**Supplementary Methods and Results**

**From: “An invasive herbivore structures plant competitive dynamics” by L. Wong, T.N. Grainger, D. Start and B. Gilbert**

*Additional experimental methods*

Seeds of *A. syriaca* and *A. tuberosa* from a commercial nursery (Prairie Moon Nursery, Winona, MN, USA) were sterilized in a 5% bleach solution, nicked, cold-stratified at 4°C for 5 days and dark-incubated in a warm room for 5 days. Germinated seeds were then planted in growing trays. After three weeks, when most plants had 3 to 5 sets of true leaves, seedlings were planted in pairs in 2-litre pots with either a conspecific seedling or a heterospecific seedling.

*Aphis asclepiadis* colonies were raised from individuals collected from *A. syriaca* plants at the Koffler Scientific Reserve, King Township, Ontario, while *A. nerii* colonies were raised from individuals collected from *A. syriaca* plants in Toronto, Ontario, approximately 40 km south of the reserve. We maintained small populations of aphids by serial transfer on seedlings of *A. syriaca* and *A. tuberosa*.

Each experimental community (consisting of a pot containing two plants, plus added aphids) was enclosed in a cylindrical cage (50cm tall, 25cm diameter). Cages were composed of a metal wire frame with 5cm by 10cm rectangular holes overlaid with superfine netting (625 holes/square inch, Skeeta, Bradenton, FL, USA). Potted plants were watered throughout the experiment as needed.

*Additional statistical methods*

To test the impact of *A. nerii* on live biomass, we used a linear mixed effect model with aphid treatment, focal plant identity, neighbor plant identity and their interactive effects as predictor variables with the log live biomass as the response variable and ‘cage’ as a random factor. A similar model was also used to determine the effects of aphid treatment, focal plant identity and neighbor plant identity on plant survival. However, since *A. tuberosa* had 100% survival in both the controls and in the *A. asclepiadis*-only treatments, we were not able to analyze the interactive effects of focal plant identity, neighbor plant identity and aphid treatment on *A. tuberosa* and *A. syriaca* together. We instead ran separate tests for each plant species using binomial general linear models with neighbor plant identity, and aphid treatment as predictors, and plant survival as a binary response. We then contrasted survival between plants grown with conspecific neighbors and plants grown with heterospecific neighbors using a *t-*test with the coefficients and standard errors reported from these analyses.

Two weeks into the experiment, we discovered a generalist predator, *Orius insidiosus* (minute pirate bug) that had been able to get into several of the cages. *O. insidiosus* had negligible effects on *A. asclepiadis* abundances but caused considerable short-term declines in *A. nerii* populations in some cases. To quantify its effects on aphid population sizes, we recorded whether or not *O. insidiosus* was present in the cages each time we conducted aphid censuses. In all analyses where we tested the effects of herbivory on plant growth, live biomass, and survival, and we included the presence of *O. insidiosus* as a covariate whenever it was significant.



**Figure S1. Effect of plant species on *A. nerii* and *A. asclepiadis* population growth.** Mean abundances of (a) *Aphis nerii* and (b) *Aphis asclepiadis* over the six week experiment when aphids were grown with no interspecific competition in communities with two common milkweed plants (green lines), two butterfly milkweed plants (yellow lines), or one plant of each milkweed species (black lines). Data points are mean values ± one standard error.