Dodder: A Parasite in the World of Plants

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Dodder is a unique plant because it is a true obligate parasite. That is, dodder's host receives no benefit whatsoever from dodder and dodder must have its host to survive. Dodder does not have any leaves nor any chlorophyll to produce its own food. It lives by attaching to a host with small appendages (called "haustoria") and extracting the host plant's carbohydrates.

Although neither toxic nor unpalatable to some livestock, dodder can weaken host plants enough to reduce yield, quality, and stand. A parasite receives no advantage from a dead host, thus dodder generally will not kill its host. But if infestations are severe enough, dodder may kill host plants.

Dodder in a grass and clover mixed pasture.

Photo: Eric Ott, Graduate Research Assistant

A study in southern California found that alfalfa yield dropped from 2,235 lbs./A to 1,576 lbs./A when untreated for dodder (Cudney, et al.; 1992). The same study also found that alfalfa stand was reduced from five plants per square foot to two plants per square foot.

Once thought to belong to the morningglory family, dodders are now being placed in a family of its own, cuscutacease. This family only has the one genus (*Cuscuta*). The USDA plant database (http://plants.usda.gov) lists approximately 47 species of dodder.

Specific dodder species will parasitize only particular hosts. For example, *Cuscuta epithymum* (clover dodder) and *Cuscuta polygonorum* (smartweed dodder), as the common names suggest, generally parasitize only clovers and smartweeds.

Without leaves, identifying dodder species can be difficult. All the identification keys I am aware of use the flowers to identify specific dodder species, noting differences in corollas and the way capsules open are common identification practices for dodder. *An Illustrated Flora of the Northern United States and Canada*, Vol. 3 (N. Britton and A. Brown; 1913) has a key and descriptions of 12 dodder species.

When looking at broadleaf plants, single dodder plants may be missed if you don't look close enough. They appear as yellow strings winding up the stems or over the leaves of other plants. However, if the dodder infestation is severe enough these yellow strings can form a mat that covers the plants they parasitize.

Dodders are annuals that spread by seed. Their seeds have a hard seed coat and gas and water levels are suspected to control seed dormancy. How long seeds can survive appears to be variable. This may be due to different environmental conditions and differences between species. Seed may be able to survive in the soil over 20 years. One article describes how seed collected from an herbarium specimen more than 60 years old can still germinate (Hutchison, 1980). Of course, it should be noted that conditions in an herbarium are not like those in the soil.

Control Methods

Several control approaches have been investigated. Flail mowing and burning were investigated in Southern California. Flail mowing increased yield in dodder infested alfalfa by 32 percent over untreated alfalfa (Cudney et.al., 1992). Burning decreased alfalfa yields, as might be expected, but the treated soil had less dodder emergence than untreated soil when soil was moved into a greenhouse, most likely due to decreased seed production. So,

if the soil has an established dodder seed bank, burning may not be a good control option (especially when considering the seeds' possible longevity).

Controlling dodder with herbicides depends on the crop in which you wish to control it. Some herbicides may affect dodder, but also may affect the crop, or not be labeled for use in that crop. Always read and follow herbicide labels.

In many cases, dodder control may be more effective if herbicide applications are made before the plant attaches to the host. PRE applications of Kerb® have provided good control of dodder in ornamentals and turf (Anonymous). Treflan® and Prowl® have also been reported to suppress dodder germination (Mueller, 2006). However, in most cases that I have experienced, PRE applications often do not retain enough residual activity to provide control for the rest of the season.

Results from POST applications to control dodder after it has attached to host plants can be more variable. POST application recommendations for dodder control are few and inconsistent. Dawson and Saghir (1983) reported Dactathol® (DCPA) achieved 100 percent dodder control three weeks after application. However, Dactathol® is not labeled for alfalfa or clover, crops that often experience dodder problems.

Glyphosate has been reported to control dodder POST and can be applied as a spot treatment of a 1-2 percent solution to alfalfa. However, be aware that the alfalfa will be damaged where glyphosate is applied. The use of Roundup Ready® alfalfa would be a good option in fields that have dodder problems.

Raptor® can suppress dodder at 5 fl oz/A when applied after dodder emergence and applied before it is three inches tall. Pursuit DG® also can suppress dodder after emergence, but as soon as dodder attaches to the host plant, suppression drops. The Pursuit® label recommends using it with COC or methylated seed oil to suppress dodder.

Britton, N and A. Brown. 1913 (reprinted 1970). An Illustrated Flora of the Northern United States and Canada Vol 3. Dover Publications, Inc., New York.

Cudney, D.W., S.B. Orloff, and J.S. Reints. 1992. An intergrated weed management procedure for the control of dodder (*Cuscuta indecora*) in alfalfa (*Medicago sativa*). Weed Technology 6:603-606.

Dawson, J.H. and A.R. Saghir. 1983. Herbicides applied to dodder (Cuscuta spp.) after attachment to alfalfa (*Medicago sativa*). Weed Science 31:465-471.

Hutchison, J.M and F.M. Ashton. 1980. Germination of field dodder (*Cuscuta campestris*). Weed Science 28:330-333.

Mueller, S. Dodder Control in Seed Alfalfa. University of California Cooperative Extension, Fresno County. http://alfalfa.ucdavis.edu/seed/Weed_control/Dodder_control.htm Accessed July 21, 2004.

Reisen, P., N. Johannsen, and M. McCaslin. Dodder control in Roundup Ready Alfalfa. http://www.naaic.org/Meetings/National/2002meeting/2002Abstracts/Reisen.pdf. Accessed July 21, 2004.