

GENERIC DODDER MANAGEMENT PLAN

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Government of South Australia
South East Natural Resources
Management Board



White Clover Growers Association
of the
MacKillop Farm Management Group

GENERIC DODDER MANAGEMENT PLAN

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GENERIC DODDER MANAGEMENT PLAN

1. PURPOSE OF THE GENERIC DODDER MANAGEMENT PLAN

This document is a collaborative effort between the South East Natural Resources Management Board and Lucerne Australia. It provides a generic outline of how to effectively manage dodder infestations in lucerne or small seed crops. The information contained in this document includes legislative requirements and also what is considered by the lucerne industry to be best practise management options.

The contents of this management plan are largely designed on a golden dodder infestation in a lucerne or clover crop. However, the principles of dodder management described in this plan will apply to most dodder outbreaks regardless of the host crop.

Aim

- To facilitate the development of a practical and cost-effective dodder management plan to enable timely and appropriate management of dodder in accordance with the Natural Resources Management Act 2004.

Objectives

- To protect susceptible industries from the impact of dodder species.
- To map and manage all dodder infestations in a cost-effective and appropriate manner.
- To develop accurate records on the management, distribution and density of dodder throughout the South East as a basis for the development or modification of dodder management planning.
- To obtain the full cooperation of the affected landholder(s) to undertake all necessary actions that contribute to the eradication of dodder from property under their management.
- To minimise the risk of spread to other un-infested sites within the region and the State.

All affected landholders will be required to produce an annual property management plan in conjunction with their Authorised Officer which specifically describes control requirements appropriate to their situation. This property management plan is in addition to this generic management plan.

2. BACKGROUND INFORMATION

Biology

Dodders are summer-growing annual parasitic plants with thread-like stems that twine around the host. Host plants may be any of a wide range of broadleaf plants; summer weeds such as Noogoora burr, wire weed, thistles and fat hen; lucerne, clover, beans, peas and tomato that grow actively in summer are good hosts. The stems attach to the host by haustoria through which the dodder draws water and nutrients. Dodder is spread by seed, which is produced in large quantity as soon as a month after germination. Dodder seed is long-lived in the soil, and may still be germinating in low numbers fifty years after it was produced.

Origin and distribution

Golden dodder originated in the U.S.A. It is now also widespread in temperate regions of the world, and is a significant pest species in Australia. It occurs throughout New South Wales, extending to south-eastern Queensland and Victoria, with an isolated outbreak in south-western W.A. In SA it is widespread within the River Murray Valley from 7 km south of Morgan to the Victorian and NSW border. Outside the Riverland area it is restricted to a few isolated sites. The seed production areas of SA are considered by the Australian Quarantine Inspection Service to be "free of dodder".

Impacts

Golden dodder is a primary parasitic weed of lucerne and clover crops and at all stages of their growth hence it poses a direct threat to crops by reducing yields and contaminating seed and hay. Seedlings are able to parasitise summer-growing weeds among the host crop; from these intermediate hosts they can reach the lucerne/clover crops and form colonies of several square

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meters during the 4-6 week intervals between lucerne/clover cuts. Infestation reduces yields of forage and seed, and may reduce palatability; contamination may make hay and seed unsaleable. It also threatens the small seeds industry through seed contamination.

Dodder seed is difficult to separate from clover and lucerne seed; cleaning is done using iron filings and magnetic rollers. The reduced cleanout yield and increased cost of cleaning may make legume seed production uneconomic. The presence of dodder seed reduces the saleability of seed crops into some of the export markets. Furthermore seed contaminated with dodder is not legally saleable anywhere in Australia.

No country, other than Australia, legislatively prohibits the importation of dodder. The two actual issues in regards to market access are:

1. Australia currently receives premium prices for small seeds as International importers rely on our reputation of being dodder free to avoid more careful cleaning processes. Prices for seed that is contaminated with dodder will be downgraded due to the expensive cleaning processes that are required to remove dodder seed from contaminated seed lots.
2. The seed export industry in SA wishes to maintain its dodder free status as it provides a competitive edge over other countries such as the USA where dodder is endemic. Should SA lose this status, buyers may start requiring proof that the product is dodder free, which will add extra costs to production.

Industries at risk

The key agricultural enterprises at risk from dodder are the white clover and lucerne sectors of the small seed industry.

Data from seed certification authorities in SA and Vic estimate production to be 2,500 tonnes of white clover seed from an estimated area of 4,000ha. The current value of white clover seed is between \$3.25 and \$4.00 per kilogram, equating to approximately \$8-10 million (AUS).

