

COLOR PATTERNS IN *DARLINGTONIA*

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I once believed that all *Darlingtonia* plants had the same basic coloration pattern. I held this belief because all the articles I read on the genus rarely treated plant pigmentation in any depth, other than to mention that the plants were brightly colored with red and green. However, when I moved to northern California I was bedazzled by the great diversity of color types I observed in wild *Darlingtonia* populations! These pigmentation variants are not documented in the literature, but they deserve to be noticed.

Before I proceed, some warnings are required.

Darlingtonia, like any plant, can be modified by its environment. This is important to remember, especially since *Darlingtonia* grows in an astonishing diversity of habitats. Some sites may be relatively protected shrubby areas on slow seepages of water oozing down gentle hillsides, other sites may be crumbling cliff-faces that expose the plants to burning sunlight, cold nights, concentrated serpentinic water, and physical abuse from tumbling rocks. How strong are the roles of habitat and genetics in determining the pigmentation patterns in the resident *Darlingtonia* populations? It is difficult to tell, and ultimately, this matter may have to be addressed by reciprocal transplant experiments. (Since wild *Darlingtonia* plants rarely thrive when transplanted, there are significant practical barriers to this kind of study.) Pitcher age is also a factor in pigmentation intensity. Pitchers do not display colors well in the spring—the colors are not fully expressed until late summer. Pitchers that survive into a second year may become uniformly red, regardless of the first season's pigmentation pattern. Furthermore, a brightly colored plant, when grown in shade or in less than optimal conditions, may be transformed into a drab specimen.

All these complicating factors may be why we hear so little about *Darlingtonia* pigmentation variants. Field botanists may be dazed by the panoply of habitat types, pigmentation variants and their intergrades, or may simply be uninterested in such details. On the other hand, many of these pigmentation patterns fade when the plants are grown in cultivation. (Indeed, it is well known among growers of *Sarracenia*—a comparatively forgiving plant—that the deep red colors of some plants may fade if they are even slightly disturbed.) As such, horticulturists have also overlooked these pigmentation variants.

The most notable pigmentation characters are expressed in the forked fang appendages and the inflated bell at the top of each pitcher. I will discuss six pigmentation variants in this paper. These are the six I think are most striking, and the most likely to be genetically fixed.

Green fang. This is the simplest color pattern for *Darlingtonia*. The plant is green overall—both on the inflated pitcher-top bell and the fangs. The sepals are yellow-green and the petals are red. Red pigment is present in small amounts on the pitchers, and especially on the pitcher bases. (The wild-occurring cultivar *Darlingtonia* 'Othello' is anthocyanin-free, but occurs in a pitcher plant bog dominated by the green fang variant. Therefore, it is probably related to this population of plants.) Plants of other pigmentation variants, growing in deep shade, may look like this pigmentation variant but they can usually be identified as light-starved impostors because they are floppy and etiolated.

Red-edge fangs. The green fangs of this plant have some red blush near the area of attachment to the pitcher, but most importantly, there is a red stripe running along each fang, filling in the tissue between the outer fang vein and the outer

fang margin (see Figures 1, 2). The primary veins are often highlighted with red pigment. Other than these details, this plant is much like the green fang variant. I have only found the red-edge fang variant scattered sparsely at sites with large numbers of the blush fangs pigmentation variant (see below). Nonetheless, the two types consistently maintain their pigmentation differences with surprisingly few intergrades.

Blush fangs. This pigmentation variant is perhaps the most common in California. The bell is green, but the fangs are liberally blushed with red pigment (Figure 3). While all the pigmentation variants described in this paper may bear red spots throughout the bell and pitcher tube surfaces, some individuals of this variant outshine all the others in terms of spotty excess!

Crimson fangs. The intensely blood-red fangs of this form make this one of the most beautiful pigmentation variants. The fangs contrast boldly against the generally green bells, which are often veined red on the lower surface (see Front Cover). I have seen this variant at only one site, where it grew with large numbers of the two previous variants.

Crimson pitcher. This lovely plant is intensely red over its entire surface. Only the fenestrations interrupt the intense red pigmentation. Red pigmentation may even be expressed on the sepals, peduncle, and floral bracts. The most boldly colored specimens (see Figure 4) of this and the red keel variant I have observed have been on steep, bare serpentine slopes. It is unclear how much of the pigmentation intensity is due to habitat specifics.

Red keel. Like the previous variant, this variant has zones of solid crimson on its pitcher bells and tubes (Figure 5), but the red on this variant's bell is confined to the front-underside surface. The fangs, meanwhile, are surprisingly subdued in their red pigmentation. This variant often occurs with the previous variant, and plants intermediate between the two are common. While it is not at all clear how to sort them out, the red keel and crimson pitcher plants represent good sample extremes.

While these pigmentation variants are at least worth noting, I do not believe they merit formal designation at any infraspecific rank. This paper is not to be misconstrued as a document establishing any *forma*, *varietas*, or cultivar names!

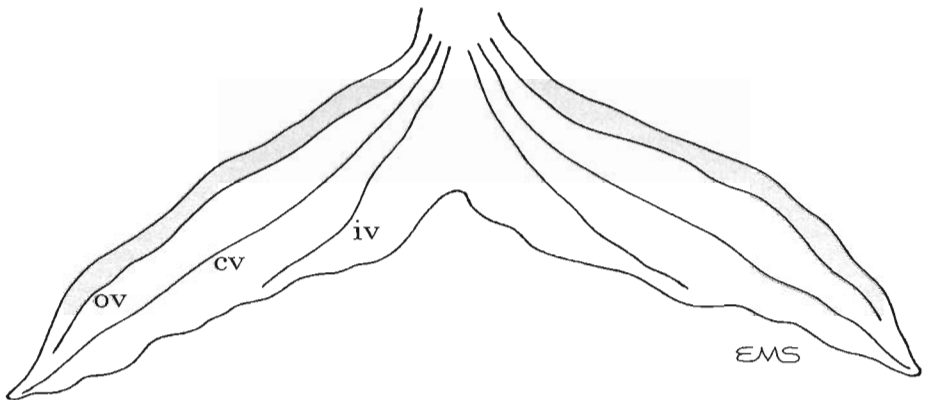


Figure 1: *Darlingtonia* fang profiles. Outer vein (ov), central vein (cv), and inner vein (iv) are labeled for one fang lobe. Shading indicates the distribution of red pigmentation in the red-edge fang variant. Drawn by E.M. Salvia.



Figure 2: *Darlingtonia*: red-edge fang variant. Photograph by E.M. Salvia.



Figure 3: *Darlingtonia*: blush fang variant.



Figure 4: *Darlingtonia*: crimson pitcher variant.



Figure 5: *Darlingtonia*: red keel variant.

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Front Cover: *Darlingtonia*: crimson fang variant. See article on page 100.

Back Cover: A new species of *Heliamphora*, photographed by Dr. Andreas Wistuba. See article on page 120.

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