Insecticidal Characteristics of the Desert Stingbush *Eucnide urens*

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Keywords: ecology: animal interactions, *Eucnide urens* – observations: California (USA), *Eucnide urens*.

Death Valley is a famous desert area of the southern borderlands of California and Nevada, in southwestern USA. In 2004-2005, the winter storms brought record rainfalls to Death Valley, and the following spring saw a spectacular show of color to the landscape. The normally forbidding landscape was brought to life with primroses, larkspurs, poppies, verbenas, lilacs, phacelias, and a vast array of flowers in the daisy family. With the abundance of food provided by these flowering plants came a boost in the Valley's insect population. However, during this season my wife and I observed a surprising insect-plant relationship; one that was certainly not of benefit to the desert insects!

In April 2005, we toured Death Valley and were captivated by the fields of golden blooms separating the white salt flats on the valley floor and the black basalt mountains that rose in the distance. Driving west on Highway 190 we headed for the small village of Stovepipe Wells, where we turned onto a dirt road for a 5 km (3 mile) jaunt to Mosaic Canyon. As we were driving up the washboard road rising up from the valley, my wife mumbled something between the bumps about bringing an iron bra next time. We parked at the wide bahada where water fans out as it exits the mouth of the canyon.

Figure 1: Young and old foliage. Note the insects are retained on the dead foliage.

Figure 2: Close view of *Scaeva pyrastri* attached to the armed flower peduncle.

Figure 3: A large flowering plant.

As we hiked up the canyon, the walls became gradually narrower and the name for Mosaic Canyon became apparent. The destructive damage of water over the millennia have carved through the sediment, exposing the layers agglomerated fragments of marble giving the appearance of an ancient Roman bath. As we continued our trek, the walls of the erosive path progressed to solid marble which had been highly polished. The canyon was almost devoid of plants except for those that could manage to survive growing out small crevices in the canyon wall.

One of these durable plants, bearing powdery white flowers, drew my attention—it was almost entirely covered in insects! Upon closer examination, the insects appeared to be all hoverflies (*Scaeva pyrastri*). They seemed to be stuck flat to the stems and undersides of the leaves. The undersides of some leaves were completely covered in insects! No insects were adhering to the tops of these leaves.

The undersides of the leaves had the texture of sandpaper because they were covered with fine, rough bumps. Numerous white trichomes (hairs) on the upper leaf surface inflicted painful stings when touched, similar to stinging nettles (*Urtica dioica*). There were no tacky or adhesive substances on the leaves, so it was not readily apparent why the insects were becoming stuck to the plant so quickly. I decided to watch a plant carefully. I saw that when a hoverfly landed on the top side of a leaf, it quickly walked to the underside, where it stopped close to the leaf margin. It struggled, then it stopped moving! Prodding the fly produced no movement of any part, including from the wings which were not in contact with the leaf.

Interestingly, hoverflies appeared to be in unusually high number in the canyon. I do not know if they are normally found in high numbers in the canyon or if they are lured there by some attractive property of the plant. I saw hoverflies in the plant's flowers, possibly lured by the pollen. Do the leaves produce an attractive property as well?

Upon returning from Death Valley, Barry Rice and Jan Schlauer from The International Carnivorous Plant Society identified the plant as a desert rock-nettle or stingbush (*Eucnide urens*, in the Loasaceae family). The name of this plant adequately describes the effect of specialized trichomes on the top of the leaves. However, a literature search did not reveal any information on the insecticidal characteristics of the desert stingbush. Eisner *et al.* (1998) describes a similar characteristic of the *Mentzelia pumila* (desert blazing star), also in the Loasaceae family. Another name for this plant is stickleaf, for its ability to stick to clothing like Velcro®. Eisner *et al.* (1998) studied the insect entrapping abilities of *Mentzelia pumila* extensively. Electron microscopy revealed several types of specialized trichomes with curved barbs which act as grappling hooks to immobilize the insects. Other trichomes may act to puncture the insect. There was no description of the nettle-like trichomes found on *Eucnide urens*. The insect-trapping trichomes of *Mentzelia pumila* are not restricted to the underside of the leaf and stems.

