



Don't leave canopy structure to chance

Oilseed rape growers harvested some hefty crops last summer — despite awful establishment. But what are the implications for this year's bulkier crops?

By Charles Abel

'Estimating GAI can be tricky — particularly in thicker crops.'

Many growers and agronomists were pleasantly surprised by their OSR yields last season, yet few can put their finger on what drove that performance.

After doom and gloom as almost universally-awful crops emerged from a diabolical autumn and winter, full harvest trailers were very welcome. But just how was the transformation achieved?

OSR expert, Dr Pete Berry, principal research scientist at ADAS High Mowthorpe, doesn't mix his words: "A large part of the success was down to luck with the weather. Thin crops produced ideally-sized canopies at flowering time with negligible lodging, and that's mainly what delivered the high yields."

Difficult establishment meant crops emerged from a relatively cold winter with low populations of relatively small plants — with many fields more brown than green. The dry spring then delayed N uptake, further slowing canopy growth

and preventing lodging — despite growers' best efforts to push crops forward.

But why are small canopies at flowering so important? The answer is simple, according to Pete Berry. "Big canopies may look good, but all those flower petals reflect sunlight and shade the green parts of the plant, which cuts photosynthesis and reduces seed-set.

Yield restricted

"And with fewer seeds produced, the yield potential is immediately restricted. However, last year's open canopies allowed sunlight through, boosting seed set and helping crops — which may've been considered marginal in early February — to turn the tables and deliver an average yield 0.4t/ha ahead of more 'normal' years.

"Additionally, last year's crops benefited from plenty of sunshine in late spring and early summer — ensuring good seed fill." Moreover, the pressure from phoma, sclerotinia and turnip yellows were all relatively low, he adds.

But the over-riding message is that it's small canopies and good lodging control that delivers the top yields, says Pete Berry. He hopes growers and agronomists will be motivated to exploit last year's lessons this spring.

"They need to be, because establishment has been much better this season. Crops are a lot bigger coming out of the winter, leaving a real risk that canopies will become too advanced — suppressing the yield."

But too many growers and agronomists are still 'in the dark' when it comes to canopy size, light interception, green area index and seeds/m², he believes. "However, it isn't always easy to achieve a small canopy when uncertain establishment and pigeons need dealing with."

'Thin crops still benefit'

ADAS trials at High Mowthorpe (N Yorks), Terrington (Norfolk) and Rosemaund (Herefordshire) last year showed that even thin crops benefit from good canopy management — with yields up by around 0.15t/ha. "So imagine how much more you can gain from managing thick crops."

But how should growers and agronomists respond this spring? Good establishment saw some of the biggest crop canopies ever going into winter, notes Pete Berry. "Some August-drilled crops had as much green plant material in November as they should have at flowering.

"So the key now will be to manage crops carefully to produce just the right-sized canopy at flowering." Extensive research over many seasons shows this should be far smaller than many growers routinely achieve, he adds.

"In a typical season, many crops end up with big, thick canopies with a green area index (GAI) of 5 or 6, which means there are five to six layers of green material for each area of ground covered.

"But what they should really be aiming for is a GAI of 3.5, and there are two key tools to help them achieve that. First, they can manipulate the canopy using a growth-regulating fungicide, and second, they can ensure they match the nitrogen applied to the needs of the crop."

In trials, the PGR fungicide Folicur (tebuconazole) has routinely helped reduce the canopy size, as well as curtail lodging, he continues.

Measure GAI

"The key is to measure the GAI as close to the start of stem extension as possible," advises Pete Berry. "Crops with a GAI of 1+ will benefit from 0.5 l/ha Folicur, rising to 1 l/ha where the GAI is 2+."

Estimating the GAI can be tricky — particularly in thicker crops — so refer to sample images (as in the canopy management section at www.bayercropscience.co.uk, or upload a crop picture to

www.totaloilseedcare.co.uk/canopymanagement, or simply weigh the green material from 1m² of crop in kg and multiply by 0.8 to get a GAI figure, he suggests.


