

PREFACE

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## Recent advances in rust systematics

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Rust fungi (Basidiomycota, Uredinales) are biotrophic plant pathogens with complex and often cryptic life cycles. Rust fungi are unique within the Eumycota in many aspects, including the evolution of heteroecism and the numerous (up to six) different spore types that may be produced by a single species. The Uredinales is the largest natural group among the Basidiomycota, with about 7000 species currently placed in approximately 14 families and 160 genera. Traditional ecological and morphological approaches have played important roles in detecting and circumscribing rust species. However, determining systematic relationships and taxonomic placement of the rust species in genera and higher taxa has to a large extent depended on a few limited characters of spore morphology and structure of sori and putative host specificity, and no universally accepted phylogenetically based rust classification is currently available. Thus, modern molecular phylogenetic techniques can be particularly suitable to overcome current difficulties in rust systematics, although to date molecular systematics have not been applied to rust taxonomy above the species level.

We believe that collaborations between morphology/ecology-based taxonomists and molecular systematists are indispensable for elucidating biology of rust fungi and their evolutionary history. Thus, when the first Mycological Society of America and Mycological Society of Japan Joint Meeting was held at Hilo, Hawaii, on August 4, 2005, a special symposium, Recent Advances in Rust Systematics, was organized. Ten rust systematists from five countries and four continents convened to present results from the most current rust systematics research, examining relationships ranging from subordinal to population levels. We are very

pleased to bring together several of the papers from this symposium with the hope that this symposium will facilitate further collaborations among rust systematists to disclose the true nature and evolutionary history of these intriguing biotrophic phytopathogens.

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### Symposium presenters

- M. Catherine Aime, Agricultural Research Service, US Department of Agriculture, Beltsville, Maryland, U.S.A.  
Molecular systematics of Uredinales  
Chandalin M. Bennett, Department of Forest Resources, University of Idaho, Moscow, Idaho, U.S.A.  
Regional studies of *Melampsora* on *Salix* in the Pacific Northwest  
Sinchai Chatasiri, Graduate School of Science and Engineering, Ibaraki University, Ibaraki, Japan  
Taxonomy and phylogeny of the *Puccinia hemerocallidis* species complex  
Patricia E. Crane, Forest Research Institute, Rotorua, New Zealand  
Taxonomy and species relationships in the genus *Chrysomyxa*  
Ying Mei Ling, Graduate School of Life and Environmental Sciences, University of Tsukuba, Ibaraki, Japan  
Phylogenetic analysis of *Pucciniastrum* species in Japan  
Rachel S. Novick, Department of Ecology and Evolutionary Biology, Yale University, New Haven, Connecticut, U.S.A.  
Phylogeny and cospeciation in cedar rust fungi  
Yoshitaka Ono, Faculty of Education, Ibaraki University, Ibaraki, Japan  
Life cycle and host specificity in *Ochropsora* and *Aplopsora* species.  
Markus Scholler, Staatliches Museum für Naturkunde, Karlsruhe, Germany  
*Puccinia glechomatis* and *P. lagenophorae* in North America: invasion patterns, life cycle and life strategies  
Les J. Szabo, Agricultural Research Service, US Department of Agriculture, St. Paul, Minnesota, U.S.A.  
Deciphering species complexes and the evolutionary implications  
Marlien M. Van der Merwe, CSIRO Plant Industry, Canberra, Australia  
Phylogenetic relationships within the family Pucciniaceae with emphasis on *Puccinia* and *Uromyces*

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