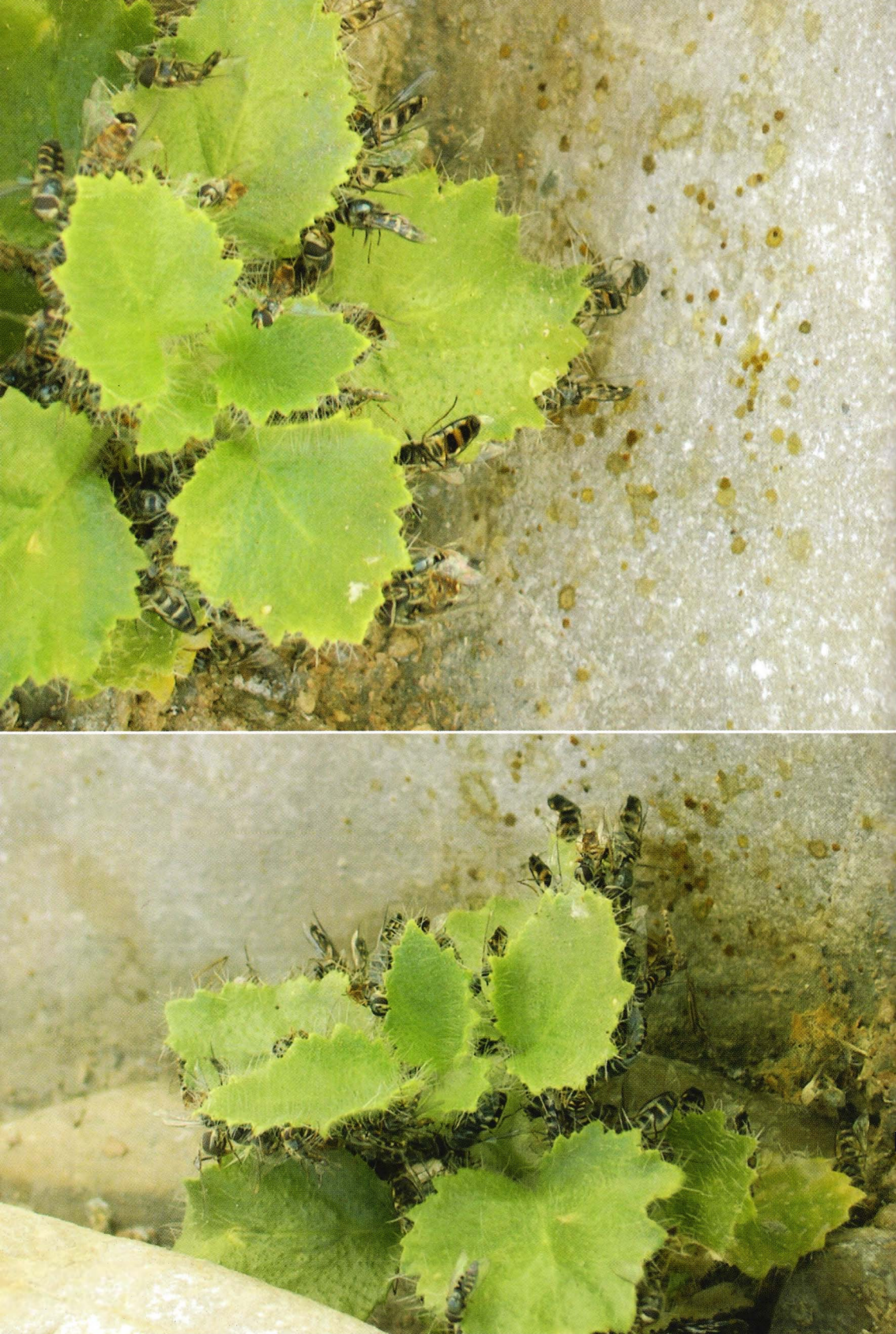
The evolutionary benefits of these hooked trichomes are not readily apparent. One possible benefit is that the insects may be providing a nutritional benefit to the plant. It may be that the plant can absorb moisture or other nutrients from direct contact with the insect. Another possible benefit may be that when the insect-littered leaves fall to the ground and decay, they may provide nutrients that are lacking in the soil.

References:

Eisner, T., Eisner, M., and Hoebeke, R.E. 1998. When defense backfires: Detrimental effect of a plant's protective trichomes on an insect beneficial to the plant. Proc. Natl. Acad. Sci. 95: 4410-4414.

Looking Back: CPN 25 years ago

Bruce Lee Bednar published a contrite and candid confession about the first time he ever saw pitcher plants (*Sarracenia* and *Drosera*) in the wild, sixteen years earlier (1965) in the New Jersey Pine Barrens: "One tends to get frenzied, almost hysterical, with a first encounter with carnivorous plants in the wild. Conservation was the last thing on this young person's mind. Not taking time to think (at all), I pulled up every *purpurea* I could find. To make matters even worse, I returned that fall with a friend and removed the last four plants we found. Certainly very poor judgement on my part." Bruce mentioned he visited the site years later "out of guilt" and was relieved to see that plants were still present, possibly having resprouted from broken rhizomes. This editor (BR), a diehard conservationist, can sympathise having committed similar youthful sins. It is an ICPS conservation goal to transform collector interest from poaching pressures that harm carnivorous plants, into legal activities that aid wild populations.



CARNIVOROUS PLANT NEWSLETTER

Journal of the International Carnivorous Plant Society
www.carnivorousplants.org

Volume 35, Number 4
December 2006

Front Cover: *Drosera intermedia* and *Drosera anglica* shown growing side by side at Vales Moor. Article on page 100. Photograph by Aidan Selwyn.

Back Cover: Two views of a young *Eucnide urens* plant. Article on page 119. Photograph by Michael Metzler.

Carnivorous Plant Newsletter is dedicated to spreading knowledge and news related to carnivorous plants. Reader contributions are essential for this mission to be successful. Do not hesitate to contact the editors with information about your plants, conservation projects, field trips, or noteworthy events. Contributors should review the "Instructions to Authors" printed in the March issue of each year. Advertisers should contact the editors.Views expressed in this publication are those of the authors, not the editorial staff.

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Date of effective publication of the September 2006 issue of Carnivorous Plant Newsletter: 22 September 2006.

The ICPS is the International Cultivar Registration Authority (ICRA) for cultivated carnivorous plants according to The International Code For The Nomenclature of Cultivated Plants. Send relevant correspondence to the ICPS. Inc.

PUBLISHER: ICPS, Inc., Pinole, California. Published quarterly with one volume annually. Desktop Publishing: Steve Baker, 5612 Creek Point Drive, Hickory, NC 28601. Printer: Kandid Litho. Logo and masthead art: Paul Milauskas. Dues: $25.00 annually. © 2006 Carnivorous Plant Newsletter. All rights reserved. ISSN #0190-9215.