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Dodder and golden dodder

Invasive Species Unit

Introduction

Dodder is the common name for species belonging to the genus *Cuscuta*. There are about 170 species of *Cuscuta*, 14 of which are found in Australia, including three native species.

Dodder is a leafless, parasitic plant that removes nutrients, reduces yield and even kills its host plant. Dodder has been recorded on a wide range of field crops, pasture legumes, vegetables and horticultural crops.

Golden dodder (*Cuscuta campestris*) is the weediest of all the dodder species that occur in Australia. In this publication golden dodder will be referred to separately where there are significant differences.

Distribution

Dodder is found in all areas of NSW. It is widespread along rivers, creeks, floodplains and irrigation areas, as water is the principal method of spread and suitable host plants are concentrated along waterways.

Golden dodder is the most common dodder species in NSW, and is also a major weed in Queensland, Victoria and South Australia.

Habitat

Dodder requires a suitable host species to survive. Hosts include a wide range of broadleaf weeds, lucerne and some vegetables. Many weed species and tree seedlings are also suitable hosts, allowing dodder to build up in areas where weeds are not controlled due to difficult access.



Figure 1. Golden dodder growing in a cropping situation. Photo: Andrew Storrie

Impact

Contamination

Dodder is a threat to lucerne, vegetables, many broadleaf crops, pastures and seed crops. Seed, fodder or hay contaminated with dodder seed is banned from sale in NSW. Lucerne is the largest host crop for dodder in Australia. Dodder will spread quickly through a lucerne crop as a result of the regular cutting and baling operations.



Figure 2. Golden dodder growing on Noogoora burr. Golden dodder has bright yellow thread-like stems. Photo: I&I NSW

Toxicity

High levels of dodder in fodder are toxic to cattle and horses. Poisoning can occur if horses and cattle are fed contaminated hay for several weeks. Problems are usually only experienced when dodder makes up about 50% of the contents of the hay. Affected animals typically suffer from abdominal pain and diarrhoea, and can also experience weight loss. On some occasions liver damage may occur, and can be associated with haemorrhages throughout the body and secondary brain damage. The brain damage makes the affected animal's behaviour erratic and unpredictable. It will be inclined to stagger about and wander aimlessly before it eventually lies down, becomes comatose or convulsive, and dies.

Description

Dodder has thread-like stems ranging in colour from yellow-green to pink, to a rich golden colour, and often completely without chlorophyll (green parts). The stems branch and twine around the host plant. Dodder has no true roots and the leaves are like scales on the stems.

Flowers

The white or cream bell-shaped flowers have 3–5 petals (usually 5), are 3–4 mm in diameter and form in clusters.

Fruit

Fruits are globular capsules 3–4 mm in diameter containing up to 4 seeds.

Seeds

Seeds are brown, yellow or grey and 1–2 mm in diameter. The seeds are slightly pear-shaped and similar in size to clover and lucerne seed.

Golden dodder

Golden dodder is easily distinguished because its thin, thread-like stems are bright yellow and stand out clearly on the green background of the crop or pasture. A related species, Chilean dodder (*C. suaveolens*), is low-growing and pale yellow/green, making it much less visible.

Lifecycle

Dodder flowers and sets seed from September to May. Seeds germinate in soil from September through to March/April. The emerging seedling in

normal conditions must make contact with a suitable host plant within two to six days or it dies. However, in wet conditions seedlings can survive for several weeks without a host.

Contact with the host plant is by suckers, called haustoria. The dodder stems twine around the host, branching to form a tangled mass which can spread from the initial host to adjacent plants. The haustoria penetrate the tissues of the host plant and remove nutrients, thereby reducing crop or pasture yields, preventing host development and even killing it.

Dodder grows rapidly and can flower within two weeks of germination.



Figure 3. Dodder has white or cream flowers in clusters. Photo: Annie Johnson

Spread

The most rapid form of spread occurs as a result of the movement of seed in water. Mature dodder seed does not float and cannot be transported over long distances, but the seed is often carried on trash or in the seed cases that can float in running water.

The seeds can also be spread in fodder and pasture seed, and can survive the digestive tracts of birds, cows, sheep and goats.

Dodder can also be spread when stem fragments are moved on farm machinery (such as hay making equipment), on livestock, or in water. Stem fragments that have withered can regrow if there is a suitable host present.

