



How to Manage Weeds

Department of Primary Industries

Weeds can be managed using many different methods. The most effective management of weeds is usually achieved by a combination of methods in conjunction with a thorough follow-up campaign.

Assessing the Problem

When assessing the extent to which a weed should be controlled consider the capacity and use of the land. On marginal land, earning small returns, it may make more economic sense to tolerate a certain weed level rather than aim for total control, especially if the weed is not particularly devastating or is not escaping into the surrounding area.

Always assess the weed in the context of its environment. This will help determine the type and level of control to be implemented.

Identifying the Weed

It is vital that the weeds be correctly identified BEFORE a control program is implemented. Control options are dependent upon the species of plants and their biological characteristics.

The following information describes some features of weeds that should be considered when developing a control program. A number of control methods are then discussed.

Weed Characteristics

Weeds are classified by a number of growth and reproductive characteristics. An efficient control program is difficult to devise unless the critical life cycle

characteristics of a plant species have been determined.

Annual Plants

Live for one year. They set seed and die within a single year. The roots are usually shallow and the plant is easily pulled up. Paterson's curse, slender thistle and caltrop are examples of annual weeds. Control methods should aim to prevent further seeding.

Biennial Plants

Live for two years. Biennials germinate and form a rosette or small plant in the first year, then flower and set seed in the second year. Wild teasel and great mullein are biennial plants. Many species of thistles can be annuals or biennials. Control measures should be taken in the first year of a biennial plant's life, before it sets seed.

Perennial Plants

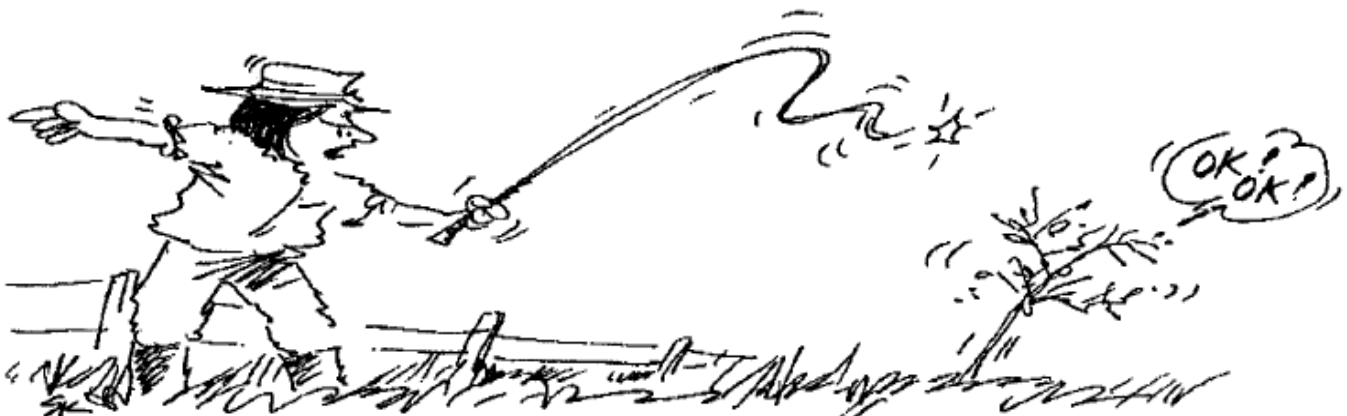
Live for many years, usually flowering and setting seed in the first few years and continuing to reproduce until they die. Often these plants multiply by sending up shoots from the roots or stems, ie. by vegetative reproduction.

Blackberry and boneseed are examples of perennial weeds. Control measures should aim to deplete the root reserves so that no new shoots can emerge. Cultivation often should be avoided as this can lead to further spread. Plants are also distinguished by their leaf type, root system, flowering times and methods of reproduction.

Control Measures

Prevention

This is the most effective means of control. Purchasers of properties need to know the weed history of the land. A



property with a history of weeds such as cape tulip or Paterson's curse could cost more to manage than initially expected. It is wise to seek advice on particular properties in the area at the local Department of Primary Industries office.

Animal stock brought into a property for the first time should be placed in a confined area for a week to allow for any viable weed seeds in their digestive tracts to be expelled. This helps to minimise the distribution of weed seeds over the property. It is preferable to purchase shorn sheep as there is less chance of transporting weed seeds in their fleece.



