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FOSSIL COCCIDS DO EXIST.

ABSTRACT

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Scale insects (Coccinea) have been discovered in almost all Tertiary and Cretaceous amber and in a few other deposits, and the number of known coccid fossils has increased from about 100 to approximately 900 in the last twenty years. This material represents a variety of forms and constitutes a reliable basis for serious palaeo-entomological studies.

Key words: fossil abundance, Eocene, Mesozoic, Cretaceous, Tertiary, Baltic amber, Ortheziidae, Xylococcidae, Matsucoccidae, Electrococcidae, Monophlebidae, Putoidae, Eriococcidae, Inkaidae, Kermesidae, Diaspididae.

Fossil coccids do exist and their study is continuing to develop. As with many other insect groups, palaeo-entomological studies on scale insects (Coccinea) started in the middle of the 19th Century with the Eocene Baltic amber inclusions. These studies were then forgotten for about 100 years until they were rediscovered by Ferris (1942). The studies of Beardsley (1969) then extended the period of coccid palaeo-entomology into the Mesozoic, with the establishment of the Cretaceous *Electrococcus canadensis*.

By the beginning of the 1980's, some 100 coccid fossils were known from various institutions and 10 species had been formally described, although only a few of them can be recognized on the basis of their original descriptions, drawings and preserved specimens. In the second half of the 1980's, about 15 papers on fossil scale insects were published (for references, see Koteja, 1990a) and the number of established species had increased to 36, affiliated to the Ortheziidae, Xylococcidae, Matsucoccidae, Electrococcidae, Monophlebidae, Putoidae, Eriococcidae, Inkaidae, Kermesidae and Diaspididae. In addition, many more fossils have been discovered in various collections or have been collected in the field, so that the number of specimens (including fossil impressions and amber inclusions) had grown to around 350. The results of those studies were summarised at the VIth ISSIS (Koteja, 1990b).

After a break for other duties, I was able to continue with my interest in fossil scale insects in 1995. It became obvious that, for serious taxonomic and palaeo-ecological research to be done in the future, the main task for coccid

palaeontology should be to collect and catalogue fossil material, and protect specimens from damage and dispersal, so that descriptions of new species could be based on more than a single specimen. Thus, the search for coccid fossils has been extended to private collections and the open market. Many fossils and inclusions have been found by amateurs searching for coccids in their collections, and at fairs, shops, etc selling minerals, gems and amber (Koteja, 1998). Owing to the interest and generous assistance of these amateurs and the curators of many public institutions, the number of catalogued coccid fossils has increased to 900 specimens, while another 200 are known to be present in public museums. My own collection has also grown during the past two years to 170 specimens. All this work has required thousands of hours of polishing, preparing and cataloguing.

It appears, from the still undescribed material, that all the main coccid groups were present in the Tertiary, with the "archaeococcids" still the dominant "group" in the Eocene. However, from the phylogenetic point of view, the Cretaceous fossils are much more intriguing. Among these are the Turonian New Jersey inclusions, which contain representives of 7 or 8 families, including the well-defined Eriococcidae, the "living-fossil" Matsucoccidae and several highly derived and, apparently, extinct "archaeococcids". The presence of these extinct groups suggests that the scale insects may also have been touched by the hypothetical Cretaceous biological crisis (Koteja, 1999).

So, the time has now come to deal with fossil taxa and not just with fossil specimens.

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