Control and management

Dodder is a difficult weed to eradicate. It grows rapidly and can set seed after only a few weeks of growth. Its seed can survive in the soil for long periods.

Preventing it from entering your property and being vigilant in spotting and destroying new outbreaks before they seed is the best form of control.

A long-term approach is required to manage this weed. Several options are available, depending on the size of the infestation, the crop or pasture infested, and the crop or pasture rotation available.

Whichever option is chosen, it is essential that treatment should begin as soon as possible after an infestation is noticed. Scattered plants can rapidly result in a major infestation which is difficult and costly to control.

Prevention

Stopping the entry of dodder onto your farm is the best control measure. Early detection is necessary if dodder is to be controlled before seeding commences.

Lucerne paddocks should be inspected thoroughly before first cut, to detect dodder growth. Pasture paddocks need to be inspected after rainfall in late spring. If dodder is found, control strategies need to be implemented immediately.

Mapping existing infestations at the end of summer will help in checking for reinfestations the following spring.

All workers on the farm should be made aware of dodder and be able to identify it.

Sow clean seed

Pasture seed infested with dodder is an important source of new infestations. Because of their similar size, dodder seed is very difficult to remove from lucerne and small clover seeds. It is therefore essential to use certified pasture seed.

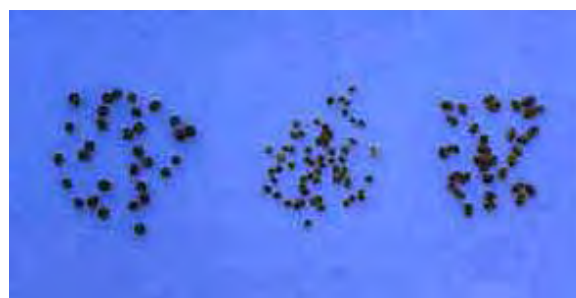


Figure 4. Dodder seed (centre) compared with subterranean clover seed (left) and lucerne seed (right). Photo: I&I NSW

Buy clean fodder

Contaminated hay and grain can introduce dodder to a clean property. Hay containing dodder should be destroyed as mature seed is often present.

Restrict movement of seed and plant fragments

Machinery used for fodder conservation in infested paddocks should be cleaned before moving to other paddocks.

Stock grazing on areas known to be infested with dodder should be kept in quarantine for at least two days before they are moved to dodder-free pastures.

Wherever infestations are found they should be marked and the area quarantined from activities such as hay-cutting and grazing. Care should also be taken to avoid spreading seed in soil, or on machinery or boots.

Restrict movement in irrigation

Small dodder seed can be picked up in irrigation suction lines. Self-cleaning or flushing filters can be used if there is a risk of spreading dodder seed in irrigation water.

Control weed hosts

Wireweed, Noogoora burr and Bathurst burr are preferred weed hosts for dodder. Controlling these will help to reduce the risk of new infestations and the extent of current infestations.

Buffer zones

Since dodder can be spread by seed and stem fragments, it is important to always treat a buffer

zone outside the obvious areas of infestation. Look for small threads starting to invade further into the crop. Even small threads up to 5 cm can re-attach to the host crop and continued infestation will result.

A buffer zone of at least 1 m from the infestation should be treated with herbicide or burnt.

Once treated, infestations should remain marked so the effectiveness of the control can be checked at a later date.

Cutting and burning

Slashing promotes the spread of dodder. Do not cut or slash dodder and leave the cut material in the crop as it will re-attach itself to a new host.

All host and dodder plant material must be burnt, preferably on the infested site. Cut the host plant as close as possible to ground level and burn it. Burning can be carried out after cutting and drying, using flame throwers or other combustible material to ignite the vegetation.

Burning is more effective following the application of a desiccant herbicide.

The area should be inspected again after one week, as dodder may re-shoot from the crowns of lucerne and weeds such as wireweed, Noogoora burr or Bathurst burr.

Hotter burns will achieve higher dodder kill rates but have greater risk of killing host crops. A lucerne



Figure 5. Control weed hosts and create buffer zones around dodder infestations. Photo: Bob Trounce

stand that has been burnt can regenerate from undamaged crowns without the need for re-sowing.

Consult the relevant authorities prior to undertaking any burning operations.

Chemical control

There are a number of herbicides registered for dodder control, although there are no truly selective herbicides registered for use. Refer to the *Noxious & Environmental Weed Control Handbook 4th Edition* for a complete list. (See *Publications available* below).