After machinery has been used in a weed infested area, clean it up before moving it into a weed free area. When bringing in feed supplies from outside the farm always feed-out in a confined area so that any weeds which arise are restricted to a small area and not spread through the property. Minimise the amount of soil and vegetation disturbance when carrying out work. Disturbed ground often provides ideal conditions for the germination of weed seeds. Try to buy locally produced seed. There is less chance of introducing new weeds to the district this way. If seed is obtained from outside the district, check to determine exactly what seeds are present., it is best when buying seed try to get certified because it has minimal contamination with weed seeds.

Any weed removal program needs to be coupled with a **replacement** or **revegetation** program. This can take the form of pasture improvement or renovation, the planting of a crop, or revegetation with indigenous native species ie: plants native to the local area.

Plant Competition

It is important to grow vigorous plants that out compete the weeds. A healthy pasture or crop can often suppress weed growth. A good cover of vegetation can prevent weed invasion in areas of natural vegetation.

Cultivation

There are various cultivation implements suitable for weed control. These include disc ploughs, harrows and deep rippers. The deep ripper is advisable for heavy soils with a hard layer. Cultivation can provide very good control of annual plants. The best time to cultivate is before the seed sets. Cultivation is not a good control method for plants with rhizomes (underground stems) and stolons

(horizontal stems which root at the nodes) which spread vegetatively. Small pieces of such plants can usually regenerate. If you want to use cultivation on perennial plants, be prepared to continue the program for a long time, ie. many years.



Mulching

In this method, a layer of material which the weeds cannot penetrate is placed on the ground. The weed seeds are denied access to light and some are unable to germinate. The mulch also provides an impenetrable layer to emerging seedlings. Mulching helps to preserve moisture in the soil for the use of more desirable plants. Many different materials can be used for mulch. In broad-acre farming, stubble from previous crops or other organic matter may be used. In gardens and around individual tree plantings, bark or wood chips, newspaper and plastic may be appropriate. Revegetation works in natural areas often employ commercial mulches. Care should be taken with organic mulches. They are frequently contaminated with weed seeds.

Burning

Burning is a control method for use by experienced people. It is used to control weeds of natural ecosystems eg. boneseed. Many natural ecosystems are adapted to regular fires and species diversity will decline unless they are burned. Burning can be a useful preliminary action in operations against cape tulip, because it removes any surface trash and allows more water to penetrate and stimulate corm germination early in the season.

Fire promotes germination of soil stored seed, so the weeds can be killed once they come up. It also heats the soil to a temperature which destroys soil stored seed. The intensity of the fire determines which seed are stimulated to germinate and which are killed.

Burning can severely deplete reserves of phosphorus in the soil. Ten to twenty years may be required for these reserves to be restored. Extra fertiliser is often required

after burning in agricultural situations. In natural ecosystems the burning of accumulated litter recharges the soil with minerals and can lead to a flush of new growth.

Biological Control

Biological control involves the use of one organism to attack and control another. Weed biocontrol agents include bacteria, fungi, insects and other animals. There are several examples of successful programs for the biological control of weeds in Australia. The cactoblastis moth, introduced from South America, devastated the prickly pear cactus in Queensland, and one form of skeleton weed has largely been controlled by a specific rust fungus.

Biocontrol agents are approved by the Australian Quarantine and Inspection Service and Environment Australia after being thoroughly tested to ensure that they are host specific and do not attack commercial or native plants. The introduction of a new biological control agent requires several years of scientific research and testing. Biological control programs are expensive, but effective programs have a high ratio of benefits to costs.

Biocontrol cannot eradicate a weed but can reduce the spread and density of infestations. In some cases the weed is suppressed to the level where it is no longer of concern and no other control is necessary. More commonly other methods are still required to achieve the desired level of control, however these need not be used so frequently or intensively. Biological control is best suited to large, inaccessible infestations with a low priority for control.

Grazing animals are one of our most effective biological control agents. Their potential should not be underestimated.

Pasture and Grazing Management

Good cropping and pasture management practices are essential to maintaining a weed-free farm. Well planned grazing management regimes, in conjunction with prudent fertiliser, sowing and soil aeration programs are essential to minimise weed infestations. Mowing or slashing of pasture after grazing can ensure that weeds not eaten by stock do not gain an advantage and crowd out the preferred plants.

Grazing at a range of different stocking rates is a very important technique for weed control. Heavy stocking forces animals to eat the less desirable plants. Lighter stocking rates can lead to selective grazing, where the weedy and less palatable plants remain uneaten.

Sheep graze closer to the ground than cattle, thus causing more damage to the weeds.

