14. Windrowing and harvesting

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THE BENEFITS OF WINDROWING

Canola is an indeterminate plant, which means it flowers until limited by temperature, water stress or nutrients. As a result, pod development can last over 3–5 weeks, with lower pods maturing before higher ones. Consequently, canola is often windrowed to ensure all pods are mature at harvest.

Older canola varieties had a lengthy flowering period but growers now have access to a greater range of varieties with differing maturities and more tolerance to pod-shattering. Some early maturing varieties have been developed with a shorter flowering and pod maturity period. Direct harvesting (instead of windrowing) is more of an option for these shorter statured and earlier maturing varieties in some regions.

Whether the crop is windrowed or direct harvested will depend on the type of varieties being grown, soil types, seasonal conditions, availability of windrowers and the size and variability of the crop. Canola crops which are variable in their maturity or show significant differences in the maturity of the top and bottom pods are ideally windrowed to minimise shattering losses. The plant needs to be windrowed before the lower pods approach shattering stage.

Like hay cutting, windrowing canola hastens the maturity of the crop, allowing the top pods to be harvested at the same time as the lower pods. By cutting the crop and placing it in a windrow on the stubble, the pods and seeds can dry faster than a standing crop (by as much as 8–10 days). Windrowed canola is much less susceptible to wind, rain and hail damage than a standing crop. In the windrow, seeds will reach a uniform harvest moisture content of eight per cent within 6–10 days of being cut.

A number of harvester front options are available for canola. A belt front, for example, can be used to windrow or direct head a crop but, with minor modifications, it can also be used to harvest a windrowed crop. Various pick-up attachments or crop lifters can be used on existing open front headers to harvest canola windrows.

For most canola production areas, the advantages of windrowing are that it:

- allows earlier harvest (8–10 days) because seed matures more evenly;
- hastens maturity in higher rainfall areas;
- evens maturity where soil types are variable in individual paddocks;
- reduces losses from hail and excessive winds;
- provides more flexibility for the grower with large areas, as the timing of harvest is not as critical;
- reduces shattering losses during harvest;
- can be done around the clock to help with covering large areas; and
- in some cases can help control escaped or herbicide resistant weeds.

WHEN TO WINDROW

Windrowing normally starts 20–30 days after the end of flowering. Carrying it out on time is important to maximise yield and oil content.

The crop is physiologically mature and ready for windrowing when most seeds reach 35–45 per cent moisture. The timing of windrowing is determined by estimating the level of seed colour change. Consulting experienced local growers or agronomists is also invaluable when determining timing. Begin checking canola about 14 days after the end of flowering (end of flowering is when 10 per cent of plants still have flowers). For triazine-tolerant varieties this can be slightly longer than for conventional varieties or hybrids of similar flowering maturity.

Randomly collect 30–40 pods from the primary stem of a number of plants and from different positions in the plant canopy. Select both brown and green pods and shell them in a white container.

