

MAINTAINING PROFITABLE FARMING SYSTEMS WITH RETAINED STUBBLE

Enthusiasm and knowledge drive success in stubble system

A long-term interest in soil structure has guided Derek Ingold's journey from a system of direct drilling in the late 1970s to controlled traffic in the early 2000s, through to a full stubble-retention system today

PHOTO: ALEXANDER INGOLD



An unwavering commitment over several decades to optimal soil structure and better land management meant that, for Derek Ingold, moving to full stubble retention was an obvious goal.

Achieving that goal has been a challenging learning experience, but it has produced valuable insights and long-term strategies, including the need to set up quite separate systems for his property's frost-prone areas.

Derek and Susan, their son Alexander and Derek's mother Beverley run a 2400-hectare mixed farm at Dirnaseer, 38 kilometres west of Cootamundra, cropping wheat, canola and barley, and running 2500 first-cross ewes.

The family moved from Wallendbeen, NSW, when Derek's father John bought the farm in 1960. Derek studied for a Diploma of Applied Science at Wagga Wagga Agricultural College, then completed a

Before switching to discs, Derek found he couldn't inter-row sow on his undulating country because his seeding rig would crab down on the hillsides.

PHOTO: SARAH CLARRY



SNAPSHOT:

PROPERTY: 'Ingola'

OWNERS: Beverley, Derek, Susan and Alexander Ingold

LOCATION: Dirnaseer, New South Wales

FARM SIZE: 2400 hectares

ANNUAL RAINFALL: 525 millimetres

SOIL TYPE: red kandasol with gravelly ridges and creek loams

SOIL pH (CaCl): 5.0+

ENTERPRISES: crop (70 per cent), pasture (25 per cent), remnant vegetation (5 per cent), sheep (2500 ewes)

TYPICAL CROP SEQUENCE: cereal/broadleaf/cereal

CROPS: canola, wheat, barley, albus lupins

EQUIPMENT: 12-metre Boss disc seeder on 254-millimetre row spacings with Flexi-coil air cart; 36-metre self-propelled boomspray; International 8120 harvester with 12-metre front; three-metre John Deere Track tractor (all on a three-metre controlled-traffic system)

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year of postgraduate study at the University of NSW.

When Derek first came home to farm, he and his father were direct drilling, which was a full cultivation. One sowing pass with a full breakout was, he says, common practice by the early 1980s.

The erosion caused by these traditional practices alarmed him, but his options were limited. At that time there were very few alternatives for weed management, and labour was always tight as just he and his father farmed the area. When his father retired, Derek farmed on his own for several years until Alexander came home.

“That was a great help,” Derek says. “We’ve doubled our area in the past 10 years.”

When Derek bought the airseeder in the late 1990s it was on 178-millimetre spacings, for the purposes of incorporation. Over a period of four to five years, Derek went from 178 to 230mm spacings and eventually to 305mm spacings to try to get through the stubble. During the drought years of 2004–2008 they were keeping most of their stubble to retain moisture, although there was very little there.

“Lots of years we were able to get through the stubble with the gear we had, but it was barely adequate even for very ordinary crops. Once we hit a better paddock or a better year, the system was not going to work.”

When the Ingolds changed from rotary harrows to a press-wheel system on their tine machine, they had the press wheels inside the frame. This worked well for seed placement but it restricted trash flow.

“We just didn’t know whether we would get through the straw until the day we started sowing,” Derek says. “Then we’d have to go back to paddock preparation. And because we were on a 305mm system, the stubble was very hard to burn unless we were prepared to knock it down. So it was just getting too difficult.”

DISC SYSTEM

Derek realised that if he was going to retain stubble, he would have to ‘bite the bullet’ and buy a disc unit. Initially he was reluctant because he had seen others using discs and having problems, mainly with hair-pinning – where the disc fails to cut the straw and instead pushes it into the sowing furrow with the seed. Most of the systems he had seen had Aricks Wheels to clean the rows, but Derek did not want “another thing hanging out the front of the machine asking to get broken off”.

