

Are You Sure It's a Popcorn Flower?

by Wayne P. Armstrong

The borage family (*Boraginaceae*) includes many wildflowers in the Colorado and Mojave deserts of North America. They typically have small white flowers in coiled inflorescences, and with stems and leaves covered in glistening hairs. In tropical regions, this family includes hardwood trees (*Cordia*) with beautiful, showy flowers. Two of the most common genera in the Anza-Borrego desert region are the so-called “popcorn flowers” *Plagiobothrys* and *Cryptantha*. DNA evidence indicates that root parasites of the genus *Pholisma* (*Lennoaceae*) and members of the *Hydrophyllaceae* (*Phacelia*, *Nemophila*, *Nama*, etc.) are closely related to the *Boraginaceae*. In the *Jepson Manual 2nd Edition, Vascular Plants of California* (2012), these species are placed in the borage family.

Popcorn or White Forget-Me-Not?

Species of *Cryptantha* are often referred to as white “forget-me-nots,” although some people call them “popcorn flowers.” I think the latter common name is best applied to members of the closely related genus *Plagiobothrys* (Figure 1). Both genera have white corollas in tight coiled clusters called

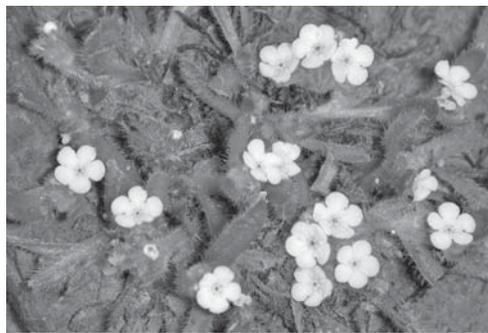


Figure 1. *Plagiobothrys californicus* var. *fulvescens*. Members of the genus *Plagiobothrys* are the true popcorn flowers. The flower clusters with distinct yellow centers (throats) resemble popcorn more than the flowers of *Cryptantha* species.

scorpioid cymes. In my opinion, the flower clusters of *Plagiobothrys* look a little more like popped grains of corn, technically referred to as exploded endosperm. This is particularly true of spreading, low-growing varieties of *P. collinus*, appropriately named California popcorn flower. From a distance, the white flower clusters resemble popcorn scattered on grassland and open ground in coastal sage scrub. Resemblance between *Cryptantha* and popcorn is slight (Figure 2).

Knowing Your Nutlets

To reliably separate the genus *Cryptantha* from *Plagiobothrys* you must carefully examine the minute nutlets enclosed within five calyx lobes covered by glistening hairs (Figure 3 and Figure 4). This requires patience and a good 10x or 20x hand lens or a dissecting microscope.

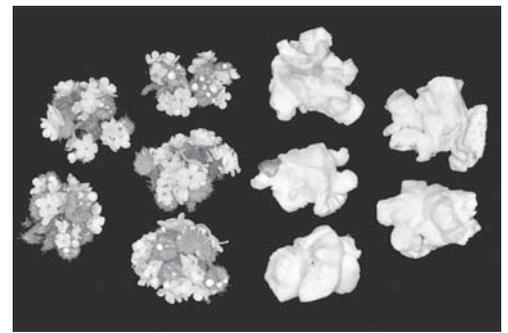


Figure 2. There is a slight resemblance between the tight, coiled flower clusters of *Cryptantha intermedia* (left) and Orville Redenbacher's Popcorn (right); however, there is a big difference in taste!

In *Plagiobothrys* the nutlets have a keel (ridge) above the elevated attachment scar. *Cryptantha* nutlets have a distinct groove above the recessed attachment scar. Depending on the species, the nutlets range in size from 0.5 to several millimeters. For some extreme macro images of nutlets on a black background, I took the pictures on a black range top with a digital SLR and ring flash. For a size relationship I used cubical grains of table salt, about 0.3 mm on a side.