In SA an annual area of 20,000 ha produce 5,000-7,000 tonnes of lucerne seed. The wholesale value of lucerne seed fluctuates between \$2.80 to \$3.50 per kilogram, equating to approximately \$14-24 million (AUS) per year. These values do not take into the worth and value of associated industries tightly integrated with the production and value adding of lucerne and white clover seed production (eg hay trade, agrochemicals & fertiliser industries).

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3. LEGISLATIVE REQUIREMENTS

3.1 South Australian legislation

Dodders are declared plants under the Natural Resources Management Act, 2004. The South East Natural Resources Management Board (SENRMB) is the statutory authority responsible for managing dodder infestations. Under the Act, landholders are responsible for controlling dodder on their properties.

Authorised officers of the SENRMB are available to provide advice and on-ground assistance to affected landholders. Management of infestations will be a cooperative effort between the staff of the SENRMB and the landholder.

The following sections of the Act apply to dodder in the South East natural resources management region:

- 175(1) it is prohibited to bring dodder into the South East region
- 175(2) it is prohibited to move or transport dodder plants, or anything that is carrying dodder, on public roads in the South East region
- 177(1) it is prohibited to sell dodder
- 177(2) it is prohibited to sell anything that is carrying dodder
- 180 a landholder must notify the relevant NRM authority (SENRMB) of the presence of dodder on their land
- 182(1) a landholder must destroy all plants of dodder found on their property.

Interpretation of the legislation allows for movement of infested or potentially infested produce to be transported with the knowledge and written approval of an Authorised Officer. It is a defence to sections 175 and 177 if the offence was not the result of a wilful or negligent act or omission.

3.2 Victorian Legislation

Dodders are declared plants under the Catchment and Land Protection (CaLP) Act 1994. In the Wimmera Catchment dodder is declared a regionally prohibited weed under the CaLP Act 1994, which means, landowners have a duty to eradicate dodder on their property.

Authorised officers of the Department of Primary Industries are available to provide advice to affected landowners. Management of infestations will be a cooperative effort between DPI staff and the landowner/manager.

The following sections of the Act apply to dodder in the Wimmera Catchment and Land Protection region:

- 20(1)(d) A landowner must take all reasonable steps to eradicate dodder;
- 70A(1) A person must not remove a vehicle from land on to a road without first taking reasonable precautions to ensure that the vehicle is free of dodder;
- 70A(2) A person must not remove machinery, implements or other equipment from land on to a road without first taking reasonable precautions to ensure that the equipment is dodder free;
- 71(1)(b) A person must not buy, offer to buy, sell, offer to sell, possess for the purposes of sale or wilfully bring or cause to be brought into Victoria any dodder or part of a dodder plant capable of growing;
- 71(1) (c) A person must not remove or caused to be removed or sell soil, sand, gravel or stone which contains or likely to contain any dodder or that comes from land that contains dodder;

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71(1) (d)	A person must not remove or caused to be removed or sell fodder or grain which contains dodder;
71(1) (e)	A person must not sell or hire or offer for hire, a substance or machinery that is used or intended to be used in primary production and which contains dodder;
71(1)(f)	A person must not sell an animal which is carrying dodder seeds (unless the animal is going straight to a meat processing facility);

A permit can be obtained to undertake activities under sub-sections 71(1)(b), (c), (d), (e) and (f) from an authorised officer of the CaLP Act 1994.

4. WHAT TO DO IF YOU FIND DODDER ON YOUR PROPERTY

Your nearest Authorised Officer will be your contact person to the South East Natural Resources Management Board and the person who provides you with on-ground assistance. Officers are based in most towns throughout the South East region. To contact your local Authorised Officer, please call the Mt Gambier office on 8724 6000 and they will direct you to the appropriate person.

The Authorised Officer will explain all requirements in detail and will design a management plan specific to your situation. The flow chart on the following page provides a summarised version of the procedure and actions required once you find dodder on your property. Section 4 of this document also provides much more detail on how to control a dodder infestation effectively and the management procedures you will discuss with your Authorised Officer.

Landowners with property in Victoria with dodder should contact the Department of Primary Industries at Horsham (03) 5362 2111 and speak to an authorised officer under the CaLP Act to discuss management procedures and to ensure you understand any legal obligations that you may now have under relevant legislation.

