

Organization of a parasitoid community associated with a complex of galls on *Atriplex* spp. in southern California

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ABSTRACT. 1. *Atriplex canescens* (Pursh) Nuttall and *A. polycarpa* (Torrey) Watson (Chenopodiaceae) support twelve morphologically distinct gall types in southern California. Thirty-seven common species of parasitoids, predators and inquilines are associated with these galls.

2. The galls incited by eight members of the *Asphondylia atriplicis* Cockerell (Diptera: Cecidomyiidae) species complex are linked into a single, interacting community through shared hymenopterous parasitoids and inquilines.

3. Cluster analysis (UPGMA) grouped the fifteen most common species of Chalcidoidea into three host guilds of five species each: (1) specialists in tumour stem and blister leaf galls on *A. canescens*, (2) specialists in woolly stem galls on *A. polycarpa*, and (3) generalists that attack all galls. Guild 1 dominated the galls with which it was primarily associated, while guild 3 dominated the remainder.

4. The abundances of the parasitoids of the tumour stem and blister leaf galls were negatively correlated with the abundances of two organizer species, a gall-forming inquiline, *Tetrastichus cecidobroter* Gordh and Hawkins, and an internal, larval–pupal parasitoid, *Tetrastichus* sp. B. The abundances of nine of the twelve most common chalcidoids were not correlated with the abundances of all co-occurring species in six other galls.

5. Host seasonality partly determines parasitoid population dynamics and guild structure. Parasitoid dominance increased with gall duration, suggesting that parasitoid competition depends on resource stability. The two continuously available galls were dominated by their specialist guild, while all seasonal galls were dominated by generalists. The sub-dominant specialists of woolly stem galls may represent competitively inferior species that utilize those galls opportunistically, because of the gall's widespread distribution and 9–10 month yearly availability.

6. Sites in the Colorado Desert and chaparral that supported several gall types showed stable relative abundances of the major parasitoid species, whereas sites in the Mojave Desert that supported only woolly stem galls had unpredictable parasitoid species assemblages.

7. The competitive success of *Atriplex* gall parasitoids may depend primarily on voltinism (multivoltine species dominated univoltine species) and mode of feeding (phytophagous, mixed entomophagous–phytophagous and facultatively hyperparasitic species in general dominated strict primary parasitoids).

Key words. *Atriplex*, gall parasitoids, community structure, guilds, phenology, resource stability.

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