Plant and animal in direct competition for food

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USF researchers have discovered that in Florida, wolf spiders and pink sundews, a carnivorous plant, compete when food is scarce in their shared habitat. Photo: Christopher V. Anderson.

(PhysOrg.com) -- Animals often compete aggressively with each other for food or other resources, and plants often compete with each other for light, water, or other resources. Now scientists in the U.S. have found an animal that competes directly for food with a plant.

The insect-eating wolf spider (Sosippus floridanus) lives close to the ground in wetland regions of southern Florida, where it builds dense webs to catch its prey, which consists of a variety of flies, crickets, ants,

and other insects. The insect-eating pink sundew (Drosera capillaris) lives in the same bogs and catches insects by trapping them in a sticky mucous it secretes on its leaves, and then consumes hapless insects with digestive enzymes.

University of South Florida ecologist, Jason Rohr, decided to find out if the two very different species competed directly for exactly the same prey species. Rohr and colleagues surveyed sites where both species lived and observed the placement and numbers of each species. They also collected insects to determine what resources were available to the spider and plant. As a result of their observations they discovered when sundews were present the webs built by the spiders were larger than if there were no sundews in the vicinity.

The researchers then collected samples of the spiders and sundews and transported them back to the laboratory, where they placed them in 40 glass tanks and gave them crickets to eat. They planted six sundews in boggy soil in each tank, and then divided the tanks into five groups: spider/no spider with high insect food supply, spider/no spider with low insect food supply, and no spider with no insect food.

They found the sundews produced more leaves and seeds when spiders were absent than when they were present. When spiders and sundews were placed in the same tank the spiders ate most of the insects before the plants could grab them. In this case the plants produced fewer leaves, seeds and flowers. The results clearly demonstrate the presence of spiders reduced sundew fitness. The scientists said the study was the first to demonstrate a land plant and animal competing directly for food.

Rohr said animals and plants are not usually thought to compete for the same food sources, but there may be many more instances. His team plan to further their research by studying the effect on the sundew of the oak toad, a tiny insect-eating amphibian inhabiting the same boggy

regions.

The paper is published online in the *Proceedings of the Royal Society B*.

More information: David E. Jennings et al.: Evidence for competition between carnivorous plants and spiders, Published online before print May 12, 2010, doi:10.1098/rspb.2010.0465