SUPPLEMENTARY DATA

METHODS

Spatial autocorrelation

Because it would be logistically difficult and unethical to experimentally manipulate the identity of the dominant ant species at a site (e.g. adding a highly invasive ant species to a previously non-invaded site), there is the risk that observed differences in ant species responses to nectar and HPI manipulations are confounded by different environmental conditions at sites dominated by different species. To partially address this concern, we examined spatial autocorrelation of ant, HPI and plant responses using Mantel tests (Koenig, 1999) in Primer-E v.6.1.10 (Clarke and Gorley, 2009), following the protocol in Savage and Whitney (2011). Analyses demonstrated that the ant, HPI and plant responses examined in this study are unlikely to be driven by spatial variation in environmental conditions, because distance between sites was not significantly associated with the responses that we measured (all $P \geq 0.1965$). We interpret a lack of spatial autocorrelation in these responses as an indication that we are measuring differences in ant species biology rather than differences in environmental conditions.

Assessment of ants assemblages prior to experimental manipulations

Because we were interested in the relative responses of *A. gracilipes* and less-invasive ants to carbohydrate-rich resources, we needed to first characterize local ant assemblages at each site. Therefore, we assessed ground-foraging ant abundances at each site in the buffer zones between plots (see below). To do this, we used a 10 × 10 cm white card and counted the number of ants that crossed the card in 30 s (following methods in Abbott, 2005). We used this approach because sites were located on lava fields, which impeded deployment of pitfall traps. Importantly, these data were not used to assess the responses of ants to our experimental manipulations (see below), but instead provided information about the numerical dominance of ant assemblages at each site (they did not change). Assessments were conducted three times: prior to treatment application, at 3 months after treatments were applied, and at 6 months (3- and 6-month assessments were conducted to confirm that the identity of the dominant ant at each site did not change). We considered sites in which *A. gracilipes* workers comprised ≥85% (range: 85.1–100%; mean: 98.6% ± 2.3%) of all individuals to be numerically dominated by this species and those in which *A. gracilipes* workers represented ≤5% (range: 0–4.7%; mean: 0.94% ± 0.94%) of all individuals to be numerically dominated by other ant species.

Study site information

Sites were located across the island of Savaii, Samoa, in the villages of Saleaula (13° 27’31” S, 172°20’58” W), Mauga (13°28’12” S, 172°37’12”W), Gataivai (13°46’19.53” S, 172°23’23.76” W) and Falealupo (13°29’52.55” S, 172°47’5.63” W). The climate in Samoa is tropical, with a distinct dry season from ~May –October. During the time of the experiments (25 October 2007-27 June 2008), average daily rainfall on the island of Savaii was 88.2 ± 0.01 mm and the average daily temperature was 30.4 ± 0.09 °C (Avao Weather Station, http://www.wunderground.com/global/stations/91757.html).

