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Moss Lacebugs in Northwest Conifer Forests: Adaptation to Long-Term Stability

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Among the many insects that live in the forests of the Pacific Northwest are a small group of lacebugs that feed on moss (Tingidae: Acalypta). Thirty-seven species occur in the northern hemisphere, eleven of these in North America (Drake and Lattin, 1963. Proc. U.S. Natl. Mus. 115:331-345; Froeschner, 1976. Amer. Midl. Nat. 96:257-269.), and three on the H. J. Andrews Experimental Forest in the western Cascade Mountains of Oregon. Each species occupies a distinct niche in the forest.

Acalypta lillianis Torre-Bueno is a recent discovery in Oregon; the nearest previously known locality for this lacebug was southwestern British Columbia and northern Idaho. It is found from northern Alaska east and south into eastern Canada and the northeastern United States. On the Andrews Forest it is found only in moss, growing on the thin soil of dry ridge-top scrub communities at 1,500 m elevation. Its occurrence so far south suggests a remnant population from earlier times when the climate was cooler. Thus far, only flightless specimens have been collected in Oregon, although long-winged individuals are known from other localities.

The second species of lacebug, Acalypta mera Drake, is known from southern British Columbia, western Washington, and Oregon. It is common in mosses from low and middle elevation sites in open 5- to 20-year-old clearcut habitats. Virtually all specimens collected are flightless, with long-winged males and females comprising about 5% of the populations. The long-winged form is important for dispersal to newly disturbed habitats.

The third species, Acalypta saundersi Downes (Fig. 1), is of special interest because it has been taken only in old-growth western coniferous forests which are characterized by long-term stability. This species only occurs in the flightless state. There are fourteen other completely flightless species of the genus closely related to A. saundersi worldwide. Three species occur in the United States and Canada—one in the Great Smoky Mountains of the Southeast, one from the southern Ozark Mountains, and the species from the Pacific Northwest. There appears to be good correlation between flightlessness in these species and the long-term stability of the habitat in which they are found. As E. O. Wilson has suggested (Scientific American, Sept. 1989), long-term stability of habitat allows the ac-

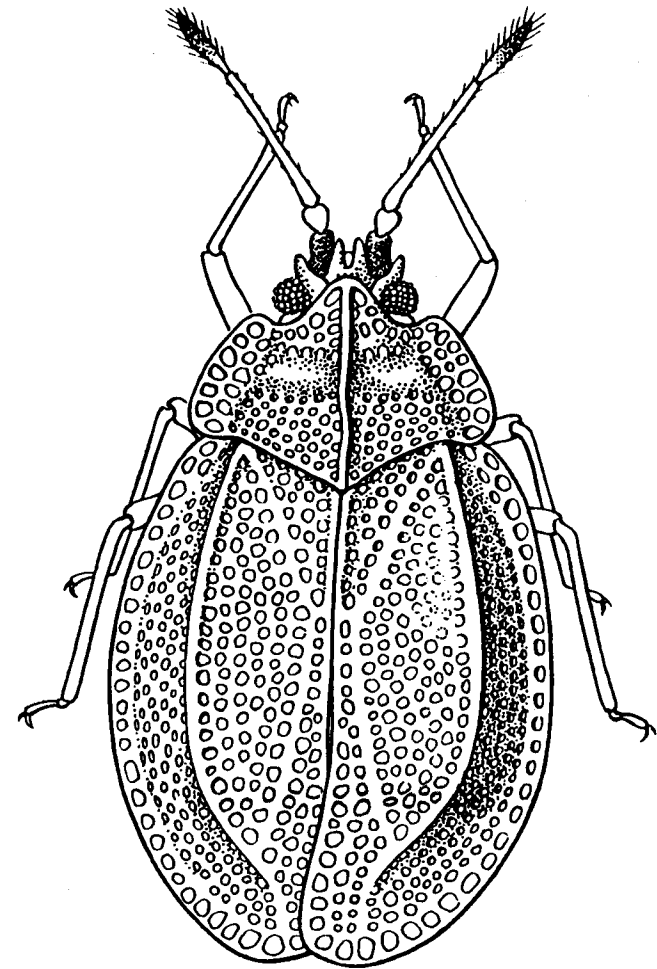


Fig. 1. Acalypta saundersi Downes. Photo courtesy Oregon State University.

cumulation of diversity (species richness) through time, particularly those species with very limited ability for dispersal. Acalypta saundersi is an excellent example of such a species. There are other flightless insect species found on the Andrews Forest whose presence supports the idea of habitat stability through time. Perhaps the occurrence of the old-growth forests themselves provides evidence as well.

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