

Exploring the stubble management potential of headers

GRAEME JENNINGS

Headers play a vital role in stubble management, but are they being used to their full potential?

Re-thinking the potential of headers and how they are used could improve efficiency, reduce risk at harvest time and improve trash clearance and herbicide efficacy at seeding time, according to consultant agronomist Bill Long.

“It is a truism that preparation for seeding begins at harvest time but there can be benefits from separating grain harvesting and stubble management objectives, particularly in a no-till stubble-retention farming system,” he said.

“The wet harvest last season reinforced just how important it is to get the crop off as quickly as possible to avoid downgrading losses associated with wet conditions at harvest.

“Focusing on getting the crop off during harvest by harvesting as little straw as possible then paying attention to the stubble afterwards maximises the chances of getting the best harvest and stubble management outcomes, often in about the same time as it takes for one pass with a header set to leave short stubble during the harvest operation.

“A header with a good straw chopper such as one of the maximum air velocity [MAV] units now available is a very effective way of dealing with stubble.

“Separating harvest and stubble management means both jobs can be done as well as possible, with less pressure and less risk because harvest is finished more quickly.

“Having ripe crops in the paddock was a high-risk exercise in last season’s wet conditions but there are always risks including fire, wind and rain damage when there is ripe grain in the paddock. With current grade spreads there can also be a big price advantage in being able to get grain off and onto the market quickly.

“We limit ourselves thinking we have to harvest grain and process stubble in the one pass.”

Harvest efficiency can be improved in many ways, including the use of contractors, purchasing a larger or second header, use of chaser bins and mother bins, all of which require a significant



THIS HEADER, WHICH USUALLY CARRIES A STRIPPER FRONT, HAS BEEN FITTED WITH SLASHERS AHEAD OF THE WHEELS SO THEY DO NOT ROLL LONG STRAW ONTO THE SOIL SURFACE.

capital outlay, said Bill, principal of Ag Consulting Co.

“Improved canopy management means we are growing more grain with less stubble but we are still focussed on large-capacity harvesters with the ability to harvest grain and process stubble in one pass at harvest.

“Most growers buy headers with sufficient capacity to deal with what they consider a reasonable amount of stubble at harvest but big harvests catch us out and often leave us wanting a bigger header to do the job.

“Some farmers have worked out ways to double harvest capacity and improve stubble breakdown using their existing machinery.”

The stubble management issue was highlighted in 2010 when wet conditions meant growers in most regions, including usually low-rainfall districts like the Mallee, had large stubble burdens to deal with.

“Many of the growers in low-rainfall districts, in particular, were at a loss as to how to deal with the large volumes of stubble and damp conditions at seeding

time increased problems with trash clearance through tined machines in particular,” Bill said.

“Stubbles from four or five-tonnes a hectare crops are rare in districts such as the Mallee and upper Eyre Peninsula but relatively common in higher rainfall areas such as Yorke Peninsula and the Lower North and several growers in higher rainfall districts are now focusing on getting their crops off and safely in the bin before going back with the header to tackle stubble management.

“There are always benefits in getting grain off quickly, and not having to worry about straw during harvest allows the header to be operated at much greater capacity because there is less stubble processed during the harvest operation.”

The length of straw left after the harvest pass is an issue with a two-pass harvest system because there is potential for it to cause blockages at seeding where it is rolled onto the soil surface by the header and other machinery, he said.

Several Yorke Peninsula growers who are leaving their straw long at harvest either have fitted or are considering fitting slashers ahead of the wheels on their

headers and chaser bins – at a reported cost of less than \$5,000 - to address this issue and Bill believes this could prove to be an important part of a two-pass system.

Many growers are reluctant to consider using a second pass with their harvester to manage stubble because they are concerned it will increase header hours and reduce the life and resale value of the machine, he said.

However, removing only the grain would significantly reduce machine hours for the harvest – some operators using stripper fronts have almost halved the time taken to get their grain off - and the second stubble management pass is done at similar speeds to the harvest pass, since the machine is being used purely to reduce stubble length.

