



# **Biosecurity Response**

## **Velvetleaf Farm Management Advisory**

### **Farm management plans for infected farms**

**Response title: Velvetleaf 2016**

**Date: 06/04/2016**

**Purpose of this advisory** The velvetleaf farm management plan has been developed for the Velvetleaf 2016 response to assist farmers affected with Velvetleaf. This document provides some farm management plans to restrict the spread of Velvetleaf from farmer's paddocks to other areas.



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## Introduction

This document has been prepared in partnership with Dairy NZ, Foundation for Arable Research (FAR), Federated Farmers, AgResearch and PGG Wrightsons agronomists. It has been developed as the best way to manage this organism into the long term to reduce spread and contain this weed species.

Following these plans and using best farm management practices will assist in protecting your farm from the risks posed by velvetleaf and allow continuation of normal farm practises. If velvetleaf (VL) seed is allowed to mature it can remain in paddocks for decades, severely affecting crops and yield. The management of VL is likely to be expensive and some paddocks could be left fallow. Conversely, if VL plants can be pulled before seed set disturbance to normal farm practices will be minimised and management costs reduced.

## Biosecurity issue

Velvetleaf (*Abutilon theophrasti* [Malvales: Malvaceae]) is an Unwanted Organism under the Biosecurity Act 1993. Its spreading canopy shades the crop and competes with plants for water and nutrients, reducing yield. Velvetleaf is a weed of orchards, gardens, cultivated lands and waste areas (e.g. hedges, tree-lines, roadsides).

Velvetleaf is self-pollinating and a plant can produce up to 17 000 seeds. The seeds remain viable following digestion and passing through birds and mammals (Warwick and Black, 1988). The propagation and reproduction through seed can result in a long 'lag' phase after introduction, where a plant may not appear to be a significant weed for considerable lengths of time (decades), but once a seed bank develops, control becomes increasingly difficult and crop losses/effects become more apparent.

## Biosecurity Risk

The greatest risk of velvetleaf is its economic impact. Velvetleaf is a major invasive crop weed in North America, parts of Asia and North Africa, and Mediterranean and Eastern Europe, and Australia, causing significant yield losses if not controlled. At minimum it is expected to result in a 30% less yield for all crop species that have velvetleaf.

Velvetleaf is widely recognised as difficult to control, particularly in crops sensitive to herbicides that are non-selective, limiting crop selection and rotation.

Presence of VL in seed for production or supplementary feed for livestock could lead to reduced internal trade and 'blacklisting' of properties. This is most likely to occur in the early stages of an incursion as farmers and growers without VL seek to protect their farms.

## Working together

Velvetleaf's main mode of spread is through mechanical distribution (human mediated, machinery, stock etc), therefore it is imperative that farmers work with MPI and industry to reduce the spread and contain velvetleaf. MPI will be able to provide advice and oversee operations, but it will be up to farmers and local industry or councils to ensure there is good on-farm biosecurity practices to contain VL to known sites. The spread of VL into new paddocks or new farms will increase the impact across New Zealand and the impact to the primary sector economy. Managing this pest locally now will help to reduce its impact in the future.



## How you can help us manage the spread

Doing your bit now with good on-farm biosecurity to restrict the spread of this pest will minimise the impact into the future.

MPI and Industry have developed the advice below to ensure you have good plans for;

- Re-Inspection in 2016
- Feeding Management Plan

### Re-Inspection in 2016

Re-inspection for velvetleaf plants by farmers in those paddocks which have previously been inspected this season should occur during April 2016 (prior to or at the point of grazing) to find VL plants that may be late growing. Any positive finds should be notified to MPI's exotic pest and disease hotline on 0800 80 99 66.

Farmers need to remain vigilant on their properties and keep an eye out for germinating plants. If plants are seen that have not yet gone to seed then these should be immediately pulled out and double bagged. Some Regional Councils have approved waste disposal processes for weeds and quarantine wastes such as autoclave / steam sterilisation. Plants can be disposed by this method or by deep burial (at least 1m deep in an undisturbed area) in sealed bags.