PGR activity can be achieved from the early stem extension-to-early flowering stage of the crop, so the spray timing can be tied-in with light leaf spot control at the earlier growth stage, or sclerotinia control at the later timing, notes Pete Berry.

"Last year's ADAS trials showed Folicur is able to reduce the size of the flower layer in both standard height and semi-dwarf varieties. For over-large canopies, that can help the crop set even more seeds/m² — helping to drive the yield."


Indeed, 0.5 l/ha of Folicur even ►





"Extensive research over many seasons shows the optimum canopy size is far smaller than most growers routinely achieve," says Pete Berry.




Innovation for your growth










HAVE YOU EXPERIENCED HYBRID VIGOUR?



Paul Hartley has! Dimension gives him what he wants...

"more reliable establishment; best competition against weeds and impressive yields."

DSV United Kingdom Ltd • tel: 01366 388223 • email: info@dsv-uk.co.uk • www.dsv-uk.co.uk



The goal should be to ensure the total amount of N available to the crop — and the time at which it's applied — is geared to delivering a GAI of 3.5 at flowering, says Pete Berry.

► benefited the new semi-dwarf variety, PR45D03, delivering an extra 0.15t/ha at Terrington, he adds.

“Although semi-dwarfs are far less lodging prone, they still have the

potential to produce an over-large canopy which will tend to reduce the level of seed set. Folicur will therefore have a good chance of improving a semi-dwarf's yield in seasons when canopies are large.”

To achieve the optimum height reduction and canopy management, apply the product at early stem extension and move onto a sclerotinia-active fungicide, such as Proline (prothioconazole), at the early flowering stage once canopy

management has been secured, advises James Taylor-Alford of Bayer CropScience.

“The focus for canopy management really does need to be the early stem extension stage when you'd expect to see a substantial height reduction.” With a more even canopy, a yield response of around 0.3t/ha is commonplace, he claims.

“Moreover, we tend to see bigger yield responses from flowering/ sclerotinia sprays following a PGR stem extension spray — a sort of accumulative effect. So optimising the canopy size not only helps with light interception, it also improves the performance of the sclerotinia sprays.”

Keeping to a robust overall disease control programme is important, believes James Taylor-Alford. “Even in last year's conditions — with small canopies and low sclerotinia pressure — we saw good responses from using two applications of Proline for sclerotinia at flowering.”

Pete Berry agrees that a robust fungicide strategy is key to realising OSR's true potential. “Although ►

OSR needs ‘managed manipulation’

The past two springs have seen smaller-than-normal winter oilseed rape crops, so the need for canopy manipulation hasn't been high on many growers' agendas.

“But it's a very different scenario this year and growers will need to focus on creating the optimum canopy size through managed manipulation,” according to Dr Clare Tucker of BASF.

“Most growers managed to drill and establish their rape very well this autumn, and, despite the dry start, growth was fast in October and November. This has meant the majority of crops were well advanced as they went into winter.” And although the snow will have led to some leaf loss, it won't have affected the growth stage overall, she adds.

Clare Tucker reminds growers and agronomists of the importance of creating an optimum canopy structure this spring. “Rape is a complex crop when it comes to assessing where the yield comes from but we know that too big a crop canopy at flowering means too little light penetration, lower rates of photosynthesis and reduced yields.

“Last year's crop looked pretty small and disappointing in the spring but it still

managed to yield well overall — with the UK national yield achieving 3.4t/ha — 9% above the ten-year average.” A key reason for this was because crop canopies were naturally quite small, she stresses.

With this year's canopies already relatively large, they will almost definitely need treating with a PGR fungicide, such as metconazole (e.g. SunOrg Pro, Caramba). “But reducing the height of the plant is only a part of what metconazole does to optimise a crop's yield potential.

“When considering plant regulation, we think first of reducing the height of the crop and metconazole is certainly effective at doing this — typically by around 7-11cm. But it also reduces each plant's apical dominance and diverts growth away from the main stem into the branches and roots.

“By reducing apical dominance, