

Comparison of Two Parasitic Vines: Dodder (*Cuscuta*) and Woe Vine (*Cassytha*)¹

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INTRODUCTION: "Dodder" is a name often applied to two genera of parasitic vines: *Cuscuta* (Convolvulaceae) and *Cassytha* (Lauraceae). *Cuscuta* is a pure (obligate) parasite of plants because dodder plants lack chlorophyll (Mabberley 1987). *Cassytha* is a hemiparasite of plants because *Cassytha* plants do contain chlorophyll and can produce some carbohydrates for the plant's nutrition. Each is potentially severely damaging or fatal to a wide spectrum of host plants attacked (Wellman 1972; Agrios 1988; Dawson *et al.* 1994).

Despite great taxonomic differences, these two species are very similar in appearance and cause confusion even among trained observers. Both have thin, yellow-to-orange colored viny stems, and are virtually leafless and rootless. *Cassytha*'s green stems will become orangish with age (Fig. 1). *Cuscuta* stems are smoother and have a more shiny appearance than *Cassytha*, which has ridged stems. When crushed, a pungent scent is released by *Cassytha*, while *Cuscuta* is odorless. The fruits of *Cuscuta* are dry, with black seeds, while *Cassytha* has juicy white berries. Still, identification is best left to specialists under most circumstances.

For convenience, we will refer to *Cuscuta* as "dodder" and *Cassytha* as "woe vine." Both are known by a variety of common names, including vampire vine, devil's guts, scald, and love vine (Mabberley 1987; Wellman 1972; Wunderlin 1982).

FAMILY DIFFERENCES: Dodder is a member of the Convolvulaceae family which includes 58 genera, such as morning glory (*Ipomoea* spp.) and many other vines, herbs and trees (Mabberley 1987). *Jacquemontia reclinata* House (Convolvulaceae) is a federally-endangered herbaceous species (U.S. Fish and Wildlife 1993). Dodder consists of ca. 145 species which are all cosmopolitan (Mabberley 1987). All but 52 excluded species are on the FDACS Noxious Weed List (FDACS/DPI Rule 5B-57.007). Wunderlin (1982) lists six species of dodder in Central Florida; Clewell (1985) lists two additional species, but lacks two of the Central Florida species; Long and Lakela (1971) list three and one is an additional species. There are, consequently, a total of nine species for Florida.

Woe vine is in the family Lauraceae, which is comprised of mostly shrubs and trees such as laurel (*Laurus nobilis* L.), red bay (*Persea borbonia* (L.) Spreng.), avocado (*Persea americana* Mill.), and cinnamon (*Cinnamomum verum* J. Presl). Notice that many of the members of Lauraceae (including woe vine) are fragrant when stems or foliage are crushed. The 16 species of woe vine are native to the Old World tropics (Mabberley 1987), but have become widespread throughout Europe and the Americas. *Cassytha filiformis* L. is the only species listed for Florida and occurs south of the area around Tampa Bay and Cape Canaveral (Wunderlin 1982). Worldwide, *C. filiformis* is frequently found near tropical beaches and will tolerate submergence in salt water for 14 days (Wellman 1972).

COMPARISONS: Dodder grows four to five times faster than woe vine and becomes permanently attached in about three days as compared to eight days for woe vine (Wellman 1972). Dodder has been observed completing four wraps around a bean plant in seven hours (Wellman 1972). Both woe vine and dodder attack host plants by attaching with their growing tips (Wellman 1972; Agrios 1988). Dodder rapidly dissolves surface cells of the host plant and then attaches by haustoria; woe vine more slowly (Burnett 1979; Agrios 1988; McRitchie 1990). Haustoria (Fig. 2) are specialized plant structures of parasitic plants that penetrate a host cell and absorb material from the host (Bold 1967); these are similar to the fungal haustoria. Both parasitic vines literally suck food and water

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from the stems and leaves of host plants. Both vines penetrate into the stems of the host plant where they grow alongside phloem cells (Wellman 1972). Although both have tiny flowers (less than 0.5 cm across for *Cuscuta*), the flower structure differs markedly (Fig. 3).

While dodder is an annual and woe vine a perennial, this fact is often of little consequence in tropical climates in the absence of a hard freeze. Dodder and woe vine may overwinter in fields on seed or debris. Seeds of these parasitic plants send up rootless shoots during growing periods. If no host is found, the parasite vine goes dormant for a few weeks, but eventually dies without a host. If contact is made and the host plant is penetrated, the base of the parasite vine shrinks, shrivels up, and all contact with the ground is lost (Agrios 1988). A single dodder vine may produce up to 3,000 seeds (McRitchie 1990). When the capsule bursts open seeds are thrown out in a circle ten feet in diameter (McRitchie 1990).

In a simulated "war of the vampire vines", Wellman (1972) found dodder to consistently overwhelm woe vine, repeatedly killing tips of woe vine. Dodder will even double back on itself, using its own tissues to allow bud and flower formation. Both vines suffered detrimental effects when they contacted the parasitic mushrooms, *Polyporus* spp.

IMPORTANCE: Dodder and woe vine may kill plants to the roots, and are potential invaders of virtually all green plants including food crops (Dawson *et al.* 1994). While dodder tends to attack herbaceous plants and woe vine woody plants, exceptions are numerous for each. Wheeler *et al.* (1989) describe *Cuscuta exaltata* Engelm., tree dodder, as a parasite on *Quercus virginiana* Mill, live oak.

Both woe vine and dodder can be vectors of plant diseases. For example, viruses, fungi, MLOs/phytoplasmas, and bacteria (*e.g.*, the tumor-producing crown gall *Agrobacterium tumefaciens* (E.F. Sm & Town.) Conn) can be passed from woe vine and/or dodder into their plant hosts (Wellman 1972, Tsai 1980).

Cuscuta species are listed as mandatory quarantine items by the Division of Plant Industry, Florida Department of Agriculture and Consumer Services. However, the Noxious Weed List (FDACS/DPI) from Rule Chapter 5B-57 specifically lists 52 species of *Cuscuta* as not being noxious weeds.

CONTROL: Control of either dodder or woe vine is difficult and most often drastic in nature. Infested plants quickly become unsalvageable (Dawson *et al.* 1994). Parasite and victim should be removed and burned or buried in soil two feet or more (Agrios 1988). Woe vine, if found in large trees, may sometimes be successfully pruned out. Preventative chemical controls noted by Agrios (1988) include Dacthal® (DCPA), a preemergent herbicide. The 1996 Weed Control Manual (Meister 1996) also lists Dacthal for control of dodder. Dacthal is labeled for use on ornamentals in Norcini (1995) and is commonly available at garden supply stores (Norcini, personal communication). Always consult current labels for latest use and safety instructions and requirements. Such treatments might prevent recurrence after an infestation.

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Fig.1. Tangled *Cassytha* stems vining around an unknown herbaceous stem. The arrow indicates a flower (see Fig. 3,B).



Fig. 2. *Cassytha* on an oak leaf. Three haustoria (parasitic connections) are indicated by arrows.



Fig. 3. A) Cluster of *Cuscuta* flowers. B) Solitary, 3-valvate flowers of *Cassytha*.

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