Growers using this system report less fuel consumption with the two passes than with a single pass with the header engine operating at full load capacity.

“The end result from a two-pass system is no or minimal increase in annual machine hours and a reduced fuel bill. Even with a marginal increase in header hours, the benefit from reducing downgrades due to weather damage is likely to outweigh the marginal extra cost.

“One grower who used a stripper front last year operated the header at 12 to 16 kph in wheat and barley, about twice the

With the stripper we have lower fuel use and less wear and tear on the machine. It's just more efficient.

ground speed he used when harvesting grain with an open or draper front and dealing with stubble management at the same time. As a result he got the crop off well before he would have with a single-pass approach and, despite using two passes, had a lower fuel bill and used fewer header hours than he would have with a single pass.”

Field observation and trial results suggest use of a stripper front can also halve the number of snails taken into the header during harvest.

“In low-rainfall areas where stubbles are usually light it makes economic sense to use a second pass with the header to reduce straw length in the few years that is necessary rather than buy an extra machine like a slasher or mulcher that might be used only once a decade and will not do as good a job as the header anyway,” Bill said.

“The benefits flow on to the subsequent crop as well. The stubble processed through a chopper has a much higher chaff fraction than slashed stubble, so

under the right conditions, break down of residue processed through a header is much faster than the larger pieces left after slashing, resulting in more exposed soil between the rows at seeding.

“This has the additional benefit of improving the efficacy of the soil-activated herbicides we currently rely on so heavily.

“Many growers just haven't considered separating harvest and stubble management and using the header to process their stubble because there seems to be an automatic assumption that it will double header hours and wear out a costly header more quickly. The reality is very different.”

Paul Lush, who farms near Hamley Bridge, harvests most of his crops with a stripper, after using a standard draper front to establish a working perimeter of short straw around the edge of each paddock so he doesn't have trucks driving through long straw.

Once the perimeter has been cut short the draper is dropped off in a corner of the paddock and the crop harvested with the stripper front, which maximises harvest efficiency and straw length; an important factor for Paul who cuts and sells straw after harvest.

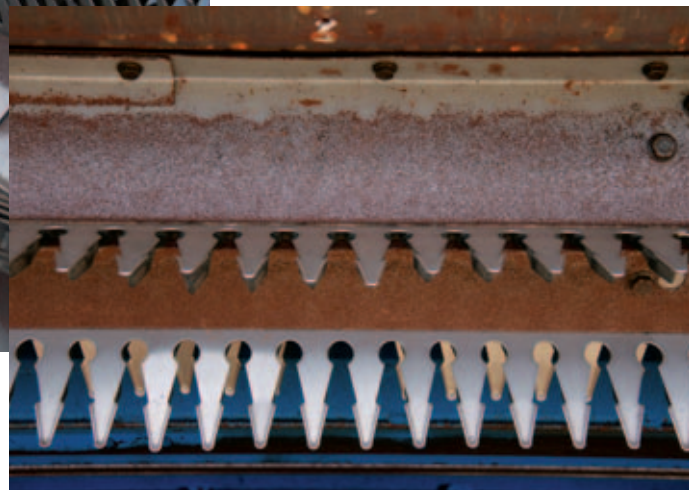
With the 10.9 metres draper front his Class 7 harvester reaps 40% less grain and uses 50 to 70% more fuel per tonne of grain than with the stripper front, which is only 9.3 metres wide.

“We can get crop off so much quicker with stripper.

“In most conditions we can harvest between 45 and 65 tonnes an hour, which has reduced our harvest time by about 40%. We aim to get the grain off and worry about the straw later.



THE 'BUSINESS END' OF A STRIPPER FRONT, IN WHICH 'STRIPPING FINGERS' STRIP GRAIN FROM THE CROP. THIS MEANS MUCH OF THE GRAIN IS THRESHED BY THE HEADER, SO THE MATERIAL ENTERING THE COMBINE IS MOSTLY GRAIN, CHAFF AND LEAF, WITH MOST OF THE STRAW LEFT IN THE PADDOCK. RIGHT: A CLOSE VIEW OF TWO ROWS OF STRIPPING FINGERS.