Also, as it was “a couple of hundred thousand dollars just for the tool bar”, he wanted to be sure it would be the right equipment for the long term. So he did his research.

“Most of the discs were almost vertical with a slight angle cutting into the soil. These disc machines weigh 15 to 20 tonnes because they rely on the weight of the machine for soil penetration,” Derek says.

“The Boss discs we bought, which are modelled on an American style, have a greater disc angle, which means they bite into the soil without requiring all that weight. The lighter weight means less pressure on the bearings and less maintenance, which is one of the perceived disadvantages of discs.”

MOISTURE RETENTION

Derek turned to stubble retention to improve soil structure and infiltration rates.

He says there is little difference in moisture retention between a stubble and a non-stubble system up to the time of sowing, provided the grower in the non-stubble system burns immediately before sowing. But once the crop is in, stubble retention starts to make a difference.

“The quicker we can get canopy closure, the quicker we’ll start to save moisture. And sowing into straw we’ve got canopy closure almost from the day we sow.”

PHOTOS: SARAH CLARRY




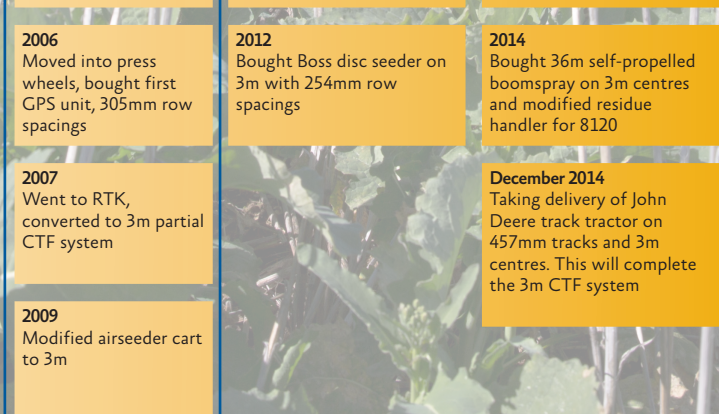


Derek turned to stubble retention to improve soil structure and infiltration rates, rather than for nutrient benefits.

STUBBLE MANAGEMENT SYSTEM STARTS AT HARVEST TIME.

EXTRA STORED MOISTURE IS ONLY GOING TO MAKE YOU MONEY IF YOU USE IT.

THE INGOLD’S JOURNEY TO FULL CONTROLLED TRAFFIC AND FULL STUBBLE RETENTION

1970	1980	1990	2000	2010	
<p>Late 1970s Direct drilling: one sowing pass with full breakout</p> 	<p>Mid 1980s Removed cultivating tines on combine</p> 	<p>Late 1990s Bought first airseeder with narrow Agmaster points, rotary harrows, 178mm row spacing</p> 	<p>2005 Partial CTF on 2m system. Contract GPS, 230mm row spacings</p> <p>2006 Moved into press wheels, bought first GPS unit, 305mm row spacings</p> <p>2007 Went to RTK, converted to 3m partial CTF system</p> <p>2009 Modified airseeder cart to 3m</p>	<p>2011 Bought 8120 Case harvester with 12m draper front</p> <p>2012 Bought Boss disc seeder on 3m with 254mm row spacings</p>	<p>2013 Bought MacDon self-propelled windrower to fit 12m draper front on header</p> <p>2014 Bought 36m self-propelled boomspray on 3m centres and modified residue handler for 8120</p> <p>December 2014 Taking delivery of John Deere track tractor on 457mm tracks and 3m centres. This will complete the 3m CTF system</p> 

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PHOTO: SARAH CLARRY



However, that early shading of the seedlings by the stubble can also mean slower germination and poor early vigour – as he observed in the 2014 season.

