

Ruderals and the life of Tarweeds



SKYLINE GARDENS · SATURDAY, JULY 14, 2018 20 Reads

Dear Skyliners,

We're still hitting the Scattergrass (*Ehrharta*) hard. Both outings last week were in the Bay Grove, where we weeded out one-year seedlings that are coming to flower. Overall in the area, we're about 95% of the way there in Scattergrass containment, so steady as she goes. Native bunch grasses (*Melica torreyana*) that we planted there last January are doing really well and now making their own seeds. The long term outlook there is great!

We're going to try shifting our mid-week outing to Thursday afternoons at 4 pm for the summer. Hopefully the date change will work with most of us. Please note that we're also shifting the time to 4pm. This will mean we can enjoy sunsets and the first stars. Sunday will still be from 9:30 am to 1pm.

Please let me know if you can make it.

Ruderals - that's a new word to many of us. In Botany, ruderal means a plant who grows in disturbed or waste areas. In terms of plant succession, ruderals are the colonizers that first grow in open ground. In lowland California, many common invasives are also ruderals, such as, thistles, Hemlock, Wild Oats (*Avena*), Bromes, Burr Chervil, and French Broom. We have learned these all too well at Skyline.

We have nearly eliminated these invasive ruderals in many places, and so we're beginning to meet the native ruderals and learn how they behave in colonizing open or rough ground. The most common native ruderals at Skyline are Tarweeds (*Madia* sp.), Wild Rye (*Elymus glaucus*), California Brome (*Bromus carinatus*) and Coyote Bush (*Baccharis*). And, some of our wildflowers also behave like ruderals and those include Clarkia, Everlasting (*Pseudognaphalium calif.*), and the Lupines.

We have especially noticed how quickly the Tarweeds move in. The first year there may be just a few, but they are vigorous seeders and by the second year, they can nearly dominate in spots. This then sets up the conditions for the colonizing shrubs, such as Coyote Bush, but also Gooseberry, Coffeeberry, Elderberry and Sticky Monkey. It is so interesting to watch this succession drama with all of them being native plants. This is a rare treat in lowland California, as the invasives are almost always present.

So, let's take a closer look at these Tarweeds and their ecology. They are members of the Aster (Sunflower) family that are known for the sticky drops of aromatic oil on their leaves and flower buds. The Tarweed who is blooming right now along the Skyline Trail is the Coast Tarweed, or *Madia sativa*. These are tall, rank growers. They often bloom in the evening. Since Tarweeds usually bloom in the warmer months, this seems to be a successful strategy to protect their flowers from being burned by the hot sun.

Here is Coast Tarweed in full bloom:



(photo by Bill Bouton, via iNaturalist)

Many people have wondered what is the point of the sticky tar? Up till recently, I have responded, "Imagine you are a small plant trying to flower and make seeds. There are many browsing animals, large and small, who would like to eat you, such as deer and rabbits. What can you do to protect yourself - you can't run away?"

(Credit here to John Muir, who said: "Any fool can cut down a tree. They can't run away.")

So one way plants protect themselves against browsers is to make themselves taste bad by developing strong chemicals. Think about Sage, for example. I believe Tarweeds use this strategy, because I rarely see browse damage to mature plants.

However, some insects have become specialists in eating the flowers of Tarweeds. One of them is the Small Owlet Moth, (*Heliothodes diminutiva*). The adults lay eggs on Tarweed flower buds and the caterpillars then eat the Tarweed flowers and buds. Here's a picture of the caterpillar.



This picture also clearly shows the many droplets of 'tar' at the tips of the bristles on the bud, stem, and leaves. (Thanks to Ken-ichi for this picture).

Here is a picture of a caterpillar, caught in the act of eating a Tarweed flower bud:



(photo by Sam Beck)

If the caterpillars are successful, we Tarweeds will not make any seeds. So how do we plants protect ourselves against these hungry ones? What if many other insects are also attracted to Tarweeds and the smaller of them, such as aphids or small flies, can get caught in our sticky tar and can't get away? And, what if predator insects are attracted by the dead ones and come to eat them?

Here is just such a predator, the famous or infamous Spine-Collared Assassin Bug (*Pseliopus spenicollis*)



The assassin bugs use their long proboscis to spear and inject a lethal saliva into their prey, which also liquifies the insides of the prey so they can be sucked out. This super clear photo (thanks again, Ken-ichi) is taken of one on an Everlasting flower head. Can you see the spiny collar? The proboscis here is tucked under the body.

And here's one, in action, spearing a fruit fly on a Tarweed:



(photo by Sam Beck)

The assassin bugs are just one of several predator bugs who visit Tarweeds. So the next question is would these predators who come to eat the carrion bugs also notice and eat the caterpillars of the Owllet Moth? And would this reduce the numbers of caterpillars enough to make a difference to the Tarweeds in terms of their fertility - making good seeds?

The answer seems to be yes. This was tested by a couple of researchers at UC Davis, who placed five dead fruit flies on selected tarweed plants each week, and then compared the results with 'un-doctored' control plants. They found that the tarweeds with the extra 'food' had significantly more blossoms and increased seed production. Here's the link to a popular summary of their research:

<http://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=9020>

So, we Tarweeds have adapted to protect ourselves both by tasting bad to browsing mammals and by trapping small insects with our tar, which brings in predator bugs who also eat the caterpillars who are eating our flowers.

That's pretty subtle and complicated, and also just amazing.

Take a closer look next time you are out.

Happy Trails,

Glen

PS. Special thanks to Ken-ichi Ueda of iNaturalist for bringing this drama (and wonderful photos) to our attention.