“And with the stripper we have lower fuel use and less wear and tear on the machine. It’s just more efficient.”

Using a stripper front increased the capacity of the John Deere header he owned at that time from 25 tonnes an hour to 40 tonnes an hour despite the narrower swath width, Paul said.

Three years ago he reaped one paddock with the draper front and another the same size with the stripper then cut and baled the straw in the paddock he had stripped.

“We were able to strip the grain and cut and bale the straw in the time it took to get the crop off with the draper.”

While he cuts and sells some of his cereal stubbles for straw, Paul is well aware of the benefits of stubble retention and in recent years has spread chicken litter to replace the organic matter in paddocks where straw has been removed.

The ability to harvest grain quickly has enabled Ian to dispense with the chaser bin.

Twelve months ago he bought a disc seeder, which he used to sow canola and lentils into standing stubbles of his 2010 wheat crops, some of which yielded 6 t/ha. Based on that experience he expects the disc will make it easier to handle long straw left as standing stubble.

“The disc seeder, which is set up to apply liquid fungicides and fertilisers in the sowing pass, will let me take a more strategic approach and match the stubble management with the paddock and seasonal conditions.”

He is concerned about the build up of ‘mice and bugs’ in stubble retention systems and his strategic stubble management is likely to include some strategic burning to help reduce snail numbers if they get too high. Apart from that, the combination of the stripper front and disc seeder means he will be able to leave his stubbles as long as possible at harvest and decide later whether to cut them for sale or leave them in the paddock.

“Straw length is not an issue for a disc provided the stubble is still standing. A disc works better in stripper straw than where a draper front has been used

because the stripper leaves the stubble standing so there is minimal organic matter on the surface to cut through.

“Harvesting with a stripper then sowing into the standing stubble with a disc seeder is cost-efficient because harvest time is minimised, the stubble is left in place to protect the soil and seeding is quick and simple.

“With a stripper there is basically bare ground between the stubble rows, but that exposed soil is protected from wind by the standing stubble.

“There are also moisture conservation benefits because rainfall infiltration is better in paddocks with standing stubble than where the surface is covered with header chaff or slashed stubble.”

Ian Westbrook also uses a stripper front; mainly for the efficiencies and cost benefits it offers but also because it maximises straw length.

Ian, who farms at Arthurton with his sons Simon and David, cuts and sells his stubbles and long straw can earn a premium in the bedding straw market.

With a 2011 price of \$130 a tonne, which compares well with feed barley at \$180 a tonne, straw sales are an important part of Ian’s business, although he knows many people believe it is better to keep all crop residues on the farm.

He uses a draper front in any ‘rough’ paddocks with short straw but otherwise all his cereal crops are harvested with the stripper.

In 2010, when he was under pressure to get grain off whenever conditions were dry enough, using the stripper front meant he was able to harvest a 6 t/ha wheat crop in about a third of the time it would have taken him with a conventional front.

However, he seldom operates at such high speeds unless under extreme pressure from an approaching rain or storm event.

“If it looks like raining we do go flat out and get grain into whatever storage we have so we can protect it.

“Under normal conditions we average 16 to 17 kph without pushing the system in any way. With a draper front we work at about 8 kph.”

Working at a higher speed minimises grain loss from a stripper front because the forward momentum carries grain and heads thrown up by the stripper blades into the header, Ian said.



A CLOSE VIEW OF A SLASHER FITTED IN FRONT OF A HEADER WHEEL TO AVOID STRAW BEING ROLLED ONTO THE SOIL SURFACE WHERE IT COULD CAUSE PROBLEMS AT SEEDING TIME.

“If it’s a good standing crop, speeding up will maximise the amount of grain going into the header.

“Our biggest losses are when we slow down to turn because there is less grain going into the machine but the air flow is maintained, so more is thrown out the back.”

However, he cautions, not all headers perform as well as his 1998 Agco Gleaner when fitted with a stripper front.

The Gleaner is an axial flow machine with the rotor at right angles to the direction of travel so grain does not have to change direction as it passes through the machine.

