

# Chemicals take back seat in ryegrass wrangle

SARAH JOHNSON

A move to integrated weed management is paying dividends in the fight against ryegrass for a WA cropping family.

In the battle against ryegrass on their two WA cropping properties, the Fels family has embraced an effective and economical integrated weed management system that benefits their bottom line.

“Chemicals are our back up,” said Mic Fels, who has farmed in WA with his wife Marnie since 1993.

“They can’t be our front line, because when you put too much pressure on any herbicide it’s going to fail. Evolution has a way of making sure that happens.

“So our strategy is not putting pressure on the herbicides in the first place and that means using cultural methods to stay on top of ryegrass. They do all of the heavy lifting.”

Ryegrass is the Fels’ biggest threat at Wittenoom Hills, near Esperance and at Three Springs, 300km north east of Perth. Cropping 11,000ha of wheat, barley and canola, they have initiated a series of weed management strategies including narrow row spacing, stacked rotations, east-west sowing and chaff lining.

## Row spacing

Reducing row spacing from 305mm to 190mm, a change made possible by the adoption of disc seeding, has made the



WA GROWER AND ENGINEER MIC FELS.



USING CROP COMPETITION AS A WEED CONTROL TOOL IS PAYING BIG DIVIDENDS FOR WA GROWER MIC FELS.

biggest difference to ryegrass numbers, according to Mic.

“We were doing lots of integrated weed management to keep on top of ryegrass but were still giving the ryegrass a free kick by sowing on 305mm. It just seemed wrong. I wanted to get back to narrower row spacings. With high stubble loads, I realised I would need to look at using discs.”

An ‘unintentional trial’ caused by blocked seed lines in their newly-purchased second-hand John Deere disc seeder made the benefits of the transition to narrower row spacings clear.

“In that first year with the disc seeder we put in a lot of trials. Our agronomist did a pre-emergent trial in a weedy area using Sakura, Boxer Gold, Treflan and nil chemical to see what worked and what didn’t work with our different seeding systems. While we were playing around with 190mm and 380mm row spacings we got some blocked pipes and actually ended up with 760mm, 380mm and 190mm spacings, which made for a fascinating trial. In the 760mm rows there was just a solid mat of ryegrass in between some very poorly looking rows of barley.

“On the 380mm row spacing, there was a lot more barley but also a lot of ryegrass, whereas there was virtually no ryegrass in the crop on 190mm spacing. These results had quite a profound effect on our decision making.”

The Fels’ move to no-till farming began with a knife point machine, self-engineered by Mic for their second season in 1994. “I joined a couple of scarifiers together with a twin hitch and went to a sale to get an air seeder, which I found out later had been brought back from the tip.

“I did a bit of a home-build on it and that was our first year of no-till.”

They later upgraded to a 12.2m Morris seeder on 228mm spacing then added an 18.2m Flexi-Coil with Conserva Pack units on 305mm spacing.

The John Deere disc seeder was bought as a trial machine in 2011, and while they encountered several seeding-related issues with it, the impact of the narrower row spacing on the ryegrass population made the transition to worthwhile.

“Narrow row spacing is the most valuable tool we’ve got against weeds,” said Mic. “It’s about using your crop plants to get

rid of the weeds. For me it's a no-brainer.

"I can certainly say that in our environment, with wider rows you will always be on the back foot in the battle against weeds."

Marnie and Mic both came to farming with engineering degrees, so were well equipped to tackle the issues presented by the standard disc seeder setup. Those issues included hair-pinning, poor soil throw, blockages in wet conditions, poor

furrow formation, seedling deaths due to excess trifluralin in the seed slot and high maintenance.

"We had all of these dramas with the disc. Everybody who talks about John Deere discs talks about the modifications they've done to them and it didn't take long to work out we had to do something too," said Mic. "Essentially I wanted the productivity of discs but the simplicity of tines."