“I’d be surprised if our canola plants saw any sun at all for the first six weeks of their life,” he laughs. “Stubble-retention paddocks always look terrible until about mid-August. But they turn into magnificent crops.”

Derek believes stubble-retained paddocks “come home better”, particularly in a dry finish. But he concedes it can be troubling when looking at these struggling crops early in the season.

The other reason Derek likes the stubble system is the labour-saving component. When he was still burning stubbles he would spend up to two weeks on the task and it was weather-dependent.

GRAZING

When Derek first started retaining stubble he was hesitant about grazing it because he was worried it would damage the soil structure. Then in 2008 FarmLink and Dr James Hunt, CSIRO, ran a water-use efficiency trial, funded by the Grains Research and Development Corporation called ‘Catch More, Store More, Grow More’, at Temora, NSW.

Derek joined the project’s steering committee and Dr Hunt asked him what he wanted from the project.

“I said I’d like to know how many dollars a hectare in damage these sheep are doing to my cropping country,” Derek recalls.

The trial results were a pleasant surprise. There was surface compaction to about two centimetres, but with a disc machine and good soil structure, this would not pose a problem. Over several years the research team also found that grazed stubbles had more available nitrogen at the start of sowing than those that were ungrazed.

That research has had a big impact on Derek’s management. He had been reducing sheep numbers to accommodate a no-grazing system, and at one point was down to 1100 ewes. Now two-thirds of his

farm area is stubble, which provides grazing for all his dry ewes from December through to March–April. All the high-energy lucerne pastures are kept for the lambs, which are sold in July.

Lambs also benefit from the dual-purpose wheat and grazing barley that Derek puts in each year. This fills a feed gap and he gains the added benefit of nutrient recycling extending into the winter cropping season. Another advantage of grazing stubbles is that the sheep clean up the spilled grain, so mice are less of a problem.

ZONING

After several devastating frosts in the late 1990s and early 2000s, Derek reworked his rotations. His solution was to zone the property according to altitude, with different rotations for high and low country.

The relatively frost-free higher country is used for long-term cropping. It is cropped for 10, 15 or even 20 years until it is no longer feasible due to weed pressure or nitrogen requirements. Derek then introduces a pasture phase for four to five years.

The frost-prone country is mostly grazed, with short cropping phases of four to six years. He works on weeds in the second-last year of the pasture phase. In the last year of pasture he uses Roundup® (glyphosate) to remove all the ryegrass.

Derek explains: “The first year we generally put in a grazing wheat. There is no nitrogen requirement and very little weed control needed, because we can fix the weeds cheaply coming out of the pasture phase. The next year we might go in with another wheat or a grazing barley, so we have two cereals. There might be a bit of ryegrass by then so we bring in canola to clean it up, then one or two wheats and sow it out [to pasture]. We might apply a bit of urea at a lower rate for the last two cereal crops.”

With this system, Derek can keep his input costs low on the higher-risk country. Four out of five years, the crops are grazed, so even if he gets no return on the crop (because of frost) he has made money from meat production.

The 2014 acquisition of a Case self-propelled boom sprayer and a John Deere track tractor completes Derek’s conversion to a full controlled-traffic system and means that Derek and Alexander are now able to manage all on-farm operations themselves.

PHOTO: GREG CONDON



Acid soils are a feature of the region, but ongoing liming over many years has increased the pH of the Ingolds’ soil to an average of about 5.0 (CaCl). Derek doesn’t incorporate lime, but believes the biological activity of the soil in a well-managed stubble system will assist with incorporation.

RESEARCH AND INFORMATION

Derek Ingold looks to research, field days, publications and local producers to inform his farming decisions. He also credits his agronomist, Greg Condon, with helping him make his stubble system work. “Greg already had a few clients with discs – he’s pretty passionate about straw,” Derek says. “Enthusiastic consultants attract enthusiastic farmers, and vice versa.” He also says the knowledge he has gleaned from the research that FarmLink has done has been invaluable. “Along with their work on water-use efficiency, FarmLink did a lot of research on dual-purpose wheats with the Grain & Graze system. It would be hard to say how many hundreds of thousands of dollars those two pieces of research make me every year.”