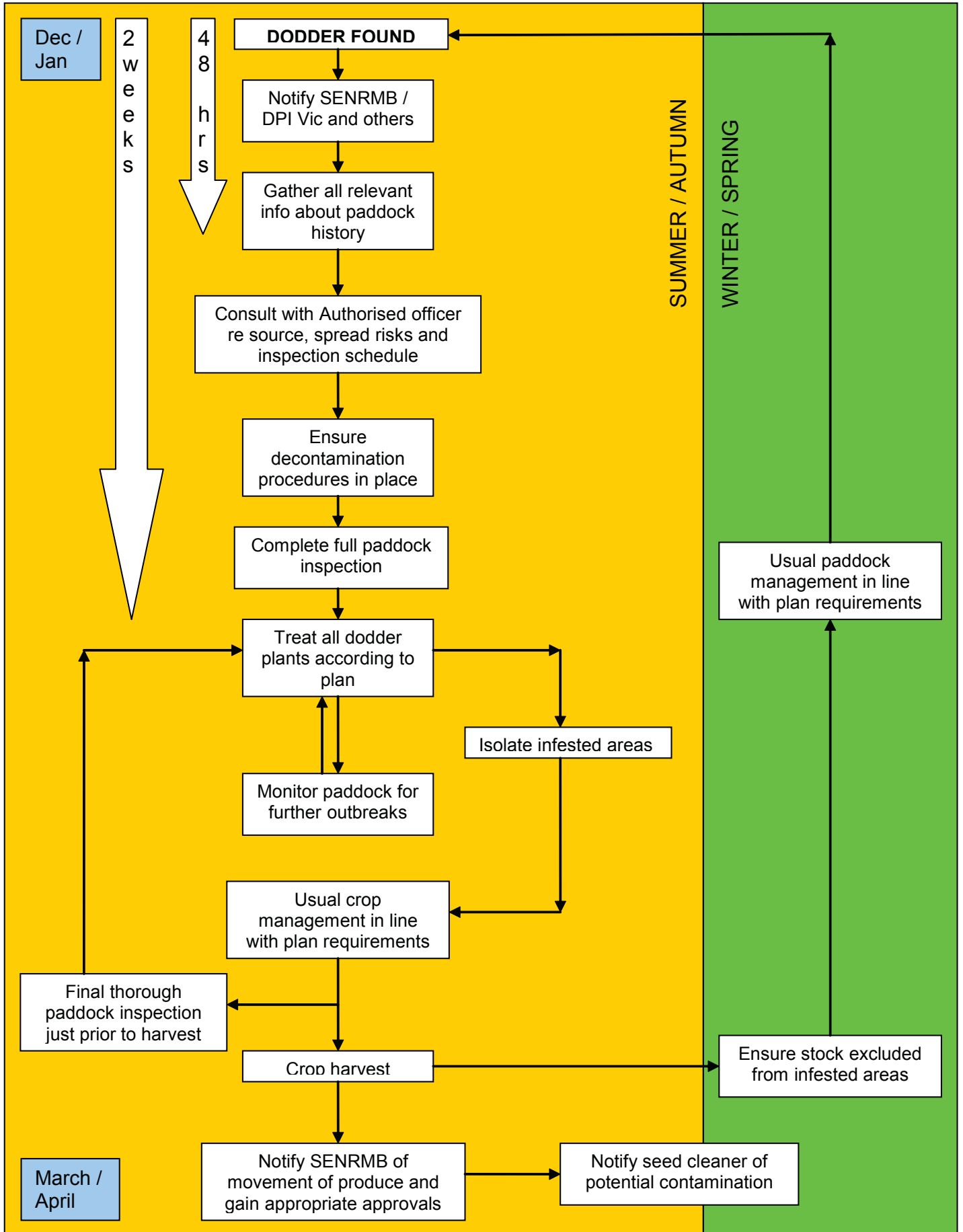


A typical golden dodder plant hosting on lucerne. The distinctive “orange string” is obvious in a lush lucerne stand.

A mature dodder plant will either form a thick mat on top of the lucerne canopy or drastically effect the health of the lucerne plants which may create an opening in the canopy - both of which are easily seen in advanced stages.

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Flow chart showing procedures and actions to follow if dodder is found on your property.



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5. PROPERTY MANAGEMENT PLAN REQUIREMENTS

The following procedures constitute best practice management of a dodder infestation in lucerne/ small seed crop as agreed by the South East Natural Resources Management Board and Lucerne Australia. Points which are mandatory under legislation are marked with *.

5.1 Notification requirements

Upon discovery of a dodder infestation on your property, you must notify the SENRMB as soon as possible. This serves two purposes, firstly it meets your statutory responsibility under section 180 of the NRM Act, secondly it puts you in contact with the people who can be of most help to you when managing this issue on your property.

Notification is not a requirement of the CaLP Act in Victoria but landholders are strongly encouraged to contact the Department of Primary Industries to seek help.

Once you have collated the relevant information as described in section 4.2, there will be other interested parties who should also be made aware of the infestation, for example seed certifiers, harvesting contractors etc. While you do not have a legal obligation to notify these people, we recommend you do as an ethical obligation to the industry and also because they will be required to adhere to decontamination procedures on your property. The Authorised Officer may also need to speak with these people to trace potential spread of dodder. These other parties are part of the risk cycle and need to be informed if dodder is to be effectively managed at the industry level.