WHAT A DIFFERENCE A GAP MAKES! MIC FELS' EXPERIENCE WITH DIFFERENT ROW SPACINGS, ILLUSTRATED IN THESE IMAGES, IS IN LINE WITH THE FINDINGS FROM FORMAL RESEARCH CONDUCTED OVER MANY YEARS. IN THE TOP PHOTO, OF BARLEY SOWN ON 760MM ROW SPACING, THERE IS A MAT OF HEALTHY RYEGRASS AND THE CROP IS STRUGGLING. WITH THE ROW SPACING HALVED TO 380MM [MIDDLE], THE BALANCE IS BETTER BUT THERE IS STILL A LOT OF RYEGRASS. COMING BACK TO A ROW SPACING OF 190MM [BOTTOM] REDUCED IN-CROP RYEGRASS NUMBERS TO ALMOST ZERO.

That was the starting point for development of the Fels' own disc units, now patented as Alpha discs. After several years modifying the John Deere disc units, including eliminating the gauge wheels and adapting the seed boots, Mic started afresh, building a prototype of his own that used an Aeon rubber suspension unit. Alpha disc units were mounted on the Fels' John Deere bar for their 2015 seeding program and about 50 units are expected to be available to farmers this season.

"We're getting good emergence, lots of stubble retention and narrow row spacing, so it's ticking all of my boxes."

## IWM

Narrow row spacing is a critical part of the Fels' integrated weed management (IWM) system that also includes stacked rotations, east-west sowing and chaff lining.

Mic first encountered the stacked rotations concept at a WANTFA conference more than six years ago. The practice involves growing the same crop for several years in succession within a rotation to create a longer gap between different crop species. Weeds and pathogens adapt when in a familiar environment over a period of time and a stacked rotation has the effect of disrupting weed and pest adaptation. Depending on the crops in the rotation it can also enable the grower to maintain different control pressures on weeds and pests over several seasons.

"Stacked rotations are about giving yourself a longer spell between crops. Six years would be better, but I don't have enough diversity in crop types that suit my environment, so I'm stuck with a four-year spell between canola crops."

The Fels' rotation comprises Triazine Tolerant (TT) canola followed by Roundup Ready (RR) canola, then two wheat crops and two seasons of barley. Prior to adopting this system their rotation was wheat, canola, wheat, barley, canola, wheat and barley. "One of the key reasons we converted to stacked rotations was because we were getting caned by crown rot in our wheat. Every second or third year was wheat, so we never cleared that pathogen out of the soil. As a result, we were losing a third of our yield if we got a dry finish. It was absolutely smashing us; there were white heads everywhere.

"Since going to stacked rotations I honestly haven't seen any white heads and we're growing two wheat crops in a row, so it is working.



MIC FELS HAS SWITCHED FROM WINDROW BURNING TO CHAFF LINING, WHICH INVOLVES DROPPING THE HEADER CHAFF IN A ROW ON THE SOIL SURFACE AND LETTING NATURE DEAL WITH THE WEED SEEDS.

“The other strength of this system is that it gives you two cleaning crops in a row, with TT canola and RR canola. The RR canola has fantastic blackleg resistance. We make sure we use different blackleg groups and combined with the four-year cleaning phase, I haven’t seen any black leg since we started doing this. I think it is helping keep sclerotinia at bay as well, which is a far bigger threat in our environment.”

While the yield effect of row orientation is small, Mic has introduced east-west sowing to help manage weeds. By sowing so the crop rows run east-west, the sun’s orientation in the northern sky during the



A PROTOTYPE OF MIC FELS’ PATENTED ALPHA DISC DESIGN MOUNTED ON HIS SEEDER FOR COMPARISON WITH HIS MODIFIED JOHN DEERE UNITS.

growing season means the soil between the rows is shaded, which limits weed growth. “It just makes a lot of sense. The crop shades the ground between the furrows, so you’re eliminating photosynthesis from the scenario, making it difficult for weeds to grow in between the rows, while making sure the crop gets access to 100% of the available sunlight.”