For farmers who have reported suspected velvetleaf to MPI and are concerned about plants seeding while they are waiting on the velvetleaf response team field visit, the following "bag it – bend it" actions could help reduce the risk of seed fall:

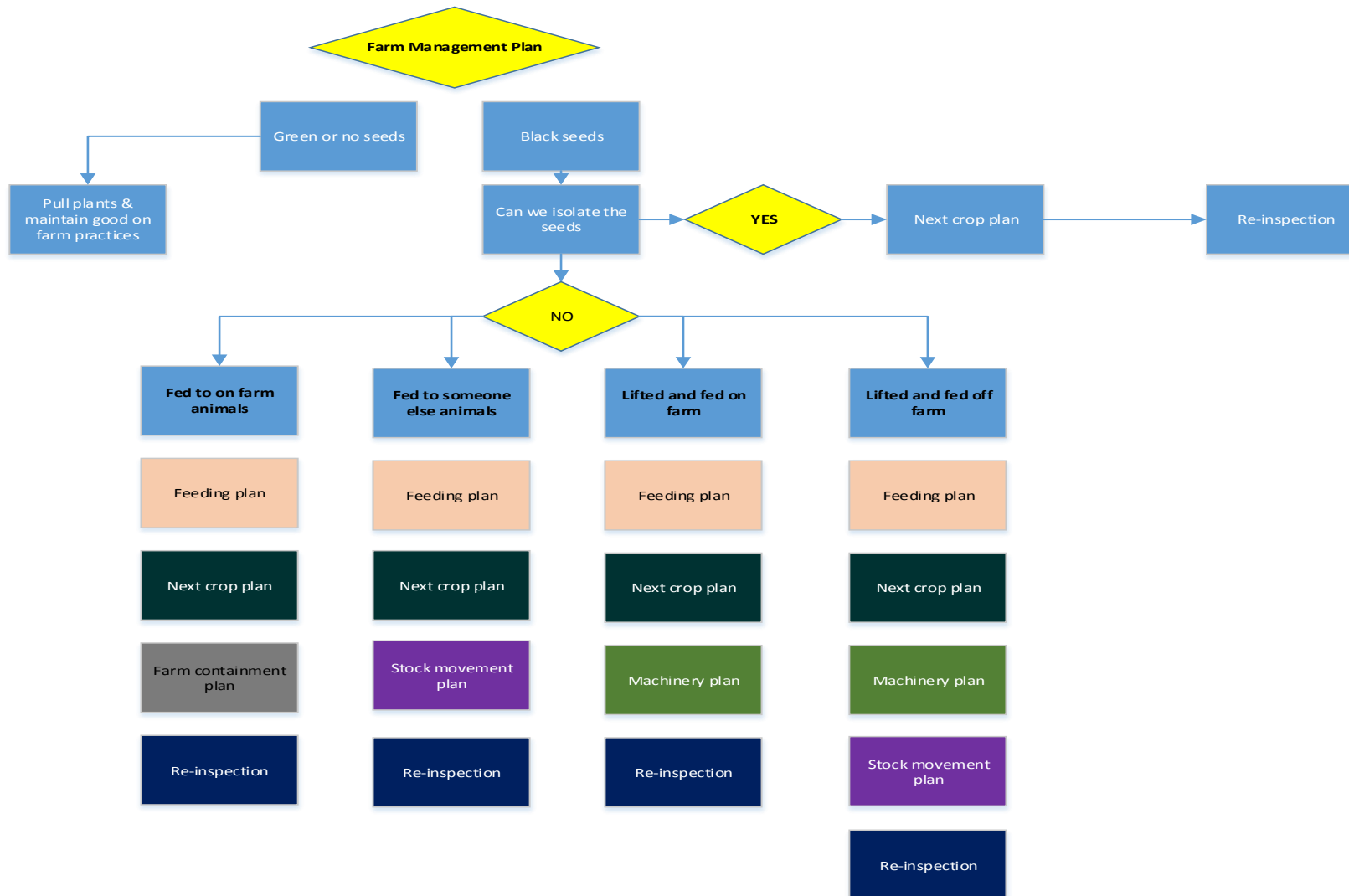
- If seed heads are present on the plant, carefully place a large bag (like a fertiliser bag or sack or similar) over the seed capsules and flowers on the plant and tie the bag tightly around the stem. It is important to make sure all seed heads are contained within the bag.
- The velvetleaf plant should then be bent in half so that seeds cannot escape out of the neck of the bag. The seeded plant should remain in the ground until told otherwise.

