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GRDC
GROWNOTES™

GRDC
GRAINS RESEARCH
& DEVELOPMENT
CORPORATION

VETCH

SECTION 12

HARVEST

WINDROWING | HARVESTING ISSUES | HARVESTER SETTINGS | FIRE PREVENTION | RECEIVAL STANDARDS | HARVEST WEED SEED MANAGEMENT

Harvest

Key messages:

- Harvesting vetch is easily achieved by using cereal harvesters with crop lifters. [1]
- Grain quality and prices can suffer if there is mechanical damage, weathering and seed staining. Moisture levels at harvest also affect the quality of grain in storage.
- To reduce the risk of shattering and seed quality reduction, aim to harvest vetch within the optimum sowing window.
- Fire prevention is important when harvesting pulses. Ensure to regularly remove flammable material from the engine bay.
- Harvest weed seed control is an increasingly important Integrated Weed Management strategy in the Northern region.

12.1 Windrowing

Windrowing or swathing involves cutting the crop and placing it in rows held together by interlaced straws, supported above the ground by the remaining stubble. It can be considered as an option where:

- the crop is uneven in maturity, or the climate does not allow for rapid drying of the grain naturally
- there is a risk of crop losses from shedding and lodging

The long, twining stems of vetch can make it difficult to form into conventional windrows by raking, but a slasher/windrower can be used instead. [2]

Windrowing enables growers to:

- Avoid pod shatter and drop crops resulting in increased harvest yield
- Avoid problems where the header reel gets in the way of tall crops during harvest
- Avoid green material such as late weeds which can contaminate the grain and cause problems during storage due to high moisture.
- Manage very slow and unevenly ripening crops in mild seasons
- Increase header efficiency.

Windrowing should be used as an optional management tool rather than an essential crop practice.

Windrowing for weed management

Windrowing can be used to help reduce seed set of weeds such as annual ryegrass, saffron thistle and wild radish. Growers must be aware that some weed seed may be mature before the crop matures. Crops windrowed to maximize weed control generally incur a yield penalty.

Alternatively, an additional form of control following harvest can be used to effectively manage weeds. Options include use of a knockdown herbicide post-harvest, and the removal of straw spreaders from headers followed by burning header tracks with a hot burn (windrow burning). When windrowing a very weedy crop, windrowing should be delayed as long as possible to reduce the risk of regrowth causing problems in the windrows.

1 R Matic, S Nagel, G Kirby (2008) Common Vetch. Pastures Australia. http://keys.lucidcentral.org/keys/v3/pastures/Html/Common_vetch.htm

2 DPI NSW. Namoi Woolly pod vetch. http://www.dpi.nsw.gov.au/agriculture/pastures-and-rangelands/species-varieties/namoi-woolly-pod-vetch

12.1.1 Timing

Correct windrow timing is essential. If crops are windrowed too early, yield will be sacrificed and quality will be reduced due to a high number of shriveled seeds. Leaving it too late will result in a high risk of pod shattering and pods being knocked off during the windrowing operation.

To properly judge the crop maturity, sample from a number of sites within the paddock. In practice, the correct time can be difficult to determine.

Windrowing should occur when the pods are passed physiological maturity and are in the dry-down phase.

12.2 Harvesting issues

Key points:

- Harvesting at the optimum moisture content means fewer grain defects. Premium prices come from harvesting at the optimum moisture.
- Harvest early before summer weeds become a problem to reduce clogging, staining and sample contamination. Desiccating the crop will kill summer weeds and ensure even crop ripening.
- Vetch can be prone to shattering, so harvesting at the right time is important.
- Sowing the vetch with 15 kg oats/ha can help lift the vetch off the ground and aid harvesting. [3]
- Crops sown into standing stubble will be easier to harvest

12.2.1 Harvest timing

Timely harvest is critical to avoid yield and quality losses from severe weather events at or just before harvest. Some pulse crops and varieties within crops are more prone to lodging, shattering and/or pod drop at maturity particularly if rain or strong wind occurs once mature. This can result in grain loss and harvesting difficulties. Yield losses increase the longer harvest is delayed.

