribatida.

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