This table provides a summary of people to potentially be notified and the appropriate timeframes in which to contact them:

STAKEHOLDER	TIMEFRAME FOR NOTIFICATION
South East Natural Resources Management Board	Immediately
All workers on property	Immediately
Lucerne Australia / White Clover Growers Assoc	Immediately
Seed company	Immediately
Seed certifier	ASAP
Agronomist	Immediately
Spray contractors	Before next spray
Harvesting contractors	Before harvest
Hay contractors	Before hay cut
Fertiliser spreaders	Before next application
Transport contractors	Before next haulage

5.2 Gathering relevant information

The first question you will have if you discover dodder on your property is “where did it come from?” (trace-backs). The second question will be “where may it have gone to?” (trace-forwards). Your ability to answer these questions will depend on the records you have kept about the infested paddock.

Proving beyond doubt where the dodder came from will always be difficult even if it seems clear. In some cases it will remain a complete mystery. The unavoidable point is that it is there now and needs to be and can be effectively managed.

In the time between finding the dodder and meeting with the Authorised Officer, collate all the relevant information pertaining to that paddock in as much detail as possible. The officer will start asking you these questions so it will help to be prepared. This information will also assist the officer in checking for other potential but unknown infestations across the region and is important to managing dodder at an industry level.

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The following table provides some suggestions for the type of information that will help the investigation:

TRACE BACKS	TRACE FORWARDS	OTHER PADDOCK INFO
Where did the seed come from and when?	Where did the harvested seed go from the affected paddock – cleaner and customer?	What was the route the header took in the affected paddock last season?
Has there been any new equipment in the affected paddock and where and when did it come from?	What were the next locations the harvester went to after the affected paddock?	What is the route the sprayer follows in the affected paddock?
Has there been any new stock in the affected paddock and where and when did they come from?	What were the next locations the sprayer went to after the affected paddock?	Where was the hay fed out in other paddocks on the property?
Are there any samples of the original seed or seed from last year remaining?	Where did the hay from the affected paddock go?	
	Where did the stock go after the affected paddock?	

In order to be able to answer these questions effectively, it is recommended that landholders keep detailed paddock diaries on all activities in the paddock in as much detail as possible. Aspects including people involved, machinery used and in what direction was the paddock harvested will assist greatly in pin pointing risk areas and also alleviate fears depending on the answers. If such detailed records do not exist at the time of discovering the infestation any information will be useful.

The answers to the questions above will provide useful information in identifying the likely source of dodder and estimating how long the infestation has been present without being detected and therefore assist in determining where else it may have gone.

5.3 Inspection procedures

The most reliable way to inspect for dodder, especially in a mature lucerne stand, is to walk through the paddock emu-parade style (i.e. as many people as possible walking not more than 5m apart). Young dodder plants are very small and will be growing below the lucerne canopy, making them very difficult to see unless you are right on top of them. However, dodder grows extremely fast and is able to reach seed set from germination in 3 weeks. This means that you may discover a mature dodder plant in an area where there was no sign of dodder only a couple of weeks ago. It is for this reason that regular monitoring and inspections of the paddock are required, especially in the first season of discovery, in order to effectively determine the full extent of the infestation.

The first and second years of the infestation will require the greatest inspection effort to ensure we have accurately identified the full extent of the infestation. Subsequent years can receive less inspection effort as long as the infestation is clearly defined and the highest risk areas are adequately addressed.

Indicative inspection schedule

Dodder requires the right combination of soil moisture and warm temperatures to germinate and grow. As a parasitic plant it will host on some broadleaf weeds, such as wireweed, as well as lucerne. Depending on the season, dodder may be seen as early as October or as late as April, with its active growing season continuing all through summer as long as the host plants remain active.

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The most likely time to look for a known or suspected dodder infestation is after the first run of hot weather (30°C + for several days), assuming the paddock has been watered in some fashion (irrigated or summer rain). Generally a dryland lucerne crop will not support dodder, however, heavy summer rains may trigger germination.

On first discovery of the dodder infestation, the Authorised Officer will arrange for other officers to assist in a full paddock inspection (emu-parade style) within 2 weeks.

Once the initial infestation is mapped out, the Authorised Officer will discuss the requirements for inspecting other paddocks on the property depending on the information covered in section 4.2. Any other inspections will be arranged as necessary.