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PHOTO: NICOLE BAXTER



STUBBLE MANAGEMENT ON ZONED COUNTRY

Derek manages his frost-zoned country differently to his higher paddocks. In these areas he burns the stubble, for three reasons:

- he believes the structure of a short rotation is less important because there is a short time between pasture phases when most of the organic matter is built up;
- the country is flat, so there is minimal erosion; and
- further FarmLink research at Temora has shown frosting to be far worse in stubbled crops, so he does not retain stubble in the frost zone.

WEEDS AND DISEASES

He concedes that a disadvantage of the zoning system is the pressure he puts on his frost-free country.

"We have to be more astute with our weed management, certainly, but we have zero tolerance for weeds. We keep the paddocks absolutely clean from harvest right through to the day we sow," he says.

"For weed and disease control – especially foliar diseases in cereals – we have strict rotations. Discipline is critical in a stubble-retention system. Our rotation is basically broadleaf/cereal/broadleaf/cereal/broadleaf/cereal. Occasionally I might have two cereals with the second being barley."

This regime allows Derek to rotate his herbicides, from triazines and the newer herbicides such as Sakura® for grass weeds. He windrow burns on occasion, and would like to do more, but the system means fire can run out of the canola into the wheat stubble and burn the whole paddock.

Yellow leaf spot is potentially the biggest disease problem Derek faces. It can occur even after a break crop because the straw is still there. Crown rot is also a threat, although by avoiding two cereals in a row, he reduces his risk.

EARLY SOWING

The information from Dr Hunt's water-use efficiency research has also guided Derek's time-of-sowing decisions. By managing weeds in the fallow, and

keeping straw cover, there will be more available moisture for the coming cropping season.

But extra stored moisture will only convert to yield if it is used. He is now sowing his early varieties even earlier and he has moved away from late varieties altogether.

The greater root mass achieved by the earlier-sown varieties means improved access to moisture and nutrients late in the season, compared with the late-sown varieties.

STUBBLE HEIGHT

Derek's advice on stubble height is: "Cut as high as possible."

"Many people cut it low so they can handle the straw. But where discs run into problems is not with the height of the straw, it's what's on the ground. When it's cut short, all that trash has to be spread properly, otherwise it's best left standing.

"Stubble management starts at harvest time," Derek says. "Lower-cut crops put about 50 per cent more straw through the machine."

A good spreading system also gives herbicides the best chance for soil contact.

FUTURE PLANS

Derek has been farming with full stubble retention for the past three years and, for now, he is content to maintain the same gross margins as before while he fine-tunes the system.

"You have to have a bit of confidence in yourself and confidence in your cash flow to go into stubble farming. You're going into uncharted waters."

So what are Derek's plans for the next five to 10 years?

"We've just got to refine the system. I wouldn't be where I am now without the passion and drive of my son Alexander; the changes I have made in the past few years have been at his urging. We are dedicated to making it work."

"The people who are going to drive stubble farming in the next 10 years are those who are innovating now; growers who are passionate and dedicated and won't let the system fail."

Derek decided on the Boss disc seeder because the greater disc angle allows the machine to be made lighter than others on the market, reducing wear and maintenance requirements.

ALL OUR ZONING IS PURELY ON ALTITUDE; NOT ON SOIL TYPE, NOT ON EROSION RISK.

ENTHUSIASTIC CONSULTANTS ATTRACT ENTHUSIASTIC FARMERS.



GRDC

Grains Research & Development Corporation

Your GRDC working with you

GRDC PROJECTS:

- **FLR00005** – Catch More, Store More, Grow More: integrating soil and crop management to improve whole farm WUE in the mixed farming zone of southern NSW
- **CSP00174** – Maintaining profitable farming systems with retained stubble in NSW south-west slopes and Riverina