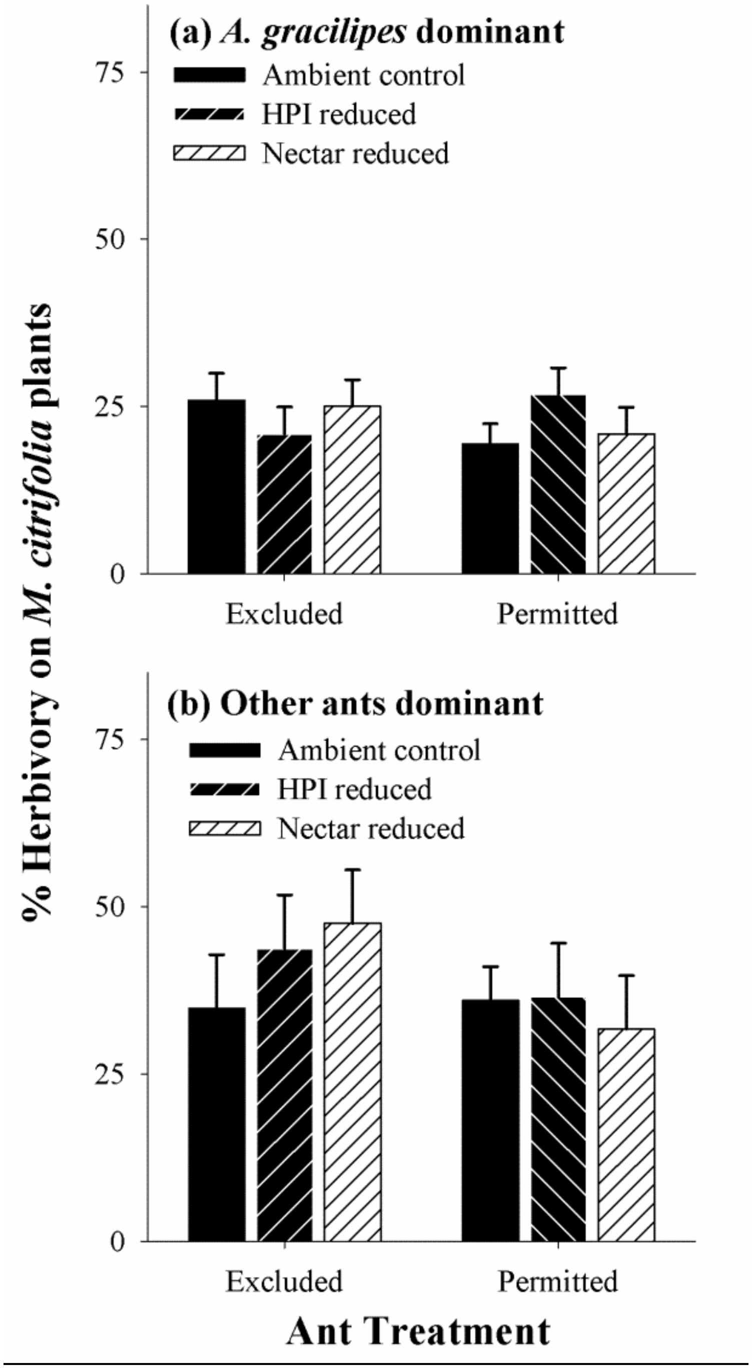
Plot-level mutualist exclusion experiment: treatment maintenance and effectiveness measures

We maintained experimental treatments every 2 weeks for the duration of the experiment, in the same order that treatments were applied (i.e. starting with plots at Falealupo and finishing with plots at Gaitaivai). To confirm treatment effectiveness, we first assessed ant and HPI abundances on *M. citrifolia* plants using a scoring system (data not shown). We then maintained both ant exclusion plots and control plots by trimming vegetation that had formed bridges across Tanglefoot barriers and replacing old Tanglefoot with a fresh coat. In all treatment plots, we also added bags to newly formed nectary bodies and replaced old bags as needed (i.e. when nectary bodies grew too large for the old bag or the bag was otherwise damaged). We also removed any HPI that had recruited to treatment plants using a paintbrush and brushed an equivalent amount of plant tissue on control plants.

How do ants, nectar, and HPI affect herbivory on EFN-bearing plants?

After sampling arthropod communities (see main text), we assessed herbivory (% leaf surface damaged) from chewing and mining herbivores using a transparent grid (1cm^2 cells) on five haphazardly chosen leaves from three *M. citrifolia* plants per plot. To statistically evaluate the effects of *A. gracilipes* invasion status and our experimental manipulations, we initially used a repeated measures ANCOVA. The factors in the model were *A. gracilipes* invasion status, the ant treatment (permitted or excluded), the carbohydrate treatment (nectar reduced, HPI reduced, or ambient control), time and all possible interactions. Initial plant size (height × diameter at base) and density of *M. citrifolia* plants per plot were included as covariates. Because interactions between time and the experimental factors were non-significant, we reported average abundances across both collection periods below. We addressed violations of GLM model assumptions using square-root transformations of % herbivory scores. Although *A. gracilipes* invasion status was associated with significantly lower rates of herbivory ($P < 0.0001$), there was no significant influence of our experimental treatments, their interactions or the covariates (Fig. S1, below).

FIG. S1. Percentage of damage from leaf-chewing and leaf-mining insects on *M. citrifolia* plants across ant access and carbohydrate availability treatments at sites (a) dominated by *Anoplolepis gracilipes* and (b) dominated by less-invasive ant species. Error bars represent the standard error of the least-squares mean. Although herbivory was significantly lower at sites dominated by *A. gracilipes*, herbivory rates did not differ among any of our experimental treatments for either (a) or (b).



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