Plants to Dye For

Stems and leaves of *Plagiobothrys nothovulvulus* and *P. arizonicus* contain a reddish dye that rubs off on your fingers. Our common desert annual *Cryptantha micrantha* (purple-rooted forget-me-not) also gives off this reddish dye. Several members of the *Boraginaceae* are known

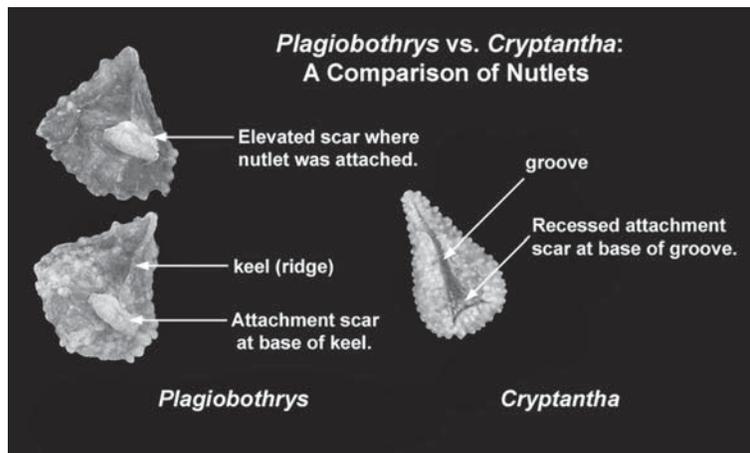


Figure 3. Nutlet of *Plagiobothrys* compared with *Cryptantha*. *Plagiobothrys* has a raised (elevated) attachment scar at the base of a ridge (keel). *Cryptantha* has a recessed attachment scar at the base of a narrow groove. The bottom line here is: If your nutlet has a distinct groove it is undoubtedly a *Cryptantha*.

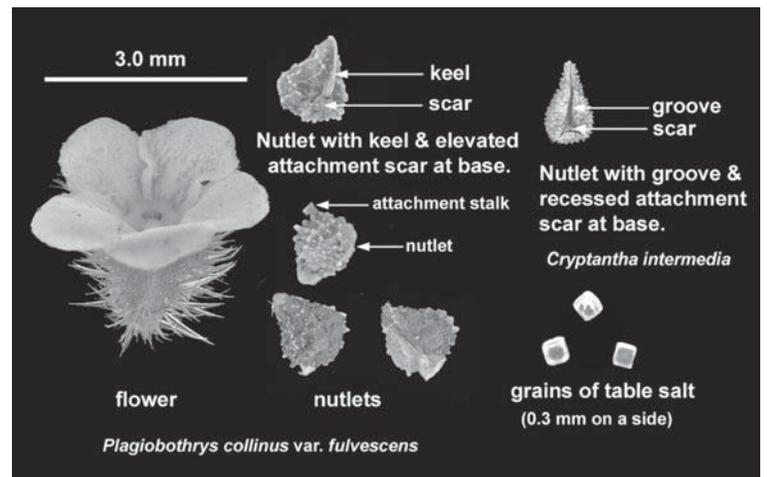


Figure 4. Comparison of the nutlets of California popcorn flower (*Plagiobothrys collinus* var. *fulvescens*) with the common “white forget-me-not” (*Cryptantha intermedia*). Depending on the photo, I use grains of ordinary table salt for a size relationship in Wayne's Word ultra-macro images.

for the deep red phenolic dye called *alkannin* (also spelled *alkanet*), including dyer's bugloss (*Alkanna tinctoria*). It was used to dye textiles, and as a coloring for vegetable oils, medicines and wine, and is commonly used today as a food coloring. In addition, it reportedly has wound healing and anti-inflammatory properties. The term "bugloss" applies to several species in the *Boraginaceae* with blue flowers and hairy foliage. It is derived from a Greek word meaning ox-tongue in reference to the rough, hairy leaves.

Other Borage Family Annuals

There are other annuals in the *Boraginaceae*, such as *Pectocarya* and *Harpagonella* with minute white flowers in scorpioid cymes; however, they have very distinctive fruits (nutlets) that are much different from *Cryptantha* and *Plagiobothrys*. White or blue-flowered "forget-me-nots" (*Myosotis*) resemble *Cryptantha*, but they are not native to San Diego County. Additional members of the traditional *Boraginaceae* in the Anza-Borrego region include yellow fiddlenecks (*Amsinckia*), Heliotropium, and the low shrub Tiquilia (*Coldenia*). Two Mediterranean genera (*Borago* and *Echium*) are commonly cultivated in San Diego County. Their beautiful blue flowers are used for soothing and medicinal teas in Iran, Pakistan and India. The "stickseeds" (*Hackelia* and *Lappula*) occur outside San Diego county. Nutlets with barbed prickles, make them effective hitchhikers. In fact, I gave *Hackelia floribunda* a rating of 4 Sock Removal Difficulty Units (SRDUs) on my Wayne's Word Top 17 Hitchhiking Plants.