Timing can often coincide with cereal harvesting so priorities must be set with the most valuable commodity harvested first. Cereal crops can be left standing in the paddock when mature with little deterioration of quality if rainfall does not occur, vetch on the other hand will decline in quality and harvestability once their moisture content declines. Vetch, if ready, should also have precedent over windrowed canola

Harvesting vetch with a low moisture content in the middle of a hot day is a recipe for disaster. Not only can the grain crack once in the header or with subsequent handling there after, but grain can be lost at the front of the header as it can shatter when the knife hits it and not even get into the header.

Many late-harvested crops are often about 8% moisture, whereas the maximum moisture content for receival is 14% with market preference at 12%. [4]

12.2.2 Weathering and mould

Weathering of seed caused by delayed harvesting can increase mould infection. *Alternaria* mould species usually predominate, while *Aspergillus*, *Cladosporium* and *Penicillium* species may also be present.

Humid (above 70% relative humidity), wet conditions favour the development of a range of fungi in late-harvested crops.

Increased risk of late ascochyta infection can develop on dry, senescing pods under wet conditions, and can penetrate through to the seed in susceptible varieties.

MORE INFORMATION

Agriculture Victoria - Estimating Crop Yields And Crop Losses

GRDC - Careful Harvester Set Up

3 QLD DAFF (2011) Vetches in southern Queensland. https://www.daf.qld.gov.au/plants/field-crops-and-pastures/pastures/vetches

4 T Weaver (2015) GroundCover Issue 118: Profitable pulses – it's all about the harvest window. GRDC. https://grdc.com.au/resources-and-publications/groundcover/ground-cover-issue-118-sep-oct-2015/profitable-pulses-its-all-about-the-harvest-window

Darkening of the seed coat is caused by oxidation of polyphenol compounds (tannins). Conditions that accelerate seed-coat darkening include rainfall, cool-to-mild temperatures, high humidity and sunlight.

Native budworm can occasionally attack senescing pulses, particularly where rainfall has softened the pod. Insect-damaged seeds are classified as defective and cannot exceed the tolerance level of 3%. The current export receival standard for visible ascochyta lesions is a maximum of 1% on the seed cotyledon (kernel).

For more information on receival standards, see Section 12.5 Receival standards, below.

Grain quality deteriorates the longer mature pulses are exposed to weather.

Expansion of the seed as it absorbs moisture and then contraction as it dries weakens the seed coat, rendering seed more susceptible to mechanical damage during harvest.

Levels of cracked and damaged grain can be as high as 50% in extreme cases of weathering and prolonged rainfall. Vetch can be prone to shattering (Table 2). Harvesting grain at high moisture levels (up to 14%) minimises cracking.

Early harvested pulses are more resilient to breakage during harvesting and subsequent handling.

Table 1: *Vetch varietal risk of pod shattering.*

Variety	Pod shattering (%)
Common vetch	
Blanchefleur	5–10
Cummins	5–10
Morava(ɒ)	0
Rasina(ɒ)	0–2
Volga(ɒ)	0–2
Timok(ɒ)	0–2
Purple Vetch	
Popany	20–30
Woolly pod vetch	
Haymaker(ɒ)	5–10
Capello(ɒ)	5–10
RM4(ɒ)	2–5

Source: SARDI

12.3 Harvester settings

Setting up header front and drum speeds correctly improves pulse quality. Pulses are easily threshed, so open the concave clearance and reduce the drum speed (Table 2).

Pulses are larger than wheat so a concave with many wires or blanked-off sections can stop grain separation. For best performance, remove alternate wires and blanking-off plates. A clean sample can be achieved with maximum wind settings and barley sieve settings.

Take extra care when harvesting pulses for seed to reduce grain cracking. Gentle harvesting will give the best seed quality. Rotary harvesters are gentler on the crop and will generally cause less grain damage than conventional harvesters.

Vetch threshes easily but can be prone to cracking so adjust thresher speed (400 to 600 revolutions per minute) and concave (10 to 30 millimetres) to suit. Removing alternate wires and blank-off plates from the concave will help reduce cracking. If possible cover the rasp bars with plate.