Inspections in the infested paddock will occur approximately every 4 weeks during the first season until harvest. This inspection schedule can be negotiated with the Authorised Officer depending on the management that occurs in the paddock, alternative options for monitoring the infestation and officer work loads. Other stakeholders, such as agronomists or seed certifiers, can be used to keep an eye on the paddock in between scheduled inspections. The landholder should also be undertaking intermittent monitoring during their travels around the paddock and property.

Regardless of the method used during the season, the paddock must have a final thorough inspection as close to desiccation / windrowing as possible. The landholder will need to keep in contact with the Authorised Officer to provide sufficient warning of when desiccation is to occur in order to allow organisation of the final emu-parade. The timing of the last irrigation of the paddock also needs to be factored in to ensure sufficient time elapses after watering to allow for any late germinating dodder to grow to a size that can be detected during the final inspection. This final inspection is designed to ensure the parts of the paddock that are harvested are dodder-free.

Resources for inspections

These inspections are the core duty of Authorised Officers under the NRM Act, and as such, the landholder will not be charged for the service. However, it is expected that the landholder will provide whatever resources possible to contribute to the inspection (themselves, workmen, other interested stakeholders etc).

As mentioned above, walking inspections are the most reliable method of detecting dodder. Other options include inspecting from vehicles such as spray rigs or motorbikes. Both of these options are possible depending on the nature of the particular crop and paddock and the confidence the landholder has in the effectiveness of such an inspection. Overseas, helicopters are used to inspect for dodder over large infested areas. This technique has not been trialled in Australia to date.

Marking dodder sites

All dodder plants found must be permanently marked with both GPS and physical marker such as a post. The GPS points will be collected by the officer for their records, while the post serves as a constant reminder to the landholder and any workers/stakeholders in the paddock that there is a risk. Physical markers allow for easy monitoring of the infested sites during the normal activities in the paddock.

Issues for consideration

- Field inspections for dodder occur in the hottest part of the year, raising some OHSW issues in regards to inspectors. It is not considered that critical that officers and landholders comply strictly to the inspection schedule that was agreed at the start of the season. Waiting a week for cooler weather will make no difference to managing the dodder infestation as long as appropriate decontamination procedures are adhered to.

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•	Field inspections for dodder also occur at a critical time for development of the lucerne seed crop and have potential to reduce the yield from that paddock. Unfortunately this is one of the impacts of a dodder inspection that cannot be avoided unless an alternative inspection method is agreed.
•	Inspecting from equipment such as a spray unit also has OHSW risks for the officers and the landholder. Careful consideration of these risks is required before embarking on such activity.
•	The method of permanently marking dodder sites within the paddock will need to be determined according to the types of management practices used, e.g. pivot irrigator tracks, type of spray equipment etc.

5.4 Decontamination requirements

In the initial stages of discovering a dodder infestation, the whole paddock should be assumed to be infested to most effectively prevent any spread of dodder from the paddock. Any traffic entering the paddock must be decontaminated prior to leaving every time.

Dodder is not easily spread by moving plant material because it relies on the host plant to survive. However, it is possible that a healthy piece of dodder attached to a fresh stem of lucerne, transported to another lucerne paddock may establish in the new location. Any equipment which is likely to transport healthy pieces of plant material is a potential risk.

Dodder is most commonly spread by seeds in soil, produce or equipment. The seed is fairly large and heavy and is not usually moved by water or wind. Spread by animals and birds is not known but possible. Dodder seed is of similar size and appearance to lucerne seed and is easily transported in this way despite cleaning and testing processes. Stock moving through infested areas have the potential to shift seed both within the paddock and to other paddocks in the soil caught in their hooves. Hay cut from an infested lucerne paddock during summer may also contain viable dodder seed. Harvesters are the greatest risk of spreading dodder seed and should be given the greatest focus in decontamination.

A wash down point should be nominated somewhere in or next to the infested paddock. Wash down equipment can then be permanently located at the site for ease of decontamination. A designated site limits the potential for spread to only one other location and also allows for easy checking to ensure no dodder is germinating as a result of decontamination.

It is the landholder's responsibility to ensure decontamination procedures are adhered to by all people entering the paddock. Decontamination is an important part of managing the overall risk of spreading dodder and should be treated as part of the standard paddock management once an infestation has been discovered. The Authorised Officer will want to witness important decontaminations such as harvesters and seed cleaning premises, it is the landholders responsibility to notify the officer when these events are going to occur.

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RISK OF SPREADING DODDER	DECONTAMINATION OPTIONS
People	Wear gators and washable boots Wash boots at exit to paddock
Vehicles	Wash tyres down on exit of paddock Check underside of vehicle for plant material Be sure to roll forward half a wheel turn and spray the other side of the tyre
Machinery	Wash down underside and tyres of spray units Thoroughly clean out harvesters with high pressure air or water
Stock	Any stock from the paddock could go to a 'clean out' pen which is devoid of vegetation or they could go straight to slaughter
Produce	Any seed harvested from the infested paddock should be flagged with the seed certifier and seed cleaner for double checking Any hay from the infested paddock to be fed out on dryland, cereal based pastures or sent to a feed lot
Produce transportation	Any trucks used to transport produce from infested site should be thoroughly wash down after delivery Seed cleaning plants will also need to be decontaminated after processes seed from the infested paddock

5.5 Control procedures

Because dodder is a parasitic plant, any control methods will involve destroying the host plant as well (lucerne). Dodder is also an annual plant meaning destruction of existing plants is very effective. Dodder is a prolific seeder and the seeds can remain viable in the soil for 50+ years. Therefore, the main aim in dodder control is to prevent seed set each year. If the infestation is discovered early enough and effectively controlled, there should be minimum seed in the soil for next year. Unfortunately, due to the longevity of the seed the paddock must always be considered infested. However, through ongoing inspections the paddock can continue to be viable and produce considered to be dodder free.

Feasibility of control

Once the extent of the infestation is determined through inspections, the landholder will need to consider the size of the infestation in relation to the rest of the paddock. Experience to date shows that dodder infestations are usually small, isolated patches within the paddock. This pattern allows for effective quarantining of the infested areas while maintaining normal production across the rest of the paddock. If a dodder infestation was to be widespread across the paddock, the landholder will need to consider whether it is viable to maintain any production in the paddock. The Authorised Officer will also consider the likelihood of achieving effective control and preventing further spread while maintaining production under the particular circumstances of the paddock. A process of negotiation between the Authorised Officer and the landholder will determine the fate of the paddock.

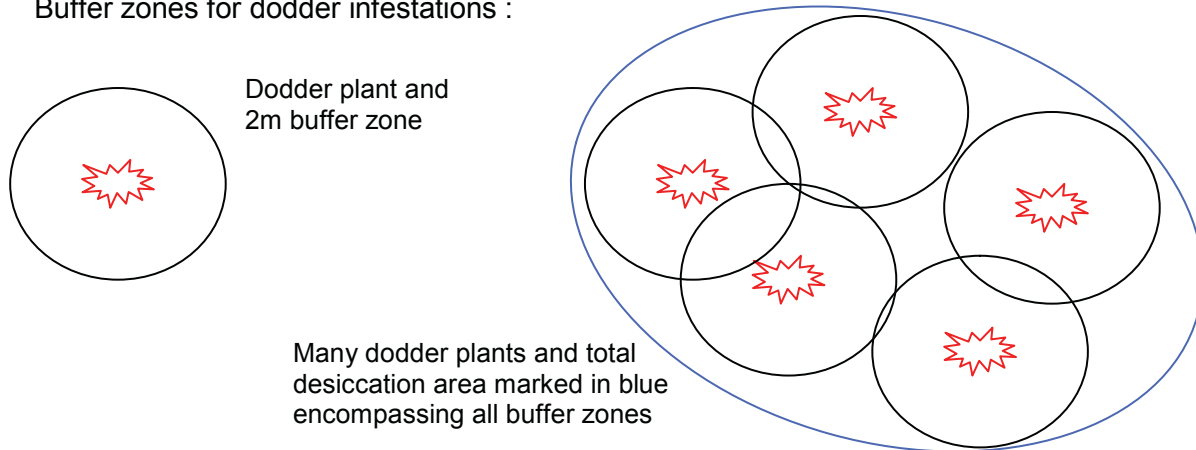
Control methods

The quickest way to stop the growth of dodder is to desiccate the infested area. This will kill the dodder in two ways – by outright destruction of the dodder and also by killing the host plant. Viable dodder seed may still remain on the plant or in the soil so the best follow up measure to ensure effective destruction is to burn the area. This will completely destroy any plant material remaining and also destroy most seeds if the fire is hot enough. The following recommendations are considered to be industry best practise for destroying dodder infestations and are based on successful experiences.

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1.	Desiccate an area around each dodder plant which includes <u>a 2m buffer zone from the outside edge of the plant</u> . A single dodder plant may be as large as 2m in diameter which is why a buffer is required from the outside edge and not the centre of the plant. If there are many dodder plants close together it may be easier to desiccate the whole area encompassing these plants rather than maintain many 2m buffer zones. See diagram below.
2.	<u>Contact your local CFS branch</u> to notify them of your intent to burn during fire ban season and apply for the appropriate permit. Your Authorised Officer may be able to assist in liaising with the CFS to gain this approval.
3.	Once the desiccated area is sufficiently dry, soak the area in diesel and place <u>hay to a depth of 600mm</u> across the entire area. When putting out the hay "fluff" it up so plenty of air can circulate and achieve a hot burn. Apply diesel to the hay and allow time for it to soak through.
4.	Select a suitable day for burning and ensure you have sufficient fire fighting procedures in place in case of emergency. Make sure the CFS is aware of your activities. The hotter and longer you can burn the areas the more likely you are to destroy any seed in the soil.

