

## Taxonomic Characters

Natural history is integrated with taxonomy in this study because the adult gall moths are so similar. The extended phenotype concept of Dawkins (1982) validates the use of gall traits in addition to insect traits for defining and distinguishing species. The characters used in this study are introduced below. *Throughout this report, any character state printed in italics is alone sufficient for diagnosing the species possessing it.*

### Adult

The main adult characters used are forewing length, descaled frons profile, length of the terminal segment of the labial palpus relative to the subterminal segment, forewing scale pattern, and the ratio posterior apophysis length (mm)/forewing length (mm) (PAL/FL). Forewing length serves as an indicator of body size. As the denominator in the PAL/FL, forewing length adjusts for the effect of body size on posterior apophysis length. Unless specified otherwise, measured adults issued from galls with known adult exit architecture on their preferred foodplants. Standard adult characters in addition to the above are used in new species descriptions.

### Gall

The main gall characters used are details of exit architecture, gall shape index, gall size (exterior volume), midgall height above ground, and gall diameter at the center of the adult exit opening. "Exit architecture" refers to the suite of traits consisting primarily of extent of tunnel excavation to the outside; whether the outside opening is located in the upper or middle one-third of the gall; bung color, shape, and nature of any attached accessories; or composition of the cap where the exit is not plugged with a bung. A few additional characters are included for certain gallers, such as bung azimuths.

To compute gall shape index,  $S_g$ , and gall size (exterior volume),  $V_g$ , I measured dimensions from tracings of bisected fresh, mature galls. These galls had known adult exit architecture and came from foodplants preferred by the particular gall moth. Galls of parasitized insects were excluded because at least one parasitoid, *Copidosoma g. gelechiae* Howard (Encyrtidae), causes its hosts to induce oversized galls (Barber 1938). Computations for shape index