

Discussion

Riley's (1869) conclusion that *G. gallaesolidaginum* winters in the adult stage colored interpretations of *Gnorimoschema* life histories for half a century. Leiby (1922) eventually demonstrated that *G. gallaesolidaginum* winters in the egg stage, not the adult. Here I show or confirm that adults of all the species in this study eclose in late summer and autumn, and that three produce viable eggs before winter. These findings leave little doubt that all eight species winter as eggs, or more precisely, as unhatched pharate larvae.

Close similarities in wing venation, forewing scale patterns, genitalia, life systems, and other characters among the species studied and reviewed here show that Nearctic *Gnorimoschema* gallers are closely related, and confirm Povolny's (1991) prediction that cryptic or sibling species exist among them. This compactness, together with the contradictory information noted in this study on insect biology, gall biology, and larval foodplants, emphasizes that distinguishing and identifying *Gnorimoschema* adults, galls, and foodplants should be done with greater care in the future.

The three bung makers in this study—*G. gallaesolidaginum*, *G. jocelynae*, and *G. salinarum*—comprise a cohesive subgroup with nonproduced frons (Fig. 12), larval-entry damage to young foodplant leaves (Figs. 24–26), larval foodplants being narrowly confined within the one genus *Solidago*, and other traits manifesting lesser rather than greater diversity. No other *Gnorimoschema* are known to make bungs.

The five moths in this study that do not make bungs—*G. septentrionellum*, *G. gallaespeciosum*, *G. gibsoniellum*, *G. slabaughii*, and *G. gallaeasterellum*—comprise a less cohesive subgroup with divergent frons profiles (Figs. 13–16), presence or absence of larval-entry damage to young foodplant leaves depending on the galler species (Figs. 27 and 28), larval foodplants distributed among at least four foodplant genera, and other traits manifesting greater rather than lesser diversity.

The bungs and plant tissue caps of finished adult exits in galls of all eight moths are translucent. One might conclude that the light thus entering the exit tunnel and gall chamber could serve as a beacon and stimulus to help adults escape from galls, except that *G. gallaesolidaginum* adults, according to Leiby (1922), issue at night.