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NEW CONCEPTS AND METHODS FOR INTEGRATED MODERN SYSTEMATICS

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Systematics is the basic Science that secures all the other biological Sciences and applications in Agriculture, Health and Environment. Systematics has a long history, and sometimes this history is complex and hard to follow, especially for mites because of their very small size and associated difficulties to see the characters and assess their variability. Along time, specialists do not agree on classification or on characters meaning for species status because of a mix of opinion / experiences on the group they work on, and somewhat subjective feelings. However, it is important to say that these feelings are not necessarily wrong as they come from a beam of accumulated unconscious sensations and experiences hard to simply describe and that can differ from one taxonomist to another. In a same time, systematics knowledge is crucial for applied fields as biological control, biodiversity management or risk previsions under global changes. The questions / challenges are thus now to determine how to get objective answers and evidences of opinions? The solution certainly includes the combination of approaches and methods, and some examples already show that this combination have lead to important advances in phylogeny and evolution, biodiversity discovery, diagnostic implementation, big data management. First, we will present how methods evolved and permit to access to more characters, to different types of characters for comparing the organisms, and answer questions about synonymies, phylogeny, and community ecology, with a synthesis of success and lacks. Then, we will present the analytical challenges to cope with all data in hand, with examples of success and also gaps to fill. We will also make a focus on collaborative taxonomy, through advances in social networks, easier distant collaboration and associated tools for the development of databases and their use in Mite Systematics and Ecology. Finally, we will draw a state of such advances, dress some future research challenges and will question the future of Acari Systematics considering education of students, systematics attractiveness, student grants and perennial positions in our institutions.

Keywords: Systematics, modern tools, analytical challenges, integrated approaches, education.