Buffer zones for dodder infestations :



Isolation of Infestations

As soon as any dodder plants are discovered in the paddock, decontamination procedures should immediately be put into place and the infested areas avoided as much as possible. This applies to all traffic through the paddock.

Once burning of the infested areas is complete and particularly as the paddock goes into the next management cycle following the harvest of the host crop, more permanent arrangements need to be made for isolating the infested areas and preventing further spread of dodder.

Again, depending on the size of the infestation, the landholder will need to decide what is feasible for the particular paddock. Ideally, fencing off the infested areas is the most effective method of preventing movement of people, machinery or stock in these high risk areas. However, the type of irrigation and other management practises will determine what is possible in order to allow production to continue as usual across the rest of the paddock.

Permanent fencing also serves as a true indicator of the extent of the infestation and also as a reminder of the infestation, both of which allow for easy monitoring. Section 5 outlines a number of options for minimising the risk of spreading the dodder infestation further, and includes alternatives such as excluding stock completely from the paddock.

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5.6 Host crop management

As long as the size of the dodder infestation is such that it is feasible to maintain production in the rest of the paddock, normal paddock management can occur in accordance with decontamination requirements and risk management suggestions described in section 5. Exact details of the most appropriate management actions for the particular paddock can be discussed with the Authorised Officer and agronomist as part of the annual management plan negotiations.

To meet statutory obligations described in section 1, landholders must notify the Authorised Officer if they discover any new infestations of dodder outside of the inspection schedule. Landholders must also obtain written permission from the Authorised Officer before transporting any potentially infested produce from the paddock. The fate of any produce from the paddock will need to be discussed with the Authorised Officer to ensure legislative requirements are met.

5.7 Indicative 5 year plan

The following schedule is indicative only and designed to illustrate how inspection efforts may be scaled down over time as an accurate delineation of the dodder infestation is established and management practises have demonstrated successful containment of the infestation. A dodder infestation will not be guaranteed to be eradicated within five years and vigilance must be maintained at all times.

YEAR 1	<ul style="list-style-type: none">• Encourage dodder germination to check for extent• Need to alter paddock management to minimise risk• Paddock inspections each month• Full decontamination requirements• Destroy infestations
YEAR 2	<ul style="list-style-type: none">• Similar inspection schedule as year 1• Landholder monitoring paddock• Adjust paddock management• Destroy infestations
YEAR 3	<ul style="list-style-type: none">• First inspection, last inspection• Landholder monitoring paddock• Decontamination less stringent
YEAR 4	<ul style="list-style-type: none">• First inspection, last inspection• Landholder monitoring paddock• Decontamination lesser
YEAR 5	<ul style="list-style-type: none">• First inspection, last inspection• Landholder monitoring paddock• Decontamination less stringent

5.8 Annual paddock plan

As an attachment to this generic management plan, an annual management plan will be developed between the landholder and the Authorised Officer every October. The annual plan will describe specific requirements for the particular paddock and take into account the type of crop, seasonal issues, changes in management practises and the extent of the infestation.

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6. RISK MANAGEMENT

Living with a dodder infestation is all about managing the risk of spreading dodder to other locations, both on your property and to other properties. The details of your annual management plan will vary according to the paddock management activities you undertake and the choices you are willing to make to minimise your risk. For example, a pivot irrigated paddock may have different management procedures than a flood irrigated paddock due to the equipment used in the paddock.

Over time, and as you become more familiar with the infestation and control actions required, managing the risk becomes easier and less stringent. The table below outlines risk factors in regards to dodder, and choices you can make to help minimise the overall risk in the context of your paddock and infestation.

The options for minimising risk have been developed largely based on a lucerne crop. The principles apply to all crop types and landholders will need to factor in timing issues of other crops such as white clover to make dodder management as described below relevant to their situation. Authorised Officers are available to assist with interpreting this information into specific management plans.

