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BOOK REVIEW

THE PLANT-FEEDING GALL MIDGES OF NORTH AMERICA. Raymond J. Gagné. Cornell University Press, Ithaca, NY 14850. 1989. 356 pp. \$45.00 (cloth).

Every once in a while a reference book comes along that is a special pleasure to review. Such a tome is *The Plant-Feeding Gall Midges of North America* by Raymond J. Gagné. You can appreciate the scope of this book only by realizing that gall midges attack numerous families of gymnosperms and angiosperms; both monocots and dicots. Greatly needed by entomologists and botanists, Gagné's book not only updates Felt's and Barne's classic works of the forties and fifties, but it also supersedes them! Covering more than 900 gall-making species, it is the most comprehensive book on midges to date. Deborah Roney's 434 line drawings of galls and insects, which accompany the text and keys, are accurately detailed, invaluable aids for identifying specific midges and their injury. Four plates of color photos add another dimension by depicting specific stages and their principal habits.

The first 100 pages provide valuable information on the biology, classification, distribution, and collection of gall midges. Gagné reviews gall midge biology in detail and includes the various ways midges have adapted to cope with different hosts and environments. He describes the various stages in a useful, simple manner so that even the novice might understand midge anatomy and how it conforms with various behavioral traits. In a brief but comprehensive section on the gall, he defines this new plant "organ" as the deformation of tissue that occurs in response to feeding or other stimuli by midges. Included are such topics as the diversity, development, complexity, and significance of galls.

Gagné's taxonomic expertise clears up much of the confusion regarding misclassified midges. He gives the reader a brief synopsis of all the known genera of midges within the two major subfamilies of Cecidomyiidae found on plants. This section tells the number of known species, principal hosts, and major identifying features. Gagné has done an excellent job on the more difficult genera such as *Calamomyia*, where most of the species have been described from isolated adults. He points out the need to have adults, mature larvae, and the host plant to confidently describe or classify a midge species and its gall.

Gagné is the first to provide a generic key to larvae, a key that also includes predacious and fungal feeding forms that are gall associates or inquilines of galls made by the true gall formers. Besides using just taxonomic characters, the key often relies on host-plant and infestation-site information in the couplets to more readily separate closely related or similar-looking genera.

The heart of the book is the comprehensive key to galls and plant damage arranged by plant families and genera—from Aceraceae (*Acer*) to Zygophyllaceae (*Larrea*). The keys are easy to use. If you know the host plant, the accompanying simple annotated key walks you through a few steps to the gall maker. Some families, such as Salicaceae and Rosaceae, are favorites for midges, and thus, have longer keys. However, a few others such as Sapotaceae and Platanaceae have only a single known midge each, so identification in these groups is a cinch. An extensive list of reference material, liberally referred to in this section, caps off the book.

Gagné's *Gall Midges* is a valuable contribution to the entomological literature. It will be the North American midge "bible" for forest researchers and practitioners for many years to come.

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