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Review of the dissertation "Trends of the evolution of eriophyoid mites (Acari, Eryphyoidea) on plants" by F.E. Chetverikov

The dissertation by F.E. Chetverikov consists of four main topics, each describing in sufficient detail, aspects related to the evolution of eriophyoid mites. The author does a fine job guiding the reader through the intricate morphological/molecular aspects of his research and the document itself is well written and organized in a logical manner. Eriophyid mites include several economically important taxa that affect fruit and vegetable crops as well as ornamental plants. The fact that this important group of mites still has unresolved taxonomy and has many unanswered questions about its' evolutionary history speaks to the importance of the work presented in this dissertation. The materials collected and used in this work represent a wide geographical area from around the world and include Russia, South Africa, USA and several European countries.

The first main topic is a summarization of the body plan of Eriophyoidea and include descriptions of the mouthparts, reproductive system, musculature and embryonic development. The form and functions of the different morphological structures are described and how they differ from other mites is made clear. The author has made several new advances in the study of the reproductive structures of both male and female eriophyoid mites including better visualization and descriptions of these structures that has led to a better understanding of their morphological relationships. The theory of "miniaturization" of these mites is presented and convincingly described in contrast to the opposing theories on the evolution of the eriophyoid mite body plan.

The second topic works to reconstruct the phylogeny of Eriophyoidea families and to understand the link between eriophyoid mites and their host plants. The discovery of mites in amber led to an understanding that the eriophyoid mite basic body plan was already formed during the Triassic period and that their evolution started long before that period. Molecular studies conducted present strong supportive data on the evolution of these mites on major plant groups but raise additional questions for certain groups like the Phytoptid mites. This work provides an excellent base for future studies to further define the host shifts in the eriophyoid mites.

The third topic identifies the main evolutionary trends of eriophyoid mites on plants that demonstrate the adaptive potential of Eriophyoidea under evolutionary constraints. Morphological modifications within the different groups within this superfamily are described and explained in terms of their evolutionary and

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biological importance. Differing climate shifts throughout the evolutionary history of these mites help explain the morphological reversals seen in some species as well as the differences in free living forms versus the concelaed forms of these mites.

The fourth topic explores the origin of eriophyoid mites and the links between these and other Acariformes. Of all the molecular and morphological work that was conducted, the hypothesis that Eriophyiodea are a sister group to the Nematalycidae is the strongest. The author gives a likely scenario of the origin of Eriopyoid mites based on the information he has learned from his morphological, molecular and host evolution studies. This hypothesis is intriguing, and I hope he continues this work in the future to further resolve the origin of Eriophyoidea.

The staggering amount of very relevant research that has come from this dissertation is truly remarkable. Dr. Chetverikov along with his colleagues have made substantial improvements in the understanding of this challenging, yet important group of mites. His work is worthy of the promotion he is seeking, and I look forward to seeing future work from him and his collaborators on these mites.

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