Who's in charge?Whether these milkweed aphids count an ant as friend or foe depends on which plant they eat.

Credit: K. Mooney

Don't Judge a Plant by Its Species

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A plant is a plant is a plant. Or is it? New research reveals that, even within a species, plants show a surprising amount a variation in shaping the world around them. The finding promises to sort out some maddening inconsistencies in how species interact.

The new study concerns the common milkweed plant (*Asclepias syriaca*) and the aphids and ants that call it home. All three species depend on each other: the aphids drink the plant's sap and defecate a sweet syrup called honeydew, which ants eat. In return, the ants kick predators off the plant, protecting both the milkweed and the aphids in the process.

Any biologist looking at milkweeds as a whole would see this mutualism play out, but community ecologists Kailen Mooney of the University of California, Irvine, and Anurag Agrawal of Cornell University wondered if the relationship held on a plant-by-plant basis. To find out, the researchers planted 320 milkweeds in an old field full of ant nests, picking 10 plants each from 32 genetically distinct families

of full siblings. The team returned throughout the summer to census the insects that colonized the plants.

Plant genetics made a huge difference in insect dynamics. For 20 of the 32 plant families, ants helped the aphids as expected by increasing the aphid population more than 150% over that on ant-free plants in the same family. But for the remaining 12 plant families, the ants actually decreased the aphid populations by more than half. This averages out to ants boosting aphid populations overall but reveals a previously unimagined role for milkweeds in changing the relationship between the two insects, Mooney and Agrawal report in this month's issue of *The American Naturalist*.

The researchers suggest that the milkweed has an interest in manipulating the ant-aphid relationship: Plants that use their aphids to attract more ants win protection against herbivores such as caterpillars, the team showed in another experiment. But that protection comes at a price--water and sugar the plants lose to the sap-sucking aphids, for example. For some genotypes, it apparently makes sense to have fewer aphids.

The study "makes a connection that nobody has made before," says Gina Wimp, a community ecologist at Georgetown University in Washington, D.C. Accounting for individual genetic differences and their ripple effects through a community promises to make sense of previously befuddling variation in community ecology, she says.

"It adds a lot of clarity," notes Gregory Crutsinger, an ecologist at the University of Tennessee, Knoxville. What's more, he says, it's "kind of a big deal" that plants are actually in control of the long-studied mutualism with ants and aphids.