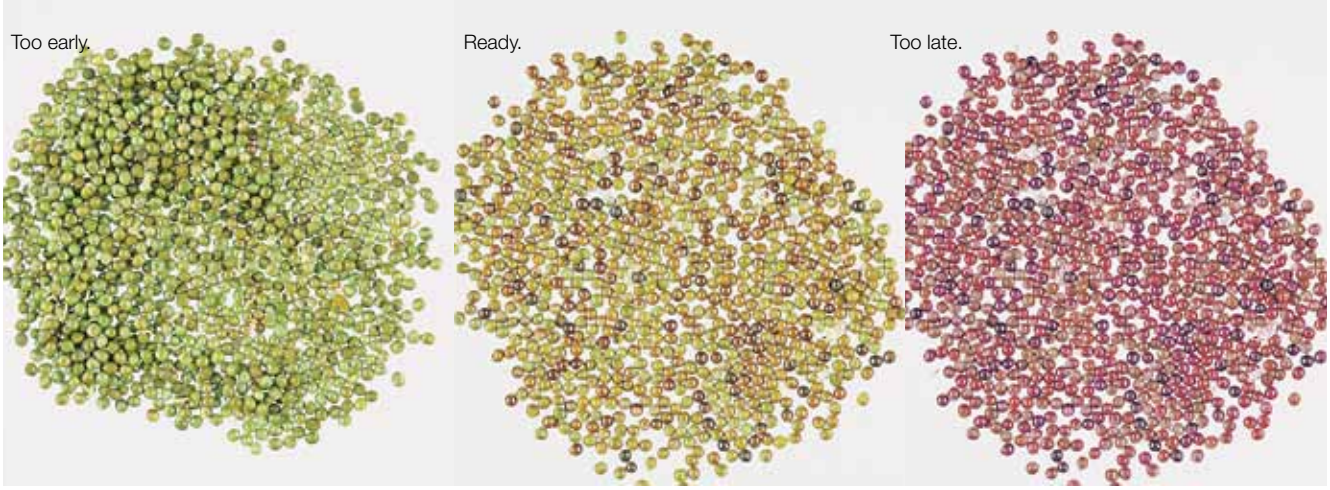
Assess what percentage of the seeds show sign of colour change. Part of the seed may have turned from green to red, brown or black. This is known as the percentage seed colour change.

The optimum time is when 40–60 per cent of seeds have changed colour from green to red, brown or black, and lasts only 4–6 days. In warmer, drier areas windrowing is better done when seed reaches 50–60 per cent seed colour change. Under higher temperatures the windrowed plant dries too rapidly to allow seeds to fully mature in the pods and oil content can be lower. In summary, windrowing too early can result in lower yields and oil contents and too late will lead to shattering losses.

The optimum time for windrowing is when the top third of the plant has mostly green seeds. These should be firm but pliable when rolled between the thumb and forefinger. The middle section of the plant will have 80 per cent of seed

Seed colour changes determines the optimum time for windrow timing.

PHOTOS: DAFWA



green or green-red and be very firm but pliable. The other 20 per cent may be red-brown to light brown. The bottom third of the plant will have dark brown to black seeds.

The time from the end of flowering to windrowing will vary with season, paddock and variety. Check each crop every year to determine the best windrowing time.

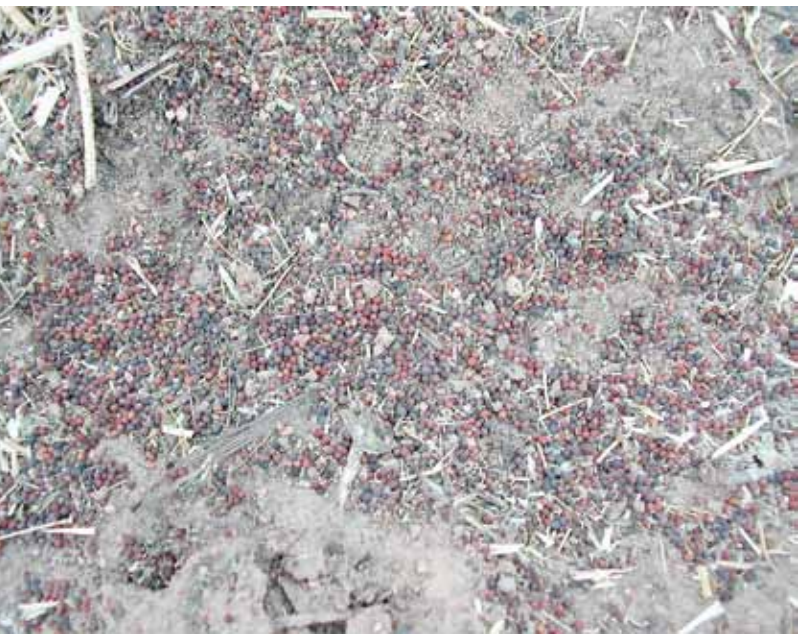
If using a contractor, ensure they are booked well in advance. Making a note of the end of flowering will help the grower and the contractor to determine roughly when the crop will be ready to windrow. The most important part of any decision to windrow is to make the assessment in a representative area of the paddock.