- Machinery plan
- Stock movement plans to reduce the spread of Velvetleaf
- Management of fodder beet cropped areas with incursions from velvetleaf.
- Re-Inspection

This document provides advice about how you can help prevent the spread of velvetleaf on your farm.

1. If the velvetleaf has been detected early and the seeds are still green or there are no seeds, then the plants can be pulled straight away, contained and safely disposed by the method in the section re-inspection 2016
2. If the velvetleaf seed has turned black or seed has dropped then following the advice in this document will help reduce further spread from the current paddocks to additional paddocks on your farm, or off your farm.

# Farm Management Plan Process



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## Machinery plan

### **The standard to achieve is: no visible soil or plant matter remains that might spread pests or weeds**

These guidelines provide some general guidance on how to achieve this desired outcome but do not include detailed procedures for cleaning the wide range of different machinery types that operators use. It is the operators' responsibility to work out what, specifically, is required for their machine.

### **Machinery washdown and equipment**

Ideally, machinery wash-down should occur on the property prior to movement off the farm, thereby containing any seed at source and avoid soil containing viable seed being transported from one farm to another. Machinery should be cleaned in a built-for-purpose wash-down facility, but care should be taken to ensure there is not a risk of pest spread during transport to that facility. You will also need to consider containment of run-off/slurry at cleaning site and future inspection of that site.

Equipment used to clean machinery will depend on the type of machinery and facilities available. Machinery includes implements, attachments, and service vehicles. Cleaning can be by any one or a combination of:

- Physical removal
- Pressure water
- Pressure air
- Vacuum cleaning
- Disinfection

Be careful not to damage sensitive equipment, particularly with pressure water. Consult and comply with manufacturer recommended cleaning methods if in doubt.

### **For general cleaning procedures the following guidelines apply**

- Remove only those cover plates etc that can be quickly and easily removed and replaced.
- No clods of dirt or loose soil should be present after washdown. Smearred soil stains and soil firmly lodged in difficult to access areas are acceptable (except for known high risk scenarios e.g. heavily infested VL paddocks).
- Radiator, grills and the interior of vehicles should be free of accumulations of seed and other plant material.
- Check the machinery inside and out, for where dirt or plant material including seeds are lodged. Pay attention to awkward places such as the underside, radiators, between dual wheels, spare tyres, hollow sections, foot wells and bumper bars.



## Feeding Management Plan

### General:

For any crops with more than 15 VL plants per ha, where possible do not graze the paddock to reduce the risk of seed being transported out of the paddock and around the farm on soil contaminated hooves and in the gut of the cows.

### Specific feeding regime options:

#### **Fodder beet grazed in situ to own animals during lactation**

Issues/positives: cows will on/off graze the crop so dung can be directly deposited onto paddocks and laneways throughout the farm and also indirectly through the effluent system

Outcome: Need to avoid cows coming in contact with soil contaminated with velvetleaf seed and spreading seed to other paddocks

Approach:

- a. Start grazing uncontaminated paddocks first. This will allow grazing plans for contaminated paddocks to be formulated and assessed
- b. When grazing contaminated paddocks, if practical **do not** allow access to any areas where velvetleaf seed has dropped (fence off with portable/semi-permanent fences). If you cannot fence with 2 wires (top and bottom) a buffer of at least 1 m is required from the contaminated soil to the temporary fence. You will need portable electric fence units for each area or a connection from the break fence to the containment fence as the cows get closer. Once you have passed the infected area a break fence can be used as an additional barrier.
- c. Do not pull fodder beet plants from this area and throw over the fence to the cows as seeds may be embedded in the leaves and on the soil around the roots.
- d. If possible plan the grazing to finish in a clean area of the paddock to maximise the chances of any ingested seed being voided before the cows move paddocks. 24 hours on uncontaminated ground is suggested to minimise the chance of seeds being carried in the digestive tract to the next paddock. This paddock will need an active management plan to deal with plants that germinate the following year.