I once camped on the western slope of the Panamint Range, Inyo County on a very cold winter night. I was finally forced to climb out of my camper shell at midnight and put on long underwear. Unfortunately, I stood in a patch of stickseed during this clothing transfer resulting in one of the most miserable nights I ever spent in my entire life. Ironically, I was seeking another serious hitchhiker, the pink-flowered Arizona devil's claw (*Proboscidea parviflora*), reportedly introduced high in the Panamint Range in the late 1800s by the legendary Shoshone named Hungry Bill.

Identifying *Cryptantha*

As stated above, to identify a species of *Cryptantha* you must observe the nutlets. They can still be green, but they must be mature enough to show minute outer bumps called tubercles. Assuming you have eliminated all other genera in the borage family, here are some of the questions presented

to you in taxonomic keys in Munz and the Jepson Manual: Do you have 1, 2 or 4 nutlets? Are your nutlets roughened by minute tubercles or are they smooth and shiny? Are all of your nutlets the same (homomorphic) or do you have dissimilar nutlets (heteromorphic)? Are the margins of your nutlets winged or knifelike with thin edge, or are they rounded? Is the shape of your nutlets triangular-ovate or oblong-lanceolate?

There are other questions about the style length related to nutlets, size of flowers (diameter of corolla limb) and details of the glistening hairs (trichomes) on the calyx. For example, if you spot a *Cryptantha* in Coyote Creek with a large calyx 10 mm in length, long trichomes with bulbous bases, and one shiny, smooth nutlet it is undoubtedly the rare and endangered *C. ganderi*, named after the famous San Diego naturalist Frank Gander. Another similar-appearing species in Coyote Creek, *C. barbiger*, typically has four tubercled nutlets. Mike Simpson's *Cryptantha* page at SDSU has marvelous images of all 22 species native to San Diego County. Tom Chester has prepared a nice key to *Cryptanthas* of Anza-Borrego arranged in an easy to follow table (See links in References).

Could Be a *Pectocarya*

The comb burs (*Pectocarya*) are common in the Anza-Borrego Desert. Like *Cryptantha* and *Plagiobothrys*, they have minute white flowers; however, the nutlets are very different. The four spreading (divergent)

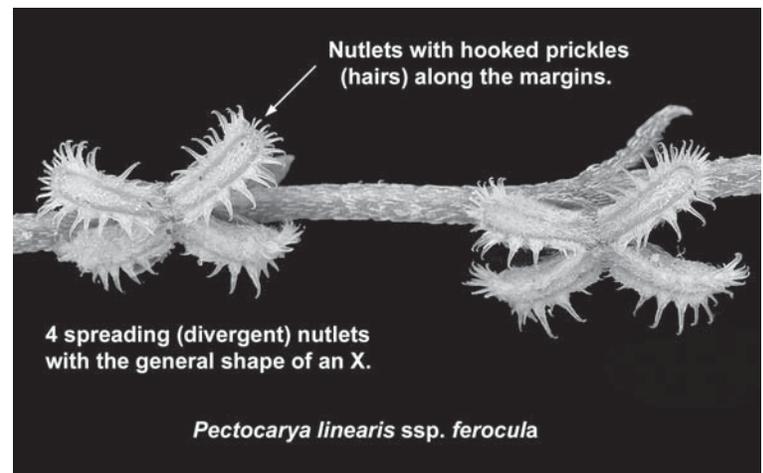


Figure 5. *Pectocarya linearis* ssp. *ferocula*, a coastal comb bur that also grows in the Anza-Borrego desert. The barbed nutlets make effective little hitchhikers.

nutlets have the shape of a tiny X. Each nutlet is fringed with minute prickles (hairs) along the margins. If you spot a small annual in a sandy wash with tiny X-shaped structures along its stem, it is most certainly a *Pectocarya* (Figure 5). To identify the species, you need a mature nutlet. The coastal gabbro endemic called grappling hook (*Harpagonella palmeri*) has a very unique fruit with barbed projections radiating out in all directions. It has a rating of 10 Sock Removal Difficulty Units (SRDUs), surpassed only by the ultimate hitchhiker from Madagascar (*Uncarina grandidieri*). The latter species belongs to the sesame family (*Pedaliaceae*) along with our devil's claws (*Proboscidea*).

References

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