The optimal windrowing stage for canola lasts about four to six days, depending on temperature and humidity. For each day windrowing is delayed past the optimum time, the more susceptible the crop is to shattering losses. These can be minimised by operating at night or when humidity is high after dew or rain. However, where shattering losses during windowing are obvious, growers are best advised to change strategy to either direct harvesting or desiccation followed by direct harvesting.

Windrowing too early, for example by four or five days, can lead to yield losses of up to 10 per cent and reduced oil content. Never windrow a canola crop before seed colour has changed, as this will result in significant yield loss.

Rollers can also be attached to the back of windrowers to help push the windrow down into the stubble and minimise wind damage.

Note: withholding periods of pesticides relate to windrowing not harvest if windrowing operations occur.



Crops windrowed too late have higher shatter losses. In this situation direct heading can be a better option.

PHOTO: PAUL PARKER, NSW DPI

Key points

- Physiological maturity occurs when the seed moisture content reaches 35–45 per cent.
- Check the crop regularly from 14 days after the end of flowering (10 per cent of plants with flowers).
- Look for seed colour change from 40–60 per cent on the main stem from pods at all levels.
- Sample from representative areas of the paddock;
- Check all varieties for seed colour change, they will vary within a district.
- Book a contractor early in the season and contact again when the crop has reached the end of flowering;
- Optimal windrowing stage lasts for four to six days in most areas.
- When seed losses are obvious on the windrower, stop and consider direct harvesting.

Planning is critical for a smooth harvest operation. Less experienced growers are well advised to organise a contractor or an experienced neighbour to carry out the windrowing.

Windrowing is a crucial part of the harvest operation in most regions. Pictured is a self-propelled draper style windrower fitted with a vertical knife.
PHOTO: F. PRITCHARD, ICF

WINDROWER TYPES

The three types of windrowers are:

- tractor-drawn (PTO windrower), delivers off-centre windrow;
- self-propelled windrower, typically delivers a centre windrow; and
- harvester belt or draper front (for example, MacDon), can deliver the windrow either side.

Tractor-drawn machines involve a relatively low capital outlay and suit most medium farms (less than 1000 ha total crop). Self-propelled machines are more manoeuvrable and suited to a wider range of applications, for example undulating paddocks, irrigated rows, raised beds and controlled traffic paddocks. They are also better suited to high-yielding crops (over 3 t/ha) which are too big for tractor-drawn machines.

The draper or belt-front harvesters work like a self-propelled windrower but are less manoeuvrable. They are more suited to lower yielding crops (less than 1.5 t/ha). As a dual-purpose front they tend to be too wide for large crops but this can be partially overcome by having less of the machine front in the crop where necessary. An advantage over a self-propelled windrower is that there is one less machine to maintain on the farm.

A draper front can deliver the windrow to either side of the machine and so in very light crops can be used to put two windrows together.

WINDROWER ESSENTIAL FEATURES

- Platform table deep enough (at least 1.1 m) to handle the cut crop.
- A large opening (intake area or 'throat') 1.2–1.5 m wide and at least 1m high above the belt.
- Throat opening free of projections that could hinder the flow of cut material through the opening.
- Good range of adjustments for the table and reel to handle different crop situations.
- Finger tine reels rather than batten reels, as they are gentler on canola crops and help feed the crop onto the belt.
- Vertical knives to minimise drag and entanglement of cut material.
- Mixer belts used for cereals need to be removed.
- A good operator to balance the reel speed, platform table speed and ground speed with the conditions of the crop they are windrowing.

