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## Manage crop weeds at harvest

Department of Primary Industries and Regional Development, Western Australia

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# Manage crop weeds at harvest

DPIRD-68

**This management strategy provides an opportunity to control weed seed set in the pasture and during harvest. The strategy physically removes viable seed from the paddock by collecting weed seed and grazing crop residues.**

Weed seed removal at harvest can be achieved in 2 ways:

1. collecting weed seeds from the system to prevent them being spread across the paddock or farm
2. grazing weed contaminated crop residue and pastures.

## Collecting weed seed at harvest

Weed seed collection at harvest will not increase grain yield, as the weeds have already caused damage to the crop. This tactic can only prevent increases to the seed bank. This may give a subsequent yield advantage to the next season's crop through reduced weed numbers during the season.

## Factors affecting weed seed removal

The weed species has a major influence on the proportion of weed seed removed from the paddock when collected at harvest. For example, annual ryegrass is much more available to collect than wild oats, which tend to shed seed before harvest.

Successful collection and control depend on the weed:

- maturing at the same time, or later than, the crop being harvested
- having seeds at a similar or greater height than the crop being harvested. This may be overcome by setting the header at a height that captures weed seeds
- having seeds that do not shed or shatter before or during harvest
- having seeds that can be threshed and are of a size that will end up in the chaff component of the harvested crop.

Timing of harvest will affect the number of seed removed from the paddock when residue is collected. As harvest is delayed, a greater proportion of the weeds will shatter or lodge, reducing the total proportion of seed able to be collected.

## **Dispose of weed contaminated chaff**

A strategy must be implemented and appropriately managed to dispose of chaff dumps or large quantities of baled straw, which will contain the collected seed. Chaff dumps are usually burned or fed to livestock, and both options require careful management.

Weed seed removal can be achieved by grazing crop residues and grazing to actively manage weeds in pastures.

## **Methods of weed seed collection at harvest**

### **Narrow header trail**

Facilitating narrow header trails (also known as trash windrows) is the cheapest, simplest form of collecting residue. It is done by disconnecting the straw spreaders on the header and allowing the straw, chaff and weed seeds to fall in a narrow trail behind the header. Adding a simple chute forces the residue into an even narrower, more discrete row.

The trail can then be burned during autumn. This has become common practice in many districts when harvesting canola. The high fuel load in the row results in a hot burn and a good weed seed kill. However, any unburned seeds will produce seedlings that will need to be controlled using an alternative tactic.

In a controlled traffic cropping system, straw can be spread while chaff and weed seed are deflected onto the wheel track where they are less likely to grow. During the subsequent growing season spray nozzles can be fitted to another implement to apply a non-selective herbicide to the wheel tracks, killing any germinated weeds. This system fits well where there is a preference for avoiding burning.

### **Chaff cart**

In a chaff cart system, the chaff and weed seeds are collected and thrown into a trailing cart. When the cart is full the gate is tripped and the cart self-empties to create a chaff dump.

### **Harrington seed destructor**

The Harrington Seed Destructor (HSD) was invented by Ray Harrington. It entered commercial production in 2012 and is now available incorporated in a header. Testing has shown the HSD can destroy 90 to 95% of weed seeds in the chaff it processes.

### **Baling systems**

Baling the chaff is an alternative to grazing. Because the material is already chopped, chaff bales are more attractive to dairy farmers than the conventional straw bales. As proximity to market and price can be limiting factors, this option appeals to those growers who have access to a stock-feed market such as a dairy, beef feedlot or stock-feed mill.

## **Grazing weed contaminated crop residues**

Grazing weed-contaminated crop residue can be a cost-effective way to control weed growth because animal digestion of weed seeds prevents a large proportion from entering the seedbank. Chaff can be grazed in-situ or burned during the following autumn.

## Benefits from grazing crop residues

- Grazing reduces the number of weed seeds added to the seed bank.
- Grazing can be used to dispose of, and gain value from, weed seed contaminated fodder.
- When stock graze crop residue, weed seeds can provide a significant proportion of the nutritional value (noting the feed value of the residue will be variable).
- Post-harvest grazing may reduce crop establishment problems by reducing stubble burdens.

