President’s Message:
Plants with no roots, no stems, no leaves and no chlorophyll:
The Stemsuckers
by Rich Spjut

What are stemsuckers? As the title may suggest, they are parasites, classified in the genus Pilostyles, in a small family, Apodanthaceae — with one other genus — Apodanthera, also parasitic. They live entirely inside other plants, and only become visible when they flower; the flowers, which burst out through the host stem, are not likely to be seen unless one has made been made aware of Pilostyles, in fruit resembling perhaps tiny candy balls stuck on the outside of the bark of woody stems. Pilostyles hosts are legume genera, whereas Apodanthera hosts are genera in the willow family, Salicaceae. The vegetative part of the plant that grows inside the host generally requires magnification greater than 60x to see the endophytic system that consists of tiny hair-like filaments intertwined among the host vascular cells, with “sinkers” analogous to miniature eyedroppers, about 1/20th of a millimeter in diameter. Sinkers penetrate from near the host surface towards the plant’s water-pipes (xylem), sucking up water and dissolved nutrients as the host transports the solution of soil nutrients taken up by its roots to the stems and leaves above. The ‘eyedropper cap’ becomes the flower that bursts outwards though the host stem. As the host plant continues to grow, so too does the Pilostyles infection, keeping in phase with new apical growth (isophasic growth).

There are about 10 Pilostyles species, each very picky on who they pick on. There are three in coastal southwestern Australia: P. coccoidea, host Jacksonia; P. collina, host Gastrolobium, Oxylabium; and P. hamiltonii, host Daviesia four spp.; one in tropical woodlands of eastern south-central Africa P. aethiopica, host Berlinia, Brachystegia three spp., Julbernardia, Pseudoberlinia, and Westia; one in Iran P. haussknechtii, host Astragalus twelve spp., Halimodendron, and Onobrychis; one in Peru, Bolivia, Chile and Argentina, P. berteroi, host Adesmia, eleven spp.; one widespread in dry forests of tropical America, P. blanchetii, host Bauhinia, Cassia, Dicolea, Galactia, Mimosa, and Schnella; one in Colombia, P. boyacensis, host Dalea; one in southern Mexico and Central America, P. mexicana, host Calliandra; one in Sonoran and Chihuahuan deserts, P. thurberi, host Psorothamnus, Dalea three spp. Only P. boyacensis and P. thurberi share the same host genus (Dalea); P. boyacensis was recently described and found most related to P. thurberi.

Multiple genera that host a stemsucker species are closely related; for example, Psorothamnus was formerly Dalea in the older California floras. Both genera have conspicuous colored aromatic spherical glands on stems, leaves and fruits. Most Pilostyles species seem to be geographically isolated from one another except for some overlap of three species in Central America.

Our California species, Pilostyles thurberi, specifically...
likes Emory’s indigo bush (Psorothamnus emoryi), which is common in Riverside and Imperial counties, but only plants in Imperial and San Diego counties get infected. I have collected it on Dalea formosa in Big Bend region of Texas. Not all Dalea plants in a wash host Pilostyles, only about one in 20 plants (label for voucher specimen, 16 Nov. 2002).

Pilostyles relationships go far beyond species and genera. The hosts for the Mediterranean and semi-desert species (Iran, Australia, Chile, southwestern N America) all belong to the subfamily Faboideae, whereas for those species in tropical regions, the host genera belong to other subfamilies.

How does Pilostyles reproduce and spread? Flowers that may develop yearly or seasonally are unisexual and lack color differentiation of petals, so there are “tepals” and “bracts.” Also, the host may have only one Pilostyles individual, meaning only one sex. Bees, wasps, flies and ants have been noted to be pollinators. Thus, pollinators have to fly or crawl to another plant, to be successful in pollination, and, of course, it has to be a host infected by a female Pilostyles. The ovary of the flower matures into an undifferentiated pericarpium (fruit) that has been referred to as a berry, which may contain a hundred or more tiny seeds, a seed in P. coccoides ~ 0.4 mm long, ± globular to broadly ellipsoid. For a seed to germinate, it has to find an uninfected host of the same species, so not just any old legume will do. Two of the Australian species are reported to have both sexes on the same host.

Judging from the geographical and taxonomic data, Pilostyles probably originated in Gondwana before it split apart and then spread north into the tropical regions and adapting to semi-arid regions in North America and Southwest Asia.

Conservation Corner
Request for Your Help!
by Lucy Clark & Fred Chynoweth

The U.S. FOREST SERVICE HAS ISSUED A Revised Draft Environmental Impact Statement/Planning Document for our Sequoia and Sierra Forests that will be in effect for perhaps 20 years. This document can be found at: https://www.fs.usda.gov/detail/r5/landmanagement/planning/?cid=STELPRD3802842.

The Forest Service favors Alternative B but conservation groups urge the public to support Alternative C with additions from Alternative E.

Alternative C recommends more wilderness protection, proposes more acres of forest restored and more riparian and meadow restoration. The FIRST addition recommended is to add “backcountry management areas”, using boundaries developed by conservation groups which would be aimed at reducing conflicts with motorized and mountain bike trails.

The SECOND addition needed is to address the problem evident in chapter 2, under the title “Animal and Plant Species” (page 47) where the Draft Plan Revisions have within their plan components NO STANDARDS REQUIRING SURVEYS for at-risk plant species before logging, prescribed fire, or any other projects. Knowing if, and to what extent, at-risk plants occur on a proposed project site is BASIC to the planning and execution of the project in a manner that preserves plant species and associated habitats in our forests.

Pre-project surveys carried out during appropriate growth periods by botanists are necessary to ensure the survival of at-risk plants and other essential components in the Sierra and Sequoia National Forests. We recommend that such standards be included in plan components, to protect at-risk plant species, before any plan is finalized.

✦ You could start your letter with your favorite location in one of the forests...and tell WHY.
✦ Follow that with your support for Alternative C, ...and tell WHY.
✦ And then tell why you support the backcountry areas in Alternative E.
✦ The big issue is the need to do botanical surveying before they do any work, so they know what grows where, so that plants of concern/at risk plants can be protected.
Makes sense, no? Do it!

Due date is September 26, 2019!
Address found at USFS site listed above.