The Diversity and Host Specificity of Mexican Idarnes

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Abstract: Organisms live within ecological communities in which a variety of abiotic and biotic interactions can occur. Mutualism symbiosis occurs when interacting species benefit from their association (e.g., pollination), whereas antagonism symbiosis occurs when one species negatively impacts another's fitness (e.g., parasitism). Mutualistic systems are susceptible to exploitation by other antagonistic species who take advantage of the interaction's resources. Fig plants (Ficus, family Moraceae) and their associated fig wasps (superfamily Chalcidoidea) provide an ideal system to investigate fundamental questions concerning host specificity, generalist behavior, and species diversity. Few studies have looked into species diversity and species delimitation in fig pollinators and even less for non-pollinators. Idarnes comprises seed gallers and cleptoparasites associated with New World strangler figs (section Americanae, ~120 species). Although it is the most abundant non-pollinating fig wasp associated with these figs, little is known of its host-associated genetic diversity. The few strangler fig species examined to date support at least one Idarnes species and where it has been tested, most of these wasps are host-species specific, leading to a prediction that the genus's overall diversity may reach nearly 300 species. Sampling Idarnes from six fig species occurring in Mexico, we sequenced the mitochondrial cytochrome oxidase gene of 120 individual wasps to quantify genetic variation within and between Idarnes lineages, to delimit species, and to quantify patterns of host specialization and generalization. From the five fig species, we identified sixteen distinct Idarnes species, of which eight were specialists associated with a single fig host species, and eight were associated with two to three fig species. Of the two species groups of Idarnes investigated, carme wasps, which are cleptoparasites, were found to be substantially more diverse and generalist than flavicollis wasps, which are seed gallers. This study brings into clearer focus the undocumented diversity and host specificity/generalization of Idarnes species.