

## PHYLOGENETIC, HOST AND BIOGEOGRAPHIC ANALYSES OF THE PILOPHORINI (HETEROPTERA: MIRIDAE: PHYLINAE)

Randall T. Schuh<sup>1</sup>

<sup>1</sup>Department of Entomology, American Museum of Natural History,  
New York, New York 10024, U.S.A.

Received 13 February 1989; accepted 9 October 1990

**Abstract**—A cladistic analysis is performed for 114 species of Pilophorini, using 73 characters with 190 states. Illustrations or figure references to the literature are provided for most characters. The resultant Nelson (strict) consensus cladogram is used as a justification for the recognition of the following genera: *Alepidiella* Poppius, *Aloea* Linnavuori, *Druthmarus* Distant, *Hypseloecus* Reuter, *Neoambonea* Schuh, *Parambonea* Schuh, *Parasthenaridea* Miller, *Pherolepis* Kulik (paraphyletic), *Pilophorus* Hahn, and *Sitenaridea* Reuter (paraphyletic). *Pilophorus indonesicus* is proposed as a replacement name for *Bilirania sumatrana* Schuh (= *Pilophorus*), a secondary homonym of *Pilophorus sumatranus* Poppius. A list of currently recognized genera and species with summary distributions and host plant associations, and a key to genera are included.

Host associations are plotted on the cladogram to reveal the pattern of host shifts. At the generic level and above, a pattern of colonization, rather than co-evolution, is strongly indicated; at the species level, genera of Pilophorini often show restricted plant-group associations, but no clear pattern of coevolution emerges. Major distributional patterns in the Pilophorini are mapped, discussed and compared with historical biogeographic schemes for some other groups. The Pilophorini appear to be of tropical Gondwanan origin with subsequent spread into, and differentiation in, the temperate Northern Hemisphere.

### Introduction

The plant bug tribe Pilophorini is known from approximately 155 species placed in 10 genera. Species belonging to the group are usually associated with a single plant species or group of plants, with some taxa being at least partly predatory on other insects. Many members of the phylogenetically more advanced lineages are weakly to strongly myrmecomorphic.

The Pilophorini, as presented here, has been documented in regional studies as monophyletic by Wagner (1952), Odhiambo (1960) and Schuh (1974, 1976, 1984). On the basis of synapomorphies in the male and female genitalia and the possession of lanceolate, silvery, scalelike setae. The Pilophorini of Carvalho (1958) was a heterogeneous grouping of genera brought together on the basis of myrmecomorphic appearance, an ill-defined attribute that shows little congruence with other morphological characteristics, and which occurs in many more phyletic lines of the Miridae than reflected in Carvalho's classification (Schuh, 1986).

The Pilophorini was a cosmopolitan group in the classification of Carvalho (1958), with a number of genera occurring on all continental land areas except Antarctica; no clades were restricted to any particular land area. In the present classification there is a much more obvious relationship between diversity and distribution, with the eight basal species on the cladogram—and only those—restricted to the New World tropics, virtual absence of the group from Australia and temperate South America, and the Northern Hemisphere fauna (with limited exceptions) comprising members of the relatively most apomorphic clade. Leston (1961) concluded that geographical distribution was of no utility in understanding the evolution of Miridae. The present analysis suggests that