Over the years a number of modifications have been made to imported windrowers to suit Australian conditions.

Australian canola crops are taller than the spring Canadian canola crops and a common local modification is to enlarge the 'throat' of imported windrowers.

A blockage during windrowing can translate to a major problem at harvest. These very large clumps in the windrow, known as 'haystacks', will take longer to dry and can also stall some smaller harvesters.

WINDROWER SIZE

The ideal width of a windrower depends on the expected yield of the crop and the size of the harvester; wider windrowers are better for lower yielding crops and short varieties as less material will be passing through the machine. Tractor-drawn 10-metre-wide PTO windrowers are sufficient where crop yields are expected to be 1.5–2 t/ha. MacDon draper fronts (12 m wide), which are attached to the front of the header work well where crop yields are expected to be below 1.5 t/ha.

A larger windrow will take slightly longer to reach the correct harvest moisture content (eight per cent). Small or light windrows are more prone to being wind-blown or lifted by whirlwinds, which can make harvest very difficult.

The rule of thumb is that a good sized windrow is about 1.5 m wide and 1 m high.

How a windrow sits on the stubble will determine if air is able to pass under it to help in drying. Most large capacity harvesters can generally handle big windrows but in high yielding areas (> 2.5 t/ha) they will require modification – such as raising and switching to a larger diameter table auger. These are best set up by the dealer.

It is important to match the harvesting capacity of the header with the size of the windrow; smaller capacity means

A well-laid windrow drying down ready for harvest.
PHOTO: P. BOWDEN, NSW DPI

smaller windrows in most conditions.

Large headers, particularly those with hydrostatic drives and axial flow machines, can handle large windrows with suitably large pickup or draper fronts.

OWNER OR CONTRACTOR

The choice between owning a windrower and hiring a contract windrower depends on attitude to risk and managing the risk of shattering loss in canola. It can be as much a personal choice as an economic one.

The availability of contractors and their timeliness needs to be weighed against windrower ownership and a grower's ability to manage the windrowing operation themself. Costs include both direct costs, such as interest, maintenance and insurance, the hidden cost of depreciation and the opportunity cost of capital. Ownership would often factor in the opportunity to offer contracting services to neighbouring farmers. The advantage of owning a windrower is that each paddock can be windrowed at the optimal time. Farmers with variable soil types and undulating country may find it easier to get the timing right by windrowing crops themselves.

Dual-purpose fronts like the MacDon or Honey Bee draper fronts provide growers with more options on whether to windrow or direct harvest their own crops.

A draper front can be justified on farms cropping more than 2000–3000 ha. A draper front offers increased flexibility at a critical time of year as it can be used as a windrower or for direct harvesting. The benefits are further enhanced if barley is a significant part of the farming operation. A draper header front can safely pick up lodged crops of malting barley without head losses.

Larger grain farms (> 4000 ha cropping) can justify a self-propelled windrower given that it can be used for hay cutting and windrowing other crops, which therefore spreads costs over a number of operations on the farm.

WINDROWING OPERATION

An even crop establishment makes windrowing and harvest easier. Stems with an average diameter of < 10–15 mm are preferred for harvest machinery. Too few stems per square metre (< 5/m^2) will result in the windrow sitting on the ground making it difficult to pick up, even with crop lifters. Also, the very large plants can cause uneven feeding into the harvester and are difficult to thresh. Planted row spacings of up to 50 cm do not usually present a problem. Using standard cereal width knife guards, the knife needs to be in good condition to cut the larger stems of canola (see harvest section for more detail on knife guards).

The most common cutting height for canola is 30–60 cm, depending on the crop density and height. Cutting crops too high can lead to lower oil content and result in yield loss as short branches fall to the ground.

Some growers place a chain or steel bar beneath the windrower exit to push tall stubble down before the windrow lays on it. This can help the windrow to sit lower in the stubble and minimise the risk of movement by wind.