#### **Grazed in situ to farmers owned non-lactating animals during winter**

Issues/Positives: Easier to contain cows in the contaminated paddock throughout the grazing period i.e. unlikely to or opportunity exists to not on/off graze

Outcome: Need to avoid cows coming in contact with soil contaminated with velvetleaf seed and spreading it to other parts of the paddock and pugging it into the soil.

Approach:

- a. Start grazing uncontaminated paddocks first. This will allow grazing plans for contaminated paddocks to be formulated and assessed

- b. If several paddocks are contaminated graze these in sequence rather than alternating with a clean paddock
- c. Keep the same mob of cattle on contaminated paddocks
- e. When grazing contaminated paddocks, if practical **do not** allow access to any areas where velvetleaf seed has dropped (fence off with portable/semi-permanent fences). If you cannot fence with 2 wires to prevent cows grazing under the fence (top and bottom) to prevent cows grazing under the fence a buffer of at least 1 m is required from the contaminated soil to the temporary fence
- d. Do not pull fodder beet plants from this area and throw over the fence to the cows as seeds may be embedded in the leaves and roots of plants
- e. Use break fences to minimise the potential spread of seed across the whole paddock by minimising pugging and stock traffic
- f. If possible start with the area closest to the contaminated site and graze away from it. The break fence then acts as a second fence stopping animals breaking into the contaminated area.
- g. If multiple contamination sites exist, and it is not practical to fence these areas off, plan the grazing to finish in a clean area of the paddock to maximise the chances of any ingested seed being voided before the cows move paddocks. 24 hours on uncontaminated ground is suggested to minimise the chance of seeds being carried in the digestive tract to the next paddock. This paddock will need an active management plan to deal with plants that germinate the following year.

### **Lifted and fed directly to animals on farm during lactation**

Issues/Positives: Easier to avoid contaminated areas when lifting if they are well identified

Issues/Positives: if using a contractor their equipment could be contaminated before it arrives or it could become contaminated on the property

Outcome: Avoid lifting areas contaminated with velvetleaf seed to prevent within farm and farm to farm transfer of VL seed

Approach:

- a. Mark out and fence off contaminated areas.
- b. Include a 1 m buffer zone from the affected area to the first row that is to be lifted.
- c. Only lift and feed areas that are known to be free of velvetleaf contamination.
- d. If using a contractor to lift the beet ensure their machinery is thoroughly cleaned down after lifting your crop. Where possible contain any loose soil that comes with the crop and do not allow it into the effluent system.
- e. Infected soil should be disposed of in appropriate biosecurity manner (i.e. deep burial or through local council guidelines)

### **Lifted and fed to animals on another farm during lactation or winter**

Issues/Positives: Easier to avoid contaminated areas when lifting if they are well identified

Issues/Positives: if using a contractor their equipment could be contaminated before it arrives or become contaminated on the property

Issues/Positives: relying on the seller to do the right thing with regards biosecurity

Outcome: Avoid lifting areas contaminated with velvetleaf seed to prevent farm to farm transfer of VL seed

Approach:

- a. Inspect the crop or discuss with the seller the potential for velvetleaf contamination before harvesting
- b. Purchase washed beet where possible.
- c. Ensure equipment used for lifting and transporting purchased fodder beet has undergone the necessary biosecurity cleaning measures as above.
- d. Record where the lifted fodder beet has been stored and fed.

### **In situ grazing of someone else's animals on your farm during winter**

Issues/Positives: seed consumed or soil in hooves may contaminate the farm the cows originated from

Issues/Positives: seed could be distributed in dung when walking or trucking animals between properties

Issues/Positives: contaminated effluent from trucks could spread seed over large distances eg Central Otago to Invercargill

Outcome: Avoid transfer of velvetleaf seed with the cows

Approach:

- a. Graze contaminated paddocks first.
- b. If several paddocks are contaminated graze these in sequence rather than alternating with a clean paddock
- c. Keep the same mob of cattle on contaminated paddocks if possible
- f. When grazing contaminated paddocks, if it is practical **do not** allow access to any areas where velvetleaf seed has dropped (fence off with portable/semi-permanent fences). If you cannot fence with 2 wires to prevent cows grazing under the fence (top and bottom) to prevent cows grazing under the fence a buffer of at least 1 m is required from the contaminated soil to the temporary fence. You will need portable electric fence units for each area or a connection from the break fence to the containment fence as the cows get closer. Once you have passed the infected area a break fence can be used as an additional barrier
- d. Do not pull fodder beet plants from this area and throw over the fence to the cows as seeds may be embedded in the leaves
- e. Use break fences to minimise the potential spread of seed across the whole paddock by minimising pugging and stock traffic
- f. If possible start with the area closest to the contaminated site and graze away from it. The break fence then acts as a second fence stopping animals breaking into the contaminated area
- g. If multiple contamination sites exist and it is not practical to fence these areas off plan the grazing to finish in a clean area of the paddock to maximise the chances of any ingested seed being voided before the cows move paddocks. At least 6-7

days on uncontaminated ground is suggested to minimise the chance of seeds being carried in the digestive tract to the next paddock

- h. If seed contamination is throughout the paddock, if practical, a holding paddock may be required to hold the cows for up to 7 days before they are transported off the farm.

## Stock movement plans to reduce the spread of Velvetleaf

**Objective:** stop the spread of velvetleaf seed from an infested to non-infested site.

**Sub-objective:** limit/contain the potential spread to identified locations on your farm.

The time taken for ingested seed to pass through a cow is not exactly known, opinion is that:

- some could pass through in 12 hours;
- the majority could pass through in the first 12-24h;
- with small semi-digestible stuff residence time is somewhat a matter of probability.

### **Movement of stock from one location to another location on the same farm**

- The aim of this process is to limit the transfer of velvetleaf seed to an identified site on your farm i.e. a holding paddock, or to recorded sites on the farm that will require later re-inspection
- After cattle have had access to an area where an infestation of velvetleaf is present, if possible, farmers are recommended to locate the herd in a holding paddock for 24 hours
- Holding the animals in one paddock will provide an opportunity for the animals to excrete some of the consumed seeds, and for potentially contaminated soil to be transferred into the holding paddock.
- The ideal is to use the same paddock any time your herd has access to the infested paddock.
- The time prescribed above is considered ideal – however farmers will need to balance this ideal based on limiting the damage caused to this paddock through excessive pugging etc on a case by case basis.
- Record movement of stock around the farm after their exposure to the VL infested paddock.

### **Movement of stock from farm A to farm B**

If possible keep the stock that you are preparing to move off the infested crop for 24 hours before moving day. This will allow the stock some time to pass the seed through their system, and for contaminated soil to be removed.

Alternative feed may be required to achieve this.

If stock need to be moved before the ideal timeframe has passed accurately record the movement (the path travelled) if physically walking stock from one farm location to another. Inform

If using a stock truck, inform MPI of your plan to move the stock. Inform the operator of the potential for seed contamination in the effluent and if possible ensure effluent is disposed of in a designated contained area.

When you reach your destination, if practical, try to hold the stock in a paddock for the 24 hours to result in more seed passing through the animals. Record which paddock was used as that holding paddock.

If you are receiving new stock onto your farm, ask whether they could have been exposed to velvetleaf. If the answer is yes, discuss the situation with the previous owner/manager and hold the replacement stock in a paddock for at least 24 hours.

## Management of fodder beet cropped areas with incursions from velvetleaf.

This section discusses some management options for fodder beet paddocks where velvetleaf was identified in the 2015/16 growing season. A number of crops and pasture species are considered and the possible crop establishment practices that could be used are discussed. The options differ slightly for crops where seed was dropped from mature plants as compared to those crops where velvetleaf was removed prior to any seed drop.

### **Mature seed**

The future crop management in fodder beet crops where velvetleaf seed has matured and potentially dropped to the ground should be more stringent than in crops where seed did not mature, although the practices are similar. It is expected that within the vicinity of a parent plant that produced seed there will be clusters of seed from which VL seedlings will germinate.