Table 2: *Harvester settings for vetch.*

Setting	Vetch
Reel speed	Slow
Spiral clearance	Low
Thresher speed	400 to 600rpm
Concave clearance	10 to 30 mm
Fan speed	Medium
Top sieve	25 mm
Bottom sieve	10 to 16 mm
Rotor speed	Slow

Source: GRDC

12.3.1 Modifications and aids

Early harvesting can solve many problems and losses are reduced as the pods are less prone to shattering or dropping. The crop is also easier to gather because it stands more erect, allowing the harvester front to operate at a greater height and reducing the dirt, rocks and sticks entering the harvester.

A straw chopper may be of value to chop up the stubble and spread it uniformly. Crop lifters are not required unless the crop is badly lodged or late-sown and drought-affected. Set the finger tyne reel to force material down onto the front. For example, moving the broad elevator auger forward can improve the feeding of light chickpea material.

Vibration due to cutter bar action, plant on plant, reel on crop impact and poor removal of cut material by the auger all cause shattering and grain loss. Grain loss can be reduced by harvesting in high humidity or at night to minimise pod shattering. Avoid harvesting in extreme heat.

Finger reels are less aggressive than bat reels and cause fewer pod losses. Double-acting cutter bars reduce cutter-bar vibration losses. Four finger guards with open second fingers also reduce vibrations (Photo 1).

Photo 1: *Finger tyne reel with four finger guards and pen second fingers to reduce vibrations.*

Source: GRDC

12.4 Fire prevention

Key points:

- Most harvester fires start in the engine or engine bay
- Others are caused by failed bearings, brakes and electricals and rock strikes
- Regular removal of flammable material from the engine bay is urged
- More regular clean downs with a high pressure air compressor are required. This may be as often as each stop at the chaser bin.

Harvesting season in Australian cropping areas is the most stressful time for farmers as they glean finished crops. Ideally, harvest occurs under hot dry conditions, but the risk of fire is extreme and a fire can damage crops, machinery and property, not to mention the lives of the community as well.

With research showing an average of 12 harvesters burnt to the ground every year in Australia (Photo 2), agricultural engineers encourage care in keeping headers clean to reduce the potential for crop and machinery losses. [5]

A review of the causes of header fires concluded that 75% of the fires started in the engine bay and others from failed bearings, electrical problems and rock strikes. [6]

Photo 2: *GRDC figures show that there are 1000 combine harvester fires in Australia each year.*

Source: Weekly Times

Many of the pulse crops come with an increased fire risk because of certain characteristics of the residues.

All of these pulse crop residues may well have much lower ignition temperatures than cereal crops. When harvesting, more regular clean downs with a high pressure air compressor is required.

The proximity of flammable material to heat sources such as exhaust manifolds and turbochargers with high ambient temperature, low humidity and windy conditions in the paddock make this an explosive situation, even under ideal conditions.

Heated ignition sources can be in different areas, including:

- around the engine bay of the header such as the exhaust manifold or the tubocharger where temperatures can get up to 650°C
- mechanical failures from bearings

5 GRDC (2012) A few steps to preventing header fires. GRDC Ground Cover Issue 101, http://www.grdc.com.au/Media-Centre/Ground-Cover/Ground-Cover-Issue-101/A-few-steps-to-preventing-header-fires

6 G Quick (2010) An investigation into combine harvester fires. http://pulseaus.com.au/storage/app/media/blog%20assets/HARVESTER%20FIRES%20-%20Graeme%20Quick%20-%20Final%20Report.pdf

- sparks from electrical short circuit
- striking metal fences or rocks to cause a spark
- static electricity from moving parts or operators clothing
- foreign objects that are taken into the header

Fuel sources can include:

- the dried standing crop itself
- crop residue that has been chopped finely to create an ideal fuel for instant ignition.
- flammable fuels and oils used in the header.
- dust that carries crop residue

Oxygen (air) is required for a fire to burn. Air is being blown around inside and out of the header throughout the harvesting process and is an important component of harvest fires.

Static electricity is often blamed, but the evidence shows that this is a minor risk, even though it is common to get a build up from many parts of a header. The energy to ignite crop residue is not enough in a static electrical discharge. [7]

Machinery failure is in many cases responsible for fires starting so it is critical that all growers undertake scheduled harvester operation checks and regular maintenance leading up to and throughout harvest in an effort to reduce the risk of fire. Many pre-harvest preventative maintenance checks tie into what growers already do on a regular basis, such as checking belts, hoses and wiring for damage.