Risk factors	Options for minimising risk
<ul style="list-style-type: none"> Harvesting is the highest risk activity which has the potential to spread dodder across your paddock, your property and to other properties (particularly between broadleaf crops) 	<ul style="list-style-type: none"> Ensure a thorough final inspection of the infested paddock occurs just prior to desiccation / windrowing Desiccating and burning buffer zones around each dodder plant ensures no part of a located dodder plant survives Do not harvest over infested area Harvest infested paddock last on property and last for contractors season if possible to ensure no seeds are spread by header Harvest the paddock in sections and take samples from each section so trace back is more precise if required Decontaminate all equipment leaving affected paddock Thoroughly clean out header after harvest and make next job a dryland cereal crop (if available) rather than an irrigated broadleaf crop
<ul style="list-style-type: none"> Stock movement may spread dodder within paddock and to other areas of property 	<ul style="list-style-type: none"> Fence off infestations to exclude stock from these areas Exclusion of stock from whole paddock will remove risk of spread by stock completely Stock grazed in infested paddock should be moved to a dryland grass based pasture, not another irrigated broadleaf pasture Desiccating and burning buffer zones around each dodder plant ensures no part of a located dodder plant survives
<ul style="list-style-type: none"> Contaminated produce may spread dodder to other properties 	<ul style="list-style-type: none"> Desiccating and burning buffer zones around each dodder plant ensures no part of a located dodder plant survives Do not harvest over infested area Ensure seed is transported in sealed trailer with the appropriate approval from SENRMB Clean seed lot last for season so no other seed lots have risk of becoming contaminated Do not produce seconds from affected paddock Destroy any offal or straw

GENERIC DODDER MANAGEMENT PLAN

Risk Factors	Options for minimising risk
	<ul style="list-style-type: none"> • Keep and test samples of uncleaned and cleaned seed from all lines harvested from the paddock – the more lines you divide the paddock into the more easily you will be able to locate any possible dodder outbreaks • Three options for fate of seed – destruction, export overseas or hammer milling • Any hay, silage or clover tops cut and bailed from paddock to be used on property in dryland, non-broadleaf pasture only or sent to feed lot • Locations where feed fed out to be marked and monitored in following seasons • The inspection schedule for your paddock is designed to provide some assurance that the parts of the paddock where dodder is not found can be considered dodder free and be harvested and processed under normal conditions.
<ul style="list-style-type: none"> • Hot weather may stimulate germination of dodder 	<ul style="list-style-type: none"> • Regularly inspect paddock after hot weather • Decontaminate all equipment leaving affected paddock
<ul style="list-style-type: none"> • Late summer watering and rain may stimulate germination of dodder 	<ul style="list-style-type: none"> • Regularly inspect paddock after summer rain • Ensure final irrigation in a lucerne crop is at least 4 weeks prior to desiccation or wind rowing to prevent last minute germination of dodder that may not be found before harvest • Desiccating and burning buffer zones around each dodder plant ensures no part of a located dodder plant survives • Decontaminate all equipment leaving affected paddock
<ul style="list-style-type: none"> • Soil disturbance may stimulate germination of dodder eg sowing, stock movement 	<ul style="list-style-type: none"> • Decontaminate all equipment leaving affected paddock • Don't sow in infested area if possible • Aerial spraying will avoid soil disturbance in the affected paddock • Exclusion of stock from whole paddock will prevent soil disturbance
<ul style="list-style-type: none"> • Infestations along spray tracks and pivot tracks are high risk for spread 	<ul style="list-style-type: none"> • Check all tracks regularly during summer • Minimise all traffic in paddock during summer months • Decontaminate all equipment leaving affected paddock • Aerial spraying will avoid machinery contamination • Desiccating and burning buffer zones around each dodder plant ensures no part of a located dodder plant survives

7. SIGNATORIES TO PROPERTY MANAGEMENT PLANS

As outlined in Section 2, the statutory responsibility for dodder management lies with the South East Natural Resources Management Board and the landholder. However, there are a number of other relevant stakeholders that need to be involved in the management plan. It is up to the landholder how actively he/she involves other parties in development and implementation of the management plan. Below are some suggestions for who may be party to the plan:

Essential : South East Natural Resources Management Board
 Land owner

GENERIC DODDER MANAGEMENT PLAN

Optional : Lucerne Australia
Department of Water Land and Biodiversity Conservation
Seed marketing company
Seed certifier
Agronomist
Contractors

8. PERPETUITY

Because dodder seed is so long lived, once infested, a paddock must always be considered infested. To ensure potential infestations are managed effectively into the future it is essential that management plans are fully implemented by current and future landholders.

As a responsible member of the lucerne industry, it is your responsibility to notify (potential) new owners about the dodder history on your property.

There is also an option to have the management plan formalised under the Natural Resources Management Act and registered on the property title.

Communication is also required with all parties who may work with the affected crop, especially the seed cleaner and certifier. By flagging the crop with a dodder history each year, these other parties are able to be particularly careful with produce and inspections to ensure dodder is not spread further by contaminating other produce and equipment.

9. IMPORTANT CONTACT DETAILS

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