Horses are more selective than cattle and leave more weed species. Goats, which are browsing rather than grazing animals, preferentially select many weeds, and can be very useful in controlling woody weeds and thistles.

Care should be taken when allowing stock to graze weedy pastures. Some weeds have poisonous properties and can cause illness or death. For example, stock unused to

grazing cape tulip can become ill after eating excessive amounts of the plant.

Chemicals

Registrations of products can change from time to time, and it is therefore important for chemical users to ensure they refer to current information about chemical use patterns and legislative obligations. An Agricultural Chemical User Permit (ACUP) is required for use of 'restricted use' chemicals in Victoria, and there are restrictions on certain chemical uses in Agricultural Chemical Control Areas.

Since 24 July 2007, records of chemical use **MUST** be made and kept for all agricultural chemical use, not only for 'restricted use' chemicals as was required previously. Chemical users must make within 48 hours of use, and keep for a period of 2 years, records of use specified in the Agriculture Note AG1212; "Keeping Chemical Use Records (Give me one good reason!)"

For further information on chemical use patterns and/or legislative obligations in relation to chemical use in Victoria call the DPI Customer Service Centre on 136186, or visit the Chemical Standards Branch website: www.dpi.vic.gov.au/chemicalstandards



There are several main groups of herbicides.

Contact herbicides

Kill only those parts of the plant which they touch. Good coverage with contact herbicides can nevertheless kill whole plants.

Translocated herbicides

Move into the plant and are circulated around it achieving a complete kill.

Selective herbicides

Affect only certain plants. Some kill monocots (narrow leaved plants including grasses) while others affect dicots (broad-leaved plants).

Residual herbicides

Remain active in the soil for a period of time after application. These times are specified on the label of the herbicide container and may vary from a few months to a number of years. Soil sterilants are residual herbicides.

Herbicides take varying amounts of time to kill weeds, depending on the stage of growth of the weed and the mode of action of the herbicide. Results of chemical control activities may not be assessable for a number of months.

A contact herbicide may be sufficient to control annual weeds. However perennial plants generally need translocated herbicides so that the active chemical moves to all parts of the plant including the roots. Both contact and translocated chemicals should be applied when the weed is actively growing. Herbicides are not efficiently carried within the plant when it is under stress (eg when diseased or deprived of water) and control of weeds when they are stressed is not assured. Biennial plants and all thistles should be treated at the rosette stage to obtain the best kill using the least amount of herbicide. Plants should be treated before flowering and definitely before seed set.

Herbicide spraying should be undertaken on a clear, mild day on which a light breeze is blowing. The breeze allows the direction of any spray drift to be determined.

The spraying technique can then be adjusted to guard against off-target effects. Your chemical retailers can provide information on registered chemical products that are available in their store. They can also supply a 'material safety data sheet' that outlines the health and safety issues associated with use of a product.

Integrated Management

Successful long term weed management programs involve the appropriate combination of a number of control methods. A good strategy is to keep clean areas free of weeds and manage them to prevent weed invasion, clean up lightly infested areas with herbicides and tackle heavier infestations using a variety of methods, or in small parcels, as finances permit. For example, if a farm has a ragwort problem the aim is to prevent any ragwort plants flowering and to slowly deplete soil seed reserves.

One management scenario could be:

- **Chemical:** spray ragwort plants at the rosette stage.
- **Pasture Improvement:** sow an appropriate pasture mix, eg. white clover, cocksfoot and ryegrass.
- **Plant Competition:** fertilise the soil so that desirable species are advantaged.
- **Grazing:** develop a grazing program with initial heavy stocking with sheep to suppress the weed and prevent seeding.
- **Follow-Up:** keep the plant in-check with regular grazing and spot spraying of emerging plants.

- **Biological Control:** introduce ragwort flea-beetles or other agents to the worst infestations to provide long term suppression of the weed.
- **Maintain a Vigilant Watch:** continue to maintain pastures, graze them judiciously, monitor biocontrol and remove any emerging plants.

Follow-up work and inspections are a vital component of a weed control program. Once the weeds are under control a watchful eye will ensure it stays that way!



Remember, get ALL of the weed!

Further Information

- Contact your local landcare or friends group for further assistance and advice.
- Call the DPI/DSE Customer Service Centre on 136 186.
- Contact your local DPI Pest Management Officer for advice on local programs.
- Visit the DPI website at: <http://www.dpi.vic.gov.au> and the Weeds Australia website at: <http://www.weeds.org.au>

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