## Other factors to consider

- Seed burial through trampling may enhance weed germination pre-sowing. Using a knockdown herbicide and delaying sowing can capitalise on this.
- Seed of desirable plants, such as pasture species, may be distributed in faeces.
- Grazing livestock can distribute weed seeds across a paddock.
- The impact of grazing on weed numbers in the seed bank depends on the biological features of the weed. Grazing is successful in reducing weed seed numbers in palatable weeds and where the seeds can be easily eaten and digested. However, seed palatability varies from weed to weed. The presence of awns, thorns, or biochemical traits makes some weeds less attractive to grazing animals than others.
- Seed location - stock must be able to access seed to ingest it. Seed still in the head, in chaff dumps, and feed troughs are easier to access than seed lying on the soil surface.
- Seed size - when shed from the seed head, small seeds are more difficult for animals to graze and more likely to survive ingestion and digestion.
- Hard seeds - a high proportion of hard seeds will remain viable after digestion and the digestive process can break seed dormancy, encouraging the germination of seeds that are shed in faecal matter.
- Livestock trampling tends to bury weed seed, which can decrease the efficiency of burning as a means of killing seeds. Depending on the weed species, burial may also increase germination rates.
- Grazing may increase the risk of soil, water and wind erosion, soil compaction and, potentially, toxicity issues for sheep (for example, lupinosis and annual ryegrass toxicity).

## Grazing to actively manage weeds in pastures

In crop-based rotations, a 2-to-3-year pasture phase may significantly reduce weed seed banks to a manageable level before returning to a cropping phase. It is essential to maintain desirable legume and grass species while keeping pasture weed numbers under control.

To help reduce weed number, use grazing with other tactics, such as hay and silage making, mowing, and pasture spray-topping for increased weed control. Well managed grazing will increase legume composition and improve feed quality.

## Issues to consider when controlling weeds in pasture

### Grazing pressure

Even though your newly established pasture may look lush and inviting, avoid the temptation of grazing too soon because high grazing pressure is necessary to ensure weed control.

Insufficient grazing pressure, particularly in spring when the seed heads of some grasses may be less palatable than legume species, will not result in weed control.

However, high grazing pressure can increase the proportion of broadleaf weeds that have a flat rosette, like capeweed and erodium, which stock avoid because they are difficult for them to graze.

Using a herbicide to cause these species to curl their leaves will give stock better access to them, but grazing pressure must be high to ensure stock eat these broadleaf weeds.

## **Time of grazing**

High grazing pressure in autumn will physically remove small weed plants, and short periods of intense grazing are generally recommended to minimise damage to non-weed species. Optimal grazing management depends on the ecology of the pasture species and weeds. For example, silver grass species are best managed by light grazing pressure in autumn. Light grazing pressure will also avoid the development of bare areas that provide an environment for weeds to establish later.

High grazing pressure in spring will reduce weed seed production but also reduce seed production by desirable pasture species. Sheep and cattle will preferentially graze the small heads of annual ryegrass.

Sharp awned seeds from grasses like brome grass, barley grass, and silver grass are not palatable to stock so intensive spring grazing to control these species should commence prior to emergence of the seed head.

## **Herbicides (spray-grazing) to manage weeds**

Grazing can be used in conjunction with herbicides to effectively manage weeds. Spray-grazing refers to the use of sublethal rates of selective herbicides (often phenoxy-based) to cause the flat weeds to curl up and increase the palatability and accessibility of broadleaf weeds for preferential grazing. It is usually undertaken in autumn or early winter and is especially beneficial for the control of erodium, capeweed, Paterson's curse, and wild radish.

To work effectively, spray-grazing requires high stocking rates of up to 4 times the normal rate for the area. Weeds that are not killed by spraying alone will recover in 2 to 3 weeks and exhibit normal growth if they are not grazed heavily after spraying.

## **Burial of seeds**

Livestock movement will bury some weed seeds. In some cases, this will enhance germination and subsequent weed control. However, it may allow the seeds to escape other weed control techniques, like burning.

Consider which weed species are in the field and how burial will affect subsequent weed control.

## **Livestock transporting weed seeds**

Practicing good farm hygiene techniques will assist in minimising weed seed transfer:

- move stock to holding areas after they have grazed weedy fields
- keep new stock in holding areas for at least 5 days to empty any seeds in the gut before allowing them to graze other paddocks
- keep stock in containment areas when handfeeding with imported feed
- alter shearing schedules to ensure fleece length is short when grasses are shedding seed. This will also reduce vegetable fault in fleeces.

## Contact us

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## More information

[Integrated Weed Management Manual | Grains Research and Development Corporation \(grdc.com.au\)](#)

Refer to the department website at [dpird.wa.gov.au](http://dpird.wa.gov.au) for more information on the following:

- Agronomic practices to enhance the impacts of crop weed management
- Control small weeds of crops
- Develop an integrated weed management plan
- Herbicides
- Integrated weed management of crop weeds
- Reduce crop weed seed numbers in the soil
- Stop crop weed seed set

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