While some growers have expressed concern about harvesting at the speeds he uses he believes operating at a consistent speed causes less wear and tear and carries less risk of breakage than the changes in speed, often with a full grain bin, typical of the operating pattern with a header with a draper front.

“With a header operating at 8 kph in the crop the operator invariably accelerates up to 14 or 15 kph across the paddock to the truck or in-paddock storage so the machine

is subjected to a sudden increase in speed under load.

“With a stripper front you operate at the same speed in the crop as you do travelling to and from the truck.”

The ability to harvest grain quickly has enabled Ian to dispense with the chaser bin that used to be part of his harvest set up; eliminating the cost of the driver and reducing the number of wheel tracks in the paddock and the amount of straw flattened onto the surface.

“We still use a chaser bin at the end of a run but we worked out that, with the stripper front, there is minimal benefit from using a chaser because for much of the day the header bin is full before the chaser bin can empty and get back to the header,” he said.

“The header bin fills in seven minutes and it takes four minutes to empty the chaser bin, so before long the header is full before the chaser bin can get back.

with a draper front, Ian said.

“It takes about the same amount of fuel to cut and bale the straw as it does to harvest the grain using the stripper front so effectively there is no cost for the straw if you use fuel consumption with a header using a conventional front as the reference point.

“Three years ago I was harvesting with my brother, who has an identical header, and we reaped 182 ha in a day. We both used exactly the same amount of diesel but my machine with the stripper front harvested 141 ha and he cut 41 ha.”

The higher capacity of the stripper front, which means Ian is often waiting for crops to ripen, is not due only to the minimal straw intake.

A stripper front can handle ‘tough’ straw so a header fitted with a stripper can often operate effectively an hour or more before and after conditions are right for a draper front.

He bought his first stripper to boost the capacity of the Class 6 header he was using at that time because the new front was cheaper than buying a bigger header.

Since then he has upgraded to a bigger harvester and the stripper front is usually used only where he wants to maximise stubble length for the straw market or if he has some barley that is difficult to reap with a normal front because it is down and tangled.

“A stripper can lift header capacity, but with a Class 8 header that’s seldom an issue,” he said.

Field observation and trial results suggest use of a stripper front can also halve the number of snails taken into the header during harvest.

“Adding a stripper front markedly increased the capacity of the Class 6 header we had when we bought it, but stripping gives much less capacity benefit with the bigger John Deere we have now.

“Because we set the cutter bar high to maximise straw length anyway, the stripper often isn’t much faster than using a conventional front, depending on the situation.”

And, he cautions, a stripper front is not ‘all beer and skittles’.

“You can lose a lot of grain out the front if conditions are very hot and the crop is over-ripe because the heads can snap off and fly everywhere.

“The header needs to be set up differently for a stripper front, too.

“They do shine when reaping conditions are tough, and can boost header capacity where high moisture levels make harvest difficult, but you still need a normal front sometimes.”

Brett inter-row sows with a DBS tine seeder, and in paddocks where the straw is not scheduled to be cut for sale, sets his draper front lower so more of the straw is chaffed and spread on the soil surface because tined machines handle chaff better than long stubble.



THIS SHORT STANDING STUBBLE WAS ACHIEVED USING A TWO-PASS SYSTEM IN WHICH THE GRAIN WAS HARVESTED USING A STRIPPER FRONT BEFORE THE STUBBLE WAS ‘PROCESSED’ USING THE HEADER FITTED WITH A CONVENTIONAL FRONT.

“The stripper is at least twice as fast as a conventional front. We finish harvest and cutting straw in the time it takes others to finish harvest; and last year we made \$200,000 from selling straw.”

The higher capacity achieved with the stripper front also means he uses half the diesel he needed when he was harvesting

An internet search for ‘shelbourne stripper front’ will find YouTube clips of harvesting with stripper fronts, including one of Ian’s Gleaner at work in a clip titled ‘stripping winter wheat’.

Balaklava farmer Brett Roberts has been using a stripper front ‘for years’, but only in some paddocks.