A third aspect of the Fels’ IWM is chaff lining, which they have chosen over windrow burning. Windrow burning has become a popular weed strategy for WA farmers in recent times and the Fels also adopted the practice initially on a property with a long weed history. They

found the technique highly effective in reducing the number of weed seeds but were concerned about its impact on the soil and have now opted for chaff lining.

“We were losing all of our organic material, which is the engine room for soil health,” said Mic. “Lost nutrients and wind erosion were also major problems.” The impact on the family’s lifestyle and ability to prepare for seeding was another consideration. “In March we want to make sure our seeding gear is ready by the first of April. We don’t want to be up between 9 o’clock and 2 o’clock every night burning rows or chaff dumps.”

Chaff lining involves dropping the header chaff onto the surface of the paddock in a 300mm to 330mm wide row and leaving it to rot. Any weed seeds that manage to germinate through this dense mulch layer will compete with other weeds in the same narrow zone, while the rest of the paddock remains clean. “It’s like a sacrificial strip. In fact I don’t think you suffer any yield penalties. Some have observed that the plants either side of the strip are actually better because of the nutrients and biological activity in the chaff line.”

It is also cost-effective, with the only capital cost about \$150 to build a 250mm-wide plastic chute similar to a windrow chute and fit it to the header and no extra operating cost.

“It’s \$150 for a piece of plastic and there’s no extra fuel, no maintenance, no



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reduction in harvest speed, no hours spent burning and negligible nutrient loss. Compare that to some other systems like chaff carts, chaff decks, windrow burning and even the seed destructor. None of them can tick all of those boxes.”

However, the chaff lines do harbour earwigs, which last year damaged germinating canola in a metre-wide stretch along some areas of the chaff line. On the other hand, the Fels have found earth worms in and under the chaff lines all year round.

Mic and Marine are still experimenting with how best to manage chaff lines in following years. Currently they seed into two thirds of the lines, leaving one third unseeded, but are finding that the lines they seed into tend to spread and to encroach on the crop rows either side of the chaff row.

“It’s starting to spread out and affect germination on the runs either side, so we are beginning to lose some area from it.

“My recommendation is to put a tine or a disc each side of the chaff line and try to keep it as narrow as you can.”

**We’re getting good emergence, lots of stubble retention and narrow row spacing, so it’s ticking all of my boxes.**

Every six years the Fels will burn the chaff line following an RR canola crop. “We’ll drop the canola row on it and burn it out. Canola is very easy and efficient to burn and you don’t have to do it at night. That will clean things up without us burning all of that nice, cereal straw that builds up our soil.”

Mic challenges the assumption that integrated weed management is too expensive. He has calculated the cost of adding extra seeding units to enable closer row spacing at \$70,000, which amortised over five years, represents a cost of around \$15,000 a year, which is balanced by higher returns from the crop. On Fels’ properties, reducing row spacing has increased yield by an estimated 4%.

“Based on countless publically available trials and our own experience, I am confident we’re increasing our yield by 4% by reducing the row spacings. The benefit in yield alone every year is

\$180,000 on our program, so that’s \$165,000 nett gain each year just from using narrow row spacing. That’s a pretty solid argument.”

East-west sowing and stacked rotations don’t cost the Fels anything to implement, while chaff lining requires a minimal \$150 outlay.

There is also a significant saving from a reduced need for herbicides and the ability to use less expensive chemicals. “We still use trifluralin successfully in our system,” said Mic. “I use Boxer Gold and Sakura just to mix it up a little bit and where we

have particularly heavy cereal stubbles, but trifluralin is still our mainstay pre-emergent in cereals. The only post-emergent we use in cereals is a bit of ester for broadleaves and that’s still working well because our numbers are so low to start with.

“TWM reduces reliance on chemicals, which not only saves money but is better for soil health and more sustainable.

“Plus I’m extending the life of cheap generics. Glyphosate: how good is it? How cheap is it? What happens when we lose it? Let’s be proactive and make sure we don’t lose it.”



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