A well-laid windrow is gathered evenly from both sides and interlocked with the stems angled down at 45–60° to provide good strength against the wind and allow for even drying.

Low yielding crops (< 0.7 t/ha) can be more susceptible to wind damage. In this case it is advisable to lay two windrows together by using an end delivery windrower system like that on a harvester draper front. This will halve the time to harvest the crop as two windrows are picked up simultaneously.

Harvesting in the same direction as the windrower will mean the pods enter first on to the harvester platform, reducing losses as well as the risk of crop stubble 'spearing' the tyres on the harvester.

Key windrow settings are:

- set the reel as high as possible so that it lightly pushes the plants onto the windrower;
- reel speed only slightly faster than ground speed;
- draper speed at a medium pace so that plants are evenly mixed from both sides;


Severe winds can still cause damage to windrowed crops.
PHOTO: P. PARKER, NSW DPI

- knife guard fingers about 130 mm apart (standard as for cereals); and
- minimise blocking or bunching of the windrow to allow for easier harvest.

Where windy conditions are common, a windrow roller can help push the windrow into the stubble to anchor it. Purpose built windrow rollers can be attached behind the windrower and are used successfully to push light windrows into the stubble for protection against wind.

HARVESTING WINDROWED CROPS

When to harvest

The timing of harvest for a windrowed canola crop is less critical than for a standing crop. A windrowed canola crop can be ready to harvest within 7–10 days after cutting when the seed moisture has dropped to eight per cent. Begin sampling the windrow within 7 days and thresh out a small sample with the harvester to check the moisture content. By taking a sample from a typical part of the crop, growers can be confident that, once it has reached a moisture content of eight per cent, most of the windrows will be ready for harvest.

In drier regions, when seed moisture content has dropped well below eight per cent, it is advisable to harvest canola early in the day to minimise losses. In higher rainfall districts, temperatures are not usually high enough for pod shattering to be an issue when picking up windrows.

Canola can remain in the windrow for up to six weeks if it has been windrowed at the correct stage. Canola that is windrowed late will be more susceptible to shattering if left for more than three to four weeks.


Belt pickup front
PHOTO: F. PRITCHARD, ICF

Harvester type

All modern combine harvesters are suitable for harvesting canola. Closed fronts were used on earlier harvesters for cereals but these were never suitable for harvesting canola crops. Today most harvesters have open auger fronts or draper (belt) fronts and are equally capable of harvesting windrowed canola with some minor modifications such as crop lifters. However, it is the belt pickup front which is considered the best for harvesting windrowed crops like canola.

Belt pickup fronts

In traditional growing regions many growers have dedicated pickup fronts they attach to their harvesters. These consist of rubber or canvas belts fitted with small fingers to gently pick up and feed the windrow into the harvester (see picture). Pickup fronts have a modified platform auger that allows plenty of clearance for the windrows to pass under before being pushed up into the front elevators of the harvester. As well as their gentle action, pickups can reduce contamination by green material in the harvest sample. They also reduce the amount of stubble material going through the harvester. A popular modification is the addition of a roller down across the top of the belt front. This presses the windrow down as it is fed on the platform and helps prevent the windrow from bunching up against the table auger or being pushed over the top of the front above the elevator.

Auger or draper fronts

Growers who do not grow canola every year could use either an open auger front or a draper front with crop lifters attached to pick up windrowed canola. Depending on the crop situation they are less likely to pick up the windrow as quickly and as cleanly as a belt pickup front. Auger and draper fronts will require some minor modification before they can pick up windrows.

Modifications to auger fronts

- Replace cereal augers with a narrower diameter auger to help handle the bulkiness of canola windrows.
- Raise the auger off the table to the second highest possible position to allow good clearance. If a blockage occurs there is at least some room to adjust further.
- Lupin breakers attached to the centre flights of the table auger can help feed the windrow into the elevators.
- Use finger tine reels rather than batten reels to help feed the windrow into the front gently.

