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Subject: Review of dissertation for the degree of Doctor of Biological Sciences

Title: Trends in the Evolution of Eriophyoid Mites (Acari, Eriophyoidea) on Plants

Candidate: Filipp E. CHETVERIKOV, PhD

To whom it may concern

Eriophyoid mites are one of the most difficult animal taxa for ecological, evolutionary and taxonomic studies due to their extremely small size. In addition, sometimes there are cryptic speciation and two morphologically different forms of females, the protogyne and deutogyne. Consequently, the eriophyoids are both grossly understudied and sometimes wrongly described.

My approach to reviewing this dissertation is holistic because its bold approach to research is integrative and its full merit could not be explained if it were assessed at the chapter level. Therefore, I describe the essential elements of the study and how they interconnect and complement each other to make a complete study that is much more than the sum of its parts.

The dissertation of the candidate closes one of the major gaps in our knowledge of the evolution of eriophyoid mites. Namely, the author carried out a multifaceted study of the evolution of the eriophyoids and their relationships with plants that included micromorphology and phylogenetics at the molecular level. The study also included

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the development of a suite of often highly sophisticated methods that may well become an important tool for studies of other microscopic fauna.

The study suggests that eriophyoids evolved their distinctive morphological structure before they adopted their 'phytoparasitic' lifestyle. In addition, data in the areas of molecular phylogeny and paleontology were coupled with the analysis of the relationships between eriophyoids and their host plants to reconstruct the phylogenetic history of the Eriophyoidea. Moreover, despite their simplified morphology, the eriophyoids have further evolved to exploit tens of thousands of host species across the spectrum of angiosperms, conifers and ferns.

The candidate convincingly describes the main pathways of the evolutionary modification of eriophyoid mouthparts, appendages and genitalia. In addition, the candidate describes morphological transformations and reversals as a source of the recent adaptive radiation of the eriophyoids. The description of the considerable variation in morphology between the deutogyne and protogyne forms of females is of particular relevance to the taxonomy study of the Eriophyoidea; I earlier stated that the species are sometimes wrongly described and the presence of the two forms is one of the reasons for the errors in description.

Another important element of the study is the description of the transition to endoparasitism that occurred numerous times and independently across the range of eriophyoid lineages. This phenomenon facilitated the phytoparasitism of a staggering number of both flowering and non-flowering host plants.

Furthermore, the study proposed a new hypothesis for the origin of the Eriophyoidea and their main evolutionary pathways that are evidenced from both the ecological and morphological perspectives.

Finally, the body of work compiled by the candidate resulted in multiple publications in renowned international journals that include *Experimental and Applied Acarology*, *Systematic and Applied Acarology*, *Acarina* and *Zootaxa*.

The candidate is an internationally renowned scientist who has had and continues to have many productive cooperative projects that bridge the continents. The absolutely outstanding body of work that he has presented deserves wide recognition because it has considerably advanced the study of a major taxon of mites in a manner that can also serve as a robust model for the study of other taxa of microscopic fauna.

In conclusion, I wholeheartedly support the application of Filipp E. CHETVERIKOV for the degree of Doctor of Biological Sciences.

If the clarification of any matters associated with my endorsement of the elevation of Filipp E. CHETVERIKOV to Doctor of Biological Sciences is required, please do not hesitate to contact me.

Yours sincerely



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