### **Crop establishment**

It will be important to minimise the treading damage from grazing animals so that it is possible to use reduced cultivation to establish the next crop. You can do this by following the below guidelines:

- Ploughing, deep ripping, discing or rotary hoeing should not be used. Instead minimum tillage or no tillage should be used. This means only the top 5cm of soil should be disturbed in cultivating or drilling a paddock.
- In infested areas each cultivation pass should be in the same direction of the paddock as the previous year to reduce the risk of seed movement across the paddock.

Where ever possible the infested parts of the paddock should be cultivated last and machinery fully washed down before leaving the paddock or a secure area adjacent to the paddock.

If it is not possible to cultivate infested areas last then cultivate these areas first so any velvetleaf seed will be dislodged from the machinery before exiting the paddock.

The need to avoid deep cultivation means crops such as potatoes and onions should be avoided.

### **Crop options**

A number of criteria should be considered in selecting crops.

1. Aim to sow the crop as early as possible before soil temperatures are warm enough to favour velvetleaf germination. This means the crop will be established and competing with velvetleaf plants that germinate. Aim to drill the crop by the end of August if possible. If the fodder beet is autumn grazed sow a crop in the autumn to early winter.
2. Select crops that do not grow taller than a metre. This will allow velvetleaf to grow taller than the crop and be easily identified. **Avoid tall growing crops such as maize, sweet corn, forage brassicas and triticale.**
3. Select crops that are annuals and will be harvested in December or January before the velvetleaf goes to flower. This means the velvetleaf will be cut off near ground level prior to any seed forming.
4. Ideally select crops where selective herbicides can be used to control velvetleaf. These crops may be monocots allowing the use of a wider range of broadleaf herbicides.
5. Crops such as wheat, barley or oats for silage harvested in December to January or an annual ryegrass harvested in January would be useful crop options. Cereal crops grown for grain will probably mature too late to be harvested before the velvetleaf seed

matures. Short season crops such as peas and beans for process that are harvested prior to the end of January are possible options.

6. Avoid long season crops such as maize or forage brassicas as the seed will mature before the crop is ready to harvest.
7. Inspect all crops for velvetleaf prior to harvest.
8. After harvest of the crop in summer leave fallow for a few weeks to allow any velvetleaf to germinate in the warm soil temperatures.
9. After harvest follow the above cultivation practices and aim to sow a winter crop (grass or cereal) in Autumn as soil temperatures begin to cool in March. Velvetleaf is not expected to survive the winter in most regions of New Zealand.

#### **No mature seed.**

Reports indicate that approximately 90% of seed is likely to germinate in the first year after sowing. Thus in crops sown in 2015 where VL plants did not produce mature seed, it is expected that seeds sown with the fodder beet will have germinated.

The seed analysis of two seed lines indicated that velvetleaf was present in the fodder beet at rates of 3 seeds/ha and possibly up to 9 seeds/ha. Thus, if only 10% of seed did not germinate in year 1, then in year two it is expected seeds could germinate at 1 plant per 4ha or 1 plant per 1.1ha.

A strategy that involves no deep cultivation, using minimum till or no-till, to establish the crop and sowing a crop in late winter / early spring, that is harvested prior to the end of January, would mean any velvetleaf seedlings that germinated in year two would be removed with the crop prior to seed set. This approach should also include inspection of the paddock in February, during and after harvest to ensure no plants are present. Thus suitable crops are likely to be monocot, eg. cereals for silage or annual ryegrass, where broadleaf herbicides can be used and possibly crops such as process peas or beans. All these crops would be harvested prior to the velvetleaf going to seed.

Crops such as maize and sweet corn should be avoided as they are difficult to actively inspect and mature after VL has gone to seed. Crops like potatoes and onions that require intensive and deep cultivation should also be avoided, even if they were harvested early, as there is a risk of burying seed to a depth that it will be brought to the surface with the next cultivation or years later. Forage or seed brassicas should be avoided as it will be difficult to effectively inspect as they mature late in the season.



## Re-Inspection next season

Re-inspection for velvetleaf plants on those paddocks which have previously been inspected should occur between December, January and February (2017) to find VL plants before they go to seed. This is likely to be coordinated in conjunction with MPI. Any positive finds should be notified to MPI's exotic pest and disease hotline on 0800 80 99 66.

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