Draper fronts with some modifications are well suited to harvesting windrowed crops as well as for direct harvesting. PHOTO: P. CARMODY, DAFWA

Modifications to draper fronts

- Bring the auger at the elevator forward to help feed the windrow into the elevator.
- Maintain a belt speed slightly faster than the ground speed.
- Ensure the belt is tight, especially in heavy windrows.
- A short overhead auger across the mid section of the front helps feed bulk into the elevator.
- The reel need only just touch the windrow onto the belt.

Consult your local machinery dealer to determine the most suitable modifications to the harvester.

Crop lifters

Where a belt pickup front is not available, attaching crop lifters to an open front harvester is a good alternative to pick up windrows. The simplest way to attach crop lifters is to the knife guards at 300 mm spacing, at least across the centre of the front. Some growers place them across the entire front to handle all crop situations but it is advisable to pick up the windrow at the centre of the front to minimise seed losses.

The most suitable lifters for canola are usually 300–400 mm long and can lift the windrow cleanly over the knife and on to the front's platform. Most growers leave the knife cutting when picking up the windrows, which second cuts stems to shorten the stubble length for an easier seeding operation the following season.

The only manufacturer of crop lifters in Australia is Harvestaire, which has a range of crop lifters to suit either open fronts or belt fronts of most harvesters. Crop lifters are simply attached to the knife guards and will help pick up down or tangled crops as well as windrows.

CHEMICAL DESICCATION

Chemical desiccation is an alternative to windrowing and very effective where crops have lodged or where weeds have emerged in maturing crops. The most commonly used desiccant is diquat (Reglone®), which is registered for aerial application on canola crops (refer to product label for application rates).

Desiccation can be a useful strategy on variable soil types, for example, where heavier soil types or drainage lines keep the crop greener for longer a desiccant can hasten harvest of these areas and reduce the risk of high moisture problems. It can also be used where windrowing contractors are not available.

Desiccants have no detrimental effects on the seed or its oil quality if applied at the correct time. They work through contact action and require almost complete coverage of the plant to work effectively.

An experienced aerial operator can apply a crop desiccant to ensure uniform coverage with minimal spray drift.

The correct time for desiccation is when 70–80 per cent of seeds have changed colour in middle pods, which is when the crop has passed its optimal windrowing stage. The crop will be ready to harvest within four to seven days after the desiccant is applied, depending on the size and density of the crop. Only desiccate the area of crop that can be harvested over a period of one or two days.

The harvester must be ready within three days of a desiccant being applied to minimise potential losses due to shattering – withholding periods should be adhered to.

Desiccation is generally considered a special purpose management aid for when problems with windrowing, weeds or harvesting are anticipated. Specialist agronomic advice should be sought.

DIRECT HARVESTED CROPS

Most canola in Australia is windrowed but an increasing number of growers in medium and low rainfall districts are switching to direct harvesting. Advances in harvest machinery and improvements in varieties are making direct harvesting of canola more of an option. The new varieties can have a shorter pod maturation phase and are less prone to shattering.

In lower yielding regions, crops tend to be direct harvested. Harvesting is usually a better option than windrowing for very low yielding crops (< 0. 5 t/ha) due to the extra costs involved in windrowing and the difficulty in laying and picking up windrows with the harvester. There is some risk of pod shatter and for large areas (> 500 ha) it is advisable to desiccate to bring forward harvest for some of the crop. Earlier maturing crops ripen quickly without concerns of high seed moisture in most seasons.

Benefits of direct harvesting

- One less operation on the farm (no windrowing).
- Direct harvesting can give cleaner samples with lower admixture.
- Suits rocky areas or where sticks can be a problem when windrowing.
- Reduces the risk of harvester blockage that can occur with windrows.
- Can harvest the paddock according to tramlines.
- Possible to harvest sections of the crop as it matures.

