Additional notes on *Eucnide urens* (Parry ex Gray) Parry in the Family Loasaceae

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Michael Metzler (2006) gave such an interesting account of *Eucnide urens* that it is worth providing additional information about the plant. *Eucnide urens* is in the Loasaceae family, a group of about 15 genera and 260 species in the Americas, Africa, and the Middle East. Plants in this family (which includes herbs, shrubs, and small trees) often are covered with stiff hairs that may be stinging, grappling, or gland-tipped (Mabberley 1997). For an excellent set of photographs of these remarkable trichomes (hairs) on *Menzelia pumila* (also a member of the Loasaceae), refer to Eisner *et al.* (1998). In that paper, three types of trichomes are described and called type 1, 2, and 3. Type 1 trichomes are tall and slender, with a rosette of recurved barbs making the trichomes exactly like a grappling hook. Type 2 trichomes are larger, conical, and with a pointed tip. Type 3 trichomes are intermediate in size, conical, but with a grappling-type of tip. The grappling hooks function to retain insects, the others cause mechanical damage to them. Studying herbarium specimens of *Menzelia pumila*, I observed that the upper leaf surfaces had only type 2 trichomes, the lower leaf surfaces had mostly type 1 trichomes and occasional type 2 trichomes, while the leaf margins had type 3 trichomes.

The genus *Eucnide* comprises fourteen species (Mabberley 1997), including the Texan species *E. bartonioides* Zucc. which while stinging, is sometimes cultivated. The genus includes annuals, biennials, and perennials that range from small herbs to sub-shrubs. *Eucnide urens* occurs in the desert provinces of California, Nevada, Utah, Arizona, and northern Mexico, especially in creosote (*Larrea tridentata*) bush scrub communities at elevations below 1400 m (4600 feet) (Hickman *et al.* 1993).

I viewed the leaf surfaces of *Eucnide urens* from Death Valley (Titus Canyon, DAV #151283) at 30-100 X, and verified that *Eucnide urens* has trichomes. The upper leaf surfaces bear unbarbed stinging spines 4-5 mm long. The lower surfaces bear type 1 grappling trichomes 0.6-1.5 mm long and occasional stinging spines. The stems, peduncle, and calyx lobes are especially densely armed with spines and type 1 trichomes up to 2 mm long. Type 2 and type 3 trichomes are absent on *Eucnide urens*[1]. What makes *Eucnide urens* so particularly unpleasant to insects is the addition of the long stinging spines, as they can inject venom. Apparently, the venom that *Eucnide* injects is toxic to *Scaeva pyrastri*. While Metzler (2006) notes that insects on *Eucnide* died almost instantly, Eisner *et al.* (1998) reported that in the case of insects on *Menzelia pumila*, "death came slowly to those caught, and that survival was still an option for those able to pull loose."

The value of trapping insects to *Eucnide urens* is mysterious. A review of images on the internet and of herbarium specimens of *Eucnide urens* at UC Davis (DAV) revealed no other recorded incidences of large numbers of insects captured on the plant surfaces. While it might be attractive to suggest the possibility of some sort of insect carnivory, or soil-enhancement by the carcasses of dead prey—such as theorized by Eisner *et al.* (1998) in the case of *Mentzelia pumila*—trapping insects does not seem to be a consistent activity by *Eucnide urens*. The observations by Metzler (2006) seem to be of a serendipitous event. However, it certainly is enjoyable

[1]The stinging spines of *Eucnide urens* are probably analogous to the type 2 trichomes of *Menzelia pumila* because their distributions on their respective plants are the same. Also, the stinging spines are set atop venom glands, and similar structures can be seen at the base of the type 2 trichomes.

speculating how such accidental innovative activities could, in the past, have encouraged the development of carnivory in modern carnivorous plants. Perhaps if left to evolve for many millennia, plants such as *Eucnide urens* might develop into novel carnivorous species!

Why were the hoverflies attracted to the *Eucnide urens* plants in such large numbers? As an adult, *Scaeva pyrastri* feeds on nectar and pollen (Bugg 2006, pers. comm.), and in fact is apparently quite selective in the flowers it feeds upon (Bugg 1992; Colley & Luna 2000). As its common name implies, hoverflies are skilled aerialists and are not weakly-flying insects that blunder into surfaces accidentally. The *Scaeva pyrastri* in Death Valley were obviously drawn to the plant. Were they attracted to the flowers as the only available source of food in Mosaic Canyon, and landed on the leaves only to rest?

Another possibility is that the insects were interested in the plant as a site to lay eggs. While as an adult *Scaeva pyrastri* is a flower feeder, its larvae are voracious feeders on aphids—a single *Scaeva pyrastri* larva may consume 500 aphids in its development (Bugg 1992)[1]! Is it possible that the hoverflies were attracted to the plants because of an aphid infestation? Metzler (2006) did not mention seeing large numbers of aphids present, nor are they visible on his photographs. There are droplets of brown fluid staining the rock surface under the plants—it is unclear whether these are from hemolymph (blood) from the trapped insects, sugary exudates from a hidden aphid population, or exudates from the plant?

Clearly, this is something new for observant "flower-peepers" to look for in their annual spring treks through the deserts of the USA!

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[1]Many of the trapped insects that Eisner *et al.* (1998) observed on *Mentzelia pumila* were a species of Coccinellid beetle, *Hippodamia convergens*, that preys upon aphids. Astonishingly, despite its extensive trichome defenses, *Mentzelia pumila* is attacked by an aphid (*Macrosiphum mentzeliae*) that manages to roam the plant in safety—protected from predators by the very trichomes that should function to protect the plant!