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LOCATION IS KEY IN ECOLOGY STUDY

Location, location, location. It turns out to be a life and death matter for mites, not just a real-estate axiom.

Bean plants are attacked by mites. Then another type of mite comes along and eats the plant-eating mite. And the cycle continues.

A study of bean plants and two kinds of mites provided scientists with insight into one way that nature works to preserve populations, according to a report in the international journal Nature dated August 2.

"Sometimes there are simple answers for what you see," said William W. Murdoch, professor of biology at the University of California, Santa Barbara and a co-author of the paper, "Habitat Structure and Population Persistence in an Experimental Community." Three of the other nine co-authors are from UCSB.

"Ecologists are interested in how spatial structure in nature allows species to persist," said Murdoch. "So this is one way that can happen. The spatial structure keeps predators and prey alive. The explanation can be simple, even though nature is complicated."

In this experiment, the changing variable was spatial location. In one series of trials the scientists put all the bean plants (Phaseolus lunatus) in a "super island." All the bean plants were together in one location.

Next, they introduced the herbivorous mites (Tetranychus urticae). After that came the predatory mites (Phytoseiulus persimilis), the ones that eat the herbivorous mites.

In the "super island" or unstructured model, the prey -- the herbivorous mites -- didn't have a prayer of continued existence. For that matter neither did their predators. They quickly exterminated their prey and then had nothing left to eat, so they died out as well. Both types of mites became extinct.

But change the arrangement, create a series of islands with bean plants, and the prey and predators seem to continue their life cycle forever, or at least until the experimenters got tired of it, said Murdoch.

"It's sort of like hide and seek," he said.

In this subdivided habitat or "metapopulation" the predators are unable to kill all their prey simultaneously. They cannot drive them to extinction.

The string of islands slowed down the movement of the predators. They can't get everywhere quickly, but have to hop between islands, searching out their prey. "They persisted because the habitats were broken up," said Murdoch.

Three other co-authors on the study, Roger M. Nisbet, Bruce E. Kendall and Parvets R Hosseini are from the University of California, Santa Barbara. Other authors are: Cheryl J. Briggs of the University of California, Berkeley; Simon N. Wood of the University of St. Andrews, Fife, Scotland; Arne Janssen and Maurice W. Sabells of the Institute for Biodiversity and Ecosystem Dynamics, Amsterdam, The Netherlands; Edward McCauley of the University of Calgary, Calgary, Canada; and first author Stephen P. Ellner of Cornell University.

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