Timing of direct harvesting

- When all the pods are dry and rattle when shaken. Although tops of plants may contain a few green pods, do not wait for them to ripen as the rest of the crop will begin to shatter.
- Only begin harvest when the moisture content has fallen to eight per cent. Ensure moisture meter is properly calibrated before harvest.
- Do not use the general colour of the crop as a guide, use seed moisture content.

Direct harvesting is best done in the early hours of the day to minimise seed losses. However, at the start of the harvest period the moisture content may be too high to permit harvesting in the early hours of the day. Draper fronts are preferred for direct harvesting canola.

Properly adjusted open auger front machines are reasonably effective at directing the harvesting of canola and much of it depends on the patience and skill of the operator.

Harvester settings

Canola is easily threshed but capacity is limited by the sieves, so pay special attention to them, particularly the top sieve. Harvesters with larger sieve capacity will be able to harvest canola the fastest but, because of the bulkiness, canola harvesting can only proceed at about 80 per cent of the speed of cereal harvesting.

Regularly check for harvest losses at the start of the season. Calibrate losses with a square 2 litre ice-cream container placed under and beside the windrows before harvest. In undulating country steep slopes can significantly change the angle and therefore the load on the sieves. It is best to harvest on the contour if possible to minimise losses.

Reel

A reel fitted with finger tines is preferable to a batten reel, whether direct harvesting or picking up windrowed canola. Tine reels are able to feed the crop onto the platform with minimal shattering. The reel speed and height should be set to gently assist the crop into the machine. A reel set too low or too fast will cause excessive shattering at the cutter bar.

Vertical knife

A vertical knife rather than crop dividers will reduce shattering losses at the crop end of the front when direct harvesting canola. Knives can be attached at either or both ends of a front to help the harvester pass through the crop. Vertical knives are a standard feature on most windrowers and usually operate off the reel's hydraulic drive on harvester fronts with some minor modifications.

Front auger and elevator

Adjust the table auger as high as possible. If the adjustment is insufficient to give 8–10 mm clearance, it may be necessary to change the adjustment hole slots. Alternatively, change the front auger to a smaller diameter one which increases the clearance up to 20 cm depending on the size of the crop.

The front elevator carries a much larger volume compared to cereals and should be checked for tension and freedom of float. Check that the reverse drive mechanism is working well just in case blockages need to be cleared.

Some draper fronts can have a cross auger above the entrance to the elevators to help feed the bulky windrows into the harvester.

Drum and concave

Canola is not a difficult crop to thresh. Under normal conditions most of the seed threshes out on the front or on the elevators. Any little holes or gaps in the harvester need to be sealed or closed to reduce losses.

Drum speed should be about 60 per cent of that used for cereals. Set at 650–700 rpm for small diameter (46 cm) cylinders, and 450–600 rpm for large diameter (61 cm) cylinders. Axial flow machines should be set to a lower speed (20 per cent lower) compared to cereals to reduce excessive damage to the seed.

Too high a drum speed and too narrow a concave will cause seed cracking, skinning and excessive smashing of pods and stems, which could be difficult to remove from the sample. The concave should be nearly wide open, allowing for some further adjustment, so that any blockages can be cleared.

In many districts, canola is harvested in very dry conditions compared to Australia's northern hemisphere counterparts and consequently imported harvesters can easily over-thresh canola if not set up correctly. In some cases it may be necessary to switch to concaves with

Direct harvesting is an option on some crops.
PHOTO: F. McRAE, NSW DPI

fewer wires or bars in dry conditions or remove wires from concaves in a conventional harvester. This can also improve the capacity of some machines in canola.

Wind

Allow about half an opening for direct harvesting but this may need to be increased to two-thirds for large windrows. Set the fan at half to three-quarter speed. Where wind is controlled by shutters, these should be open less than halfway.

Direct the air as uniformly as possible under the entire length of the sieves. This will ensure that stems, pods and canola do not move across the sieve as a mat, which will result in high seed losses out the back of the header.

