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EDITORIAL in RECENT DEVELOPMENTS IN TAXONOMY AND PHYLOGENY OF PLANTS

Recent Developments in Taxonomy and Phylogeny of Plants

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Modern plant taxonomy is an extensive field that is increasingly benefiting from achievements in many other fields of the biological sciences, such as genetics, cytology, molecular biology, ecology, phytogeography, and paleobotany. The influence of these branches of science on plant taxonomy is expressed not only through a significant multiplication of information and detailed data but also through new phylogenetic concepts. Reconstructing phylogenetic compounds that unite all lines of evidence is a great challenge. The process of describing a new species is considered equivalent to generating a new hypothesis in phylogenetics. Hence, taxonomy and phylogenetics are inseparably connected with each other. Advances in taxonomy and phylogenetic taxonomy have led to this special issue of *Acta Societatis Botanicorum Poloniae* (ASBP), bringing together 13 articles from authors who responded to our invitation and call for papers from August 2019. The current issue is the fourth themed edition of ASBP and is preceded by the special issues of the journal published in 2012 (vol. 81, issue 4), 2014 (83/4), 2016 (85/4), and 2018 (87/4). The articles in this special issue cover a wide range of topics on vascular plants, bryophytes, and plant components in lichens. We would like to thank the authors who responded to our call and submitted their interesting contributions.

In the opening paper, Podani (2020) presents results of studies on iconography used for plant systematics as well as a synthesis of current knowledge about plant systematics using a modern diagrammatic approach. Cladogram topology, phylogenetic classification and nomenclature, diversity of taxonomic groups, the geological timescale, and paleontological records have, for the first time, been brought together into one figure, the Coral of Plants.

Another interesting article, written by Croat and Ortiz (2020), discusses the family Araceae, the most diverse in the New World tropics, but are also found in the Old World tropics and northern temperate regions. These authors focused on the evolution of the morphological and ecological characteristics of this family that have enabled it to colonize diverse habitats. High species diversity and rates of endemism as well as the presence of large numbers of unknown species constitute the principal characteristics of this family.

Four of the articles consider phylogenetic relationships and divergence times of species or groups of species of vascular plants in Central Europe. Boroń et al. (2020) make an interesting contribution to a taxonomically difficult group of Angiosperms, namely, *Aconitum* subgen. *Aconitum* (Ranunculaceae), employing two independent genetic markers. These authors present hypotheses about the origin, estimated divergence time, and genetic differentiation of European and Asian diploids and tetraploids. Laczkó and Sramkó (2020) reconstruct the phylogenetic relationships and divergence times of *Hepatica transsilvanica* (Ranunculaceae) and its parental species. Their findings strongly support the long-term survival of *H. transsilvanica* in the Southeastern Carpathians. Based on their phylogeographic study of *Primula vulgaris* (Primulaceae), Volkova et al. (2020) show the importance of eastern refugia (the Colchis) as sources of genetic variation in European mesophilous plant speciation. The results of these three papers highlight the biogeographic importance of the Carpathians during the Quaternary glaciation periods.

Continuing with the focus on phytogeographic issues in Central Europe, the origin of *Vincetoxicum pannonicum* (Apocynaceae), a Pannonian endemic species considered "vulnerable" according to the IUCN Red List, was investigated using molecular phylogenetic methods, and the results support its hybrid origin (Horváth et al., 2020). Moreover, Major (2020) characterizes the molecular taxonomic status of *Hedera crebrescens* (Araliaceae), a taxon considered to be a potentially invasive plant able to replace *Hedera helix* in its native habitats in Central Europe. Shifting the geographical focus to Asia, the results of a study by Rewicz et al. (2020) show that the ultrastructures of *Impatiens* (Balsaminaceae) seeds are different among the taxa and could be used as diagnostic characters in the identification of some species.

Four papers focus on taxonomy and phytogeography of mosses in different parts of the world. Ochyra and Plášek (2020) described *Isopterygium tristaniense* (Hypnaceae), an endemic species of the Tristan da Cunha archipelago in the central South Atlantic Ocean, which was found to be conspecific with the Holarctic *Pseudotaxiphyllum elegans*. The global distribution of this species is reviewed and, the distribution patterns are discussed. Ochyra et al. (2020) report two more American moss species new to Africa: *Ephemerum homomallum* (Pottiaceae) and *Torrentaria aquatica* (Brachytheciaceae). These discoveries change the phytogeographical status of both species. These authors summarized the amphiatlantic distribution pattern of mosses and provided a brief history of the muscological exploration of southern Africa. An interesting intercontinental disjunction of the moss species *Lewinskya graphiomitria* (Orthotrichaceae) is described by Plášek et al. (2020). Until now, this species has been considered endemic to New Zealand and has recently been found in southern China. Ecological niche modeling is used to suggest a possible way for its migrations. In the fourth paper on mosses, Plášek and Ochyra (2020) describe two bryophyte species of bryophytes new to Poland: *Orthotrichum alpestre* and *O. schimperi* (Orthotrichaceae). Revision using herbarium material shows that these mosses were incorrectly identified in the past. In addition, these authors provide a key for identifying species from the six critical moss genera in Poland.

Last but not least, Kukwa et al. (2020) raise the interesting topic of the taxonomic influence of photobionts on lichenized fungi. Some mycobionts can exchange photobionts during their lifecycles, a process which modifies their morphologies, and consequently has influenced lichen taxonomy in the past. These authors present cases where photobionts have impacted the taxonomy and systematics of lichenized fungi.

All submitted manuscripts were peer-reviewed according to the standard ASBP editorial process.

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