Contact herbicides containing diquat are registered for use on dodder under the Australian Pesticide and Veterinary Medicines Authority (APVMA) permit PER9385. This permit expires in September 2013. Diquat herbicide can be used to rapidly desiccate the lucerne pasture and destroy the dodder.

Such contact herbicides act by quickly killing green plant material. They are rapidly absorbed and are not affected by rain after spraying. For best results, thorough coverage and good penetration of the foliage is necessary.

A lucerne stand which has been treated with diquat can regenerate from undamaged crowns without the need for re-sowing.

Treatment with contact herbicides alone will not destroy mature dodder seed, so the sprayed area should be burnt 2–3 days after spraying to destroy the seed.

Infestations in non-crop areas can be treated with a non-selective herbicide. Glyphosate has a similar use pattern to diquat, including fallow and non-crop situations, and its use is permitted under APVMA permit PER9384, which expires in September 2013. Glyphosate is a systemic herbicide and requires a rain fast period for effective uptake. Metsulfuron-methyl, another systemic herbicide, is registered for spot treatments in pastures and non-crop situations.

Crop rotation

Lucerne or clover stands that are severely infested should be cultivated and replaced with less susceptible crops or pastures.

Cereal crops such as wheat, barley, oats, triticale and cereal rye are less susceptible to dodder, along with summer grain crops such as maize and sorghum.

While dodder cannot complete its lifecycle on cereal crops, it may do so on the broadleaf weeds that invade these crops. The advantage of a crop rotation for dodder control is lost if host weeds occur



Figure 6. Declaration of Cuscuta species in NSW. Map preparation: Alan Maguire

in the crop. In-crop weed control then becomes an essential part of crop management.

If winter cereals are to be grown in an infested paddock a clean fallow must be maintained over the summer months when dodder is active. This can be achieved with herbicides or cultivation.

Pasture rotations will need to be based on perennial grass species where practical. Subterranean clover can be used as the legume component, but any summer-growing broadleaf weed or legume will need to be controlled to prevent dodder reinvading.

Where crops or pastures are used in rotations to control dodder, lucerne or susceptible legumes should not be sown for at least five years.

Deep ploughing can help reduce the seed burden by burying dodder seed. Most dodder seed will not germinate from a depth of more than 7.5 cm.

Infestations of dodder are less likely to occur during the establishment period if lucerne or susceptible clovers are re-sown in late summer to autumn.

Follow-up control

It is essential that a follow-up control program be implemented even after control measures have been carried out. Lucerne growers in particular should be wary of reinfestation.

Under ideal conditions, the seed of dodder can survive in the soil for a number of years after a successful control program.

Legislation

Throughout NSW all *Cuscuta* species except the native species *C. australis*, *C. tasmanica* and *C. victoriana* are Class 5 noxious weeds under the *NSW Noxious Weeds Act 1993*. These plants must not be sold anywhere within NSW. This declaration includes golden dodder (*C. campestris*) but golden dodder is also a Class 4 noxious weed in many areas of NSW.

Class 4 control requirements are that 'the growth and spread of the plant must be controlled according to the measures specified in a management plan published by the Local Control Authority'.

The responsibility for the control of noxious weeds on private land rests with the land owner or occupier of the land. This responsibility extends to the middle line of any adjacent watercourse, river or inland water (tidal or non-tidal).

A full list of noxious weeds and requirements under the *NSW Noxious Weeds Act 1993* can be found at www.dpi.nsw.gov.au/weeds.

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National Herbarium of New South Wales (2007) *Cuscuta campestris*. PlantNET – FLoraOnline. www.plantnet.rbg Syd.nsw.gov.au (14/01/2008).

Publications available

Ensbey, R. (2009), *Noxious and Environmental Weed Control Handbook*, 4th Edition, Industry & Investment NSW, Orange. Copies are available from the Industry & Investment NSW Bookshop, Orange. Phone 1800 028 374 or online at www.dpi.nsw.gov.au/weeds

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PASTURE IMPROVEMENT CAUTIONS

Pasture improvement may be associated with an increase in the incidence of certain livestock health disorders. Livestock and production losses from some disorders are possible. Management may need to be modified to minimise risk. Consult your veterinarian or adviser when planning pasture improvement.

The *Native Vegetation Act 2003* restricts some pasture improvement practices where existing pasture contains native species. Inquire through your office of the Department of Environment, Climate Change and Water for further details.