Growers should also be regularly monitoring bearing operation temperatures with an infra-red thermometer to detect rapid increases in temperature, indicating imminent failure. Oil seals should also be inspected. A dripping line or weeping seal needs to be repaired prior to harvest, otherwise that could become a fire hazard.

Some growers use exhaust insulation blankets (such as those used in the mining and racing car industries), alumina-silica materials on exhausts and turbo chargers to reduce fire risk. This is an effective way of reducing fire ignition sources, but growers need to be careful with the impact such insulators could have on engine and turbo operation temperatures and any warranty implications.

Harvester hygiene is important; conduct regular clean-outs during harvest and exercise caution when harvesting leafy pulse crops, as these are renowned for dust build-up.

It is also important to have properly functioning fire extinguishers on harvesters. Machine-mounted fire suppression options on the market have come down in price so growers should consider having a fire suppression system fitted.

Abide by state-based grain harvesting codes of practice and declared harvest bans, and observe the Grassland Fire Danger Index (GFDI) protocol on high fire risk days. [8]

Harvester fire reduction checklist

1. Recognise the big four factors that contribute to fires: relative humidity, ambient temperature, wind and crop type and conditions. Stop harvest when the danger is extreme.
2. Focus on service, maintenance and machine hygiene at harvest on the days more hazardous for fire. Follow systematic preparation and prevention procedures.
3. Use every means possible to avoid the accumulation of flammable material on the manifold, turbocharger or the exhaust system. Be aware of side and tailwinds that can disrupt the radiator fan airblast that normally keeps the exhaust area clean.

7 P Bowden (2016) Fire risk when harvesting pulses. Pulse Australia. http://pulseaus.com.au/blog/post/avoiding-harvester-fires

8 S Watt, B White. (2016). Growers focused on reducing harvester fire risk. https://grdc.com.au/Media-Centre/Media-News/South/2016/11/Growers-focused-on-reducing-harvester-fire-risk

4. Be on the lookout for places where chaffing can occur, such as fuel lines, battery cables, wiring looms, tyres and drive belts.
5. Avoid overloading electrical circuits. Do not replace a blown fuse with a higher amperage fuse. It is your only protection against wiring damage from shorts and overloading.
6. Periodically check bearings around the harvester front and the machine. Use a hand-held digital heat-measuring gun for temperature diagnostics on bearings and brakes.
7. Maintain fire extinguishers on the harvester and consider adding a water-type extinguisher for residue fires. Keep a well maintained fire fighting unit close-by to the harvesting operation ready to respond.
8. Static will not start a fire but may contribute to dust accumulation. Drag chains or cables may help dissipate electrical charge but are not universally successful in all conditions. There are some machine mounted fire-suppression options on the market.
9. If fitted, use the battery isolation switch when the harvester is parked. Use vermin deterrents in the cab and elsewhere, as vermin chew some types of electrical insulation.
10. Observe the Grassland Fire Danger Index (GFDI) protocol on high fire risk days.
11. Maintain two-way or mobile phone contact with base and others and establish a plan with the harvest team to respond to fires if one occurs. [9]

Using machinery

To preventing machinery fires, it is imperative that all headers, chaser bins, tractors and augers be regularly cleaned and maintained. All machinery and vehicles must have an effective spark arrester fitted to the exhaust system. To prevent overheating of tractors, motorcycles, off-road vehicles and other mechanical equipment, all machinery needs to be properly serviced and maintained. Fire-fighting equipment must be available and maintained—it is not just common sense; it is a legal requirement.

Take great care when using this equipment outdoors:

Be extremely careful when using cutters and welders to repair plant equipment; this includes angle grinders, welders and cutting equipment,

Ensure that machinery components including brakes and bearings do not overheat, as these components can drop hot metal onto the ground, starting a fire.

Use machinery correctly, as incorrect usage can cause it to overheat and ignite.

Be aware that when blades of slashers, mowers and similar equipment hit rocks or metal, they can cause sparks to ignite dry grass.

Avoid using machinery during inappropriate weather conditions of high temperatures, low humidity and high wind.

Do repairs and maintenance in a hazard-free, clean working area such as on bare ground, concrete or in a workshop, rather than in the field.

Keep machinery clean and as free from fine debris as possible, as this can reduce onboard ignitions. [10]

Use of fire suppression systems on the header

There are several systems that can be put on the header to prevent fires or to deal with fire if it starts.

Fire Knock Out will drench the engine bay in fire retardant using a self actuating switch.

9 Barr R. (2015). Plant of attack needed for harvester fires. https://grdc.com.au/Media-Centre/Media-News/South/2015/10/Plan-of-attack-needed-for-harvester-fires

10 NSW Rural fire Service. Farm firewise. NSW Government, http://www.rfs.nsw.gov.au/dsp_content.cfm?cat_id=1161

PODCAST

LISTEN: GRDC Podcasts: Harvester Fires.

MORE INFORMATION

GRDC Reducing Harvester Fire Risk: The Back Pocket Guide

Avoiding harvester fires - pulses

An investigation into harvester fires

Plan of attack needed for harvester fires

A few steps to preventing header fires

Fire Prevention Shield reduces the temperature of the components in the engine bay by drawing air from the cooling fan through a heat exchanger, charging it to higher pressure to clean residues from around the muffler. This effectively reduces residues and temperature to lower the risk of fire. [11]

12.4.1 Harvesting in low-risk conditions

Growers can use the Grassland Fire Danger Index guide to assess the wind speed at which harvest must cease (a GFDI of 35), depending on the temperature and relative humidity (Figure 1).

Step 1: Read the temperature on the left hand side.

Step 2: Move across to the relative humidity.

Step 3: Read the wind speed at the intersection. In the worked example, the temperature is 35°C and the relative humidity is 10% so the wind speed limit is 26kph.

TEMP °C	5	10	15	20	25	30	40	50	60	65	RH%*
15	31	35	38	40	43	45	49	53	56	58	AVERAGE WIND SPEED (KPH)
20	29	33	36	38	40	43	46	50	53	55	
25	27	30	33	36	38	40	44	47	50	52	
30	25	28	31	33	35	37	41	44	47	49	
35	23	26	28	31	33	35	38	41	44	46	
40	21	24	26	28	30	32	35	39	41	43	
45	19	22	24	26	28	30	33	36	39	40	
TEMP °C	5	10	15	20	25	30	40	50	60	65	RH%*

1 2 3

*RH% (Relative Humidity rounded down)
†Wind speed averaged over 10 minutes

Figure 1: *Grassland fire danger index guide.*

Source: CFS South Australia

12.5 Receival standards

Pulse receival and export standards are set nationally by the pulse industry to ensure that market requirements for major end-users are able to be achieved.

The Australia Pulse Standards Committee compiles trading Standards through extensive consultation with all sectors of the Australian pulse industry.

Vetch should be whole, sound, dry, fresh and colour typical of the variety of the season (Table 3).

All pulses must be free from animal excreta, rodents, live insect pests and any chemical not registered for use on stored pulses or in excess of legal tolerances. There is nil tolerances on pickling compounds/seed dressings or any fungicide added to the pulse as a seed dressing and any tainting agents and/or other contaminants imparting an odour not normally associated with that particular pulse.

There is nil acceptance of toxic and/or noxious weed seeds which are prohibited by state laws against inclusion in stock feed.

It is understood that as Minimum Standards they may not be tight enough for the requirement of some buyers. Suitable qualifications to any Standard can be made

11 P Bowden (2016) Fire risk when harvesting pulses. Pulse Australia. http://pulseaus.com.au/blog/post/avoiding-harvester-fires

MORE INFORMATION

Receival and trading standards

Australia Pulse Standards 2016/2017

as agreed between all parties concerned to represent the basis for better quality consignments.

It should also be understood that these are Australian Industry Standards and do not take into account specific overseas country quarantine restrictions (such as prohibited weed seeds, disease status or contaminant levels) or the requirements of the Export Control Act (1982) and its subordinate legislation.

Individual commodity traders are responsible for ensuring that specific country requirements and those pertaining to compliance with the Export Control Act (1982) are included as additional specifications on the contract.

Table 3: *Vetch receival standards.*

Receival standard	Value	Comments
Moisture content max	14%	Aerate if 12%
Purity minimum	97%	Includes whole Vetch, Defective Vetch, skins and de-coated Vetch.
Defective maximum	5%	Vetch not of the specified variety. Vetch kernels that are broken, chipped, diseased, frost damaged, insect damaged, sappy, shrivelled, split, sprouted, weather damaged, wrinkled. Includes pods that contain Vetch, whether broken or unbroken and loose seed coat. Vetch where whole or part of the seed coat only is damaged, is included as sound Vetch.
Mould	1 grain per 200 g	Mould (Field and / or Storage), Caked, Bin Burnt & Heat Damaged.
Poor Colour maximum	1%	Vetch whose seed coat or kernels are distinctly off colour from the characteristic colour of the predominating class.
Foreign material maximum	3% Max by weight, of which Max 2% by weight cereal grain and 0.5% Max by weight Unmillable Material	Includes unmillable material and all vegetable matter other than Vetch seed material. Includes cereal grain.
Unmillable material maximum	0.5% Max by weight (of which 0.3% Max by weight of soil)	Soil, stones and non-vegetable matter. Please read important note re soil contamination – see Point 14 of Procedures.
Snails maximum	1 per 200 g	Dead or alive. Whole or substantially whole (more than half) including bodies per 200 g sample.
Field insects per 200 g	15	Dead or alive per 200 g sample.
Objectionable material	Nil tolerance	Includes Objectionable Odour.
Ryegrass ergot	2 cm max.	Pieces laid end to end per 200 g sample.

Source: Australian Pulse Standards 2016/2017

12.6 Harvest weed seed management

There are several ways of utilising harvest to lessen the numbers of viable weed seeds, to prevent weed seed returning to the seedbank and then proliferate during the next season. Techniques include harvest weed-seed control (HWSC), windrow burning, and the use of chaff carts, direct baling the Harrington Seed Destructor. It has been shown that these systems have similar effectiveness. [12]

12.6.1 Harvest weed-seed control

Many Northern grain growers have been a little sceptical about introducing harvest weed-seed control (HWSC) as a tool for combating herbicide resistance. Nationally, HWSC is proven to reduce the weed seedbank, and some weeds of the northern grains region are suited to this method of control, particularly in a farming environment of increasing herbicide resistance.

Weed-seed capture and control at harvest can add to the effectiveness of other tactics to put the weed seedbank into decline. Up to 95% of annual ryegrass seeds that enter the harvester exit in the chaff fraction. If these can be captured, they can be destroyed or removed.

Western Australian farmers and researchers have developed several systems to effectively reduce the return of annual ryegrass and wild radish seed into the seed bank, and help put weed populations into decline.

A key tactic for all harvest weed-seed control operations is to maximise the percentage of weed seeds that enter the header. This means harvesting as early as possible before weed seed is shed, and harvesting as low as is practical, e.g. at 'beer-can height'.

Northern weeds suited to HWSC

- Definitely—turnip weed and African turnip weed are potentially very good candidates for HWSC, although these species are not yet resistant.
- Definitely in winter crops—annual ryegrass, wild radish and wild oats. Wild oats shed seed at about 2% per day and ryegrass at 1% a day, but it is still worth using HWSC at the start of harvest.
- Possibly in winter crops—barnyard grass and feathertop Rhodes grass are known to shed their seed in summer crops, but where they germinate in spring in winter crops they may be suitable candidates for HWSC.
- Possibly in summer crops—feathertop Rhodes grass provides an opportunity for HWSC in summer crops where there is a high percentage of seed retention at the start of harvest. [13]

12.6.2 Burning in narrow windrows

During traditional whole-paddock stubble burning, the very high temperatures needed to destroy weed seeds are not sustained for long enough to kill most weed seeds. However, by concentrating harvest residues, which includes weed seeds, into a narrow windrow, the fuel load is increased and the period of high temperatures extends to several minutes, improving the kill of weed seeds.

12.6.3 Burning in narrow windrows

During traditional whole-paddock stubble burning, the very high temperatures needed to destroy weed seeds are not sustained for long enough to kill most weed seeds. However, by concentrating harvest residues, which includes weed seeds, into

MORE INFORMATION

GRDC's Tactics for managing weed populations

Section on narrow-windrow burning in GRDC's Tactics for managing weed populations

12 M Street and G Shepherd (2013) Windrow burning for weed control: WA fad or a viable option for the east? GRDC Update Paper. GRDC, https://grdc.com.au/Research-and-Development/GRDC-Update-Papers/2013/02/Windrow-burning-for-weed-control-WA-fad-or-viable-option-for-the-east

13 T Somes (2016) Can harvest weed-seed control work for the North? Ground Cover. Issue 124, September–October 2016. GRDC, https://grdc.com.au/Media-Centre/Ground-Cover/Ground-Cover-Issue-124-SeptemberOctober-2016/Can-harvest-weedseed-control-work-in-the-north

VIDEOS

WATCH: Windrow burning in Northern NSW

WATCH: Burning Barriers to windrow burning in NSW

MORE INFORMATION

Section on narrow-windrow burning in GRDC's Tactics for managing weed populations

Windrow burning for weed control: WA fad or a viable option for the east?

Section on chaff carts in GRDC's Tactics for managing weed populations

Setting up harvesters to capture weed seed in the chaff

a narrow windrow, the fuel load is increased and the period of high temperatures extends to several minutes, improving the kill of weed seeds (Photo 3).

Photo 3: *Narrow windrow burning the Northern region.*

Photo: P Heuston

12.6.4 Chaff carts and chaff decks

Chaff carts are towed behind headers during harvest to collect the chaff fraction (Photo 4). The chaff that is collected is dumped into piles and then burnt the following autumn or used as a source of stock feed.

Photo 4: *Chaff cart in action*

Photo: A. Storrie

12.6.5 Bale-direct system

The bale-direct system uses a baler attached to the harvester to collect all chaff and straw material (Photo 5). This system requires a large baler to be attached to the back of the harvester. As well as removing weed seeds, the baled material has an economic value as a livestock feed. Header-towed bailing systems were developed in Western Australia by the Shields family.

Photo 5: *Bale direct harvestor on a Northern region farm.*

Photo: P Heuston

MORE INFORMATION

Section on bale-direct systems in GRDC's Tactics for managing weed populations

Small and large baler projects of the Shields family

12.6.6 Integrated Harrington Seed Destructor

The integrated Harrington Seed Destructor (iHSD, Photo 6) is the invention of Ray Harrington, a progressive farmer from Darkan, WA. With funding from the GRDC and the Australian Herbicide Resistance Initiative (AHRI), the HSD was commercialised and made available to wider Australia. The iHSD comprises a chaff-processing cage mill, and chaff and straw delivery systems. The retention of all harvest residues in the field reduces the loss and/or banding of nutrients and maintains all organic matter to protect the soil from wind and water erosion, as well as reducing evaporation loss compared to the use of windrow burning, chaff carts and baling. [14]

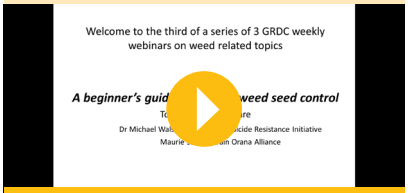
The chaff deck places the chaff exiting the sieves of the harvester on to permanent wheel tracks. Growers using chaff decks have observed that few weeds germinate from the chaff fraction and believe that many weed seeds rot in it. A permanent tramline farming system is necessary to be able to implement the chaff deck system. [15]

14 GRDC (n.d.) Section 6. Managing weeds at harvest. GRDC, https://grdc.com.au/Resources/IWMhub/Section-6-Managing-weeds-at-harvest

15 Roberts P. (2014). New systems broaden harvest weed control options. GRDC. https://grdc.com.au/Media-Centre/Media-News/West/2014/11/New-systems-broaden-harvest-weed-control-options

VIDEOS

WATCH: A beginner's guide to harvest weed seed control



MORE INFORMATION

Section on the Harrington Seed Destructor in GRDC's Tactics for managing weed populations

Chaff deck concentrates weeds in controlled traffic

Photo 6: *Integrated Harrington Seed Destructor.*

Source: Michael Walsh