Start with a low fan speed and gradually increase it until chaff and seed separate with no canola being blown over the top sieve.

Sieve settings

The proper adjustment of the fan and the sieves is vital, since the canola seeds are light and can easily be blown out of the harvester or ride out on the chaff on the bottom sieve. The top sieve does most of the separation in canola and this also minimises the returns off the lower sieve if set up correctly.

Top sieve – air foil louvre sieve, 3–6 mm open or 3–4 mm punch hole or expanded mesh sieve.
Bottom sieve – adjustable louvre sieve, 2–4 mm open.

Check the sample in the bin to adjust the lower sieve. If it contains a large quantity of trash, it is likely the sieve is open too far. This should not be a problem with a punch hole sieve. The returns to the drum should be almost minimal with a well set up harvester. If returns are too large, seed will be 'skinned', releasing oil which leads to a build up of gum throughout the threshing, cleaning and grain tank areas. High speed drum settings and a concave set too close can lead to similar problems.

While adjustable sieves are suitable they can take longer to set up but this can be necessary in districts where the crop condition varies a lot throughout harvest.

Walkers

If straw baffles are fitted over the walkers these should be lifted as high as possible to allow a free flow of material.

Sample

The best sample will be taken when the humidity is high, for example at night or after rain. During high day temperatures (above 30°C) smashed pod pieces tend to contaminate the sample but, because of its light weight, a small percentage of such admixture is acceptable. It may be necessary to stop harvesting during the heat of the day. Some receival sites will not accept seed samples which have a temperature above 30°C.

Speed of travel

The speed at which the harvester moves is the most critical part of the operation. Ground speed is determined by the ease with which the windrow can be picked up and is normally the limiting factor for modern harvesters. This highlights the importance of laying a good windrow.

Canola seed and trash are relatively light when mixed, therefore it is difficult to separate them quickly. Yield varies even though windrows look even. Set the loss monitor carefully and drive to it.

GRAIN LOSSES

The longer harvest is delayed, the greater grain losses will be and this is especially true in canola. Losses can occur from windrowing up until harvest, due to pod shattering. Harvest losses can occur at the front and back of the harvester if it has been set up incorrectly. Grain losses will also vary depending on the time of day if the machine is not adjusted throughout the day and according to conditions.

Do not rely on grain loss meters for determining losses over the sieves when harvesting canola. The easiest method to assess losses for the entire machine during canola harvest is to use a square 2 L ice-cream container (0.022 m^2 equivalent). Put containers in the uncut section of crop in front of the harvester, four either side of where the harvester will go, to measure the front losses, and four in the middle of the machine, to measure the front plus machine losses. Then harvest the crop over the top of where the containers are and count the number of seeds in each container. Remember the concentrating factor when calculating machine losses. For canola, approximately 60 seeds captured in a square 2 L ice-cream container is equivalent to 100 kg/ha of lost yield.

Insidious losses can occur from small holes in the harvester, field bins and trucks as canola seed 'runs' so easily. For older harvesters it is essential to seal all holes and cracks with duct tape or silicon, especially on the table, front elevators, returns auger and grain tank. On some machines losses can occur from the outloading auger if unchecked. To check if the machine is leaking, stop harvesting and run it for three minutes then reverse and inspect the ground for seed loss.

When harvesting canola, tolerance thresholds are lower than for cereals and therefore harvesters need to be well prepared before harvest. Harvesting windrowed canola can be about 20 per cent slower than direct harvesting cereals or canola, especially to minimise losses. Draper front harvesters have significantly lowered losses in direct harvested canola compared to conventional fronts.

Generally, up to 10–20 kg/ha is considered an acceptable loss in canola grown on reasonably uniform paddocks. If a contractor is being used, reach an agreement on acceptable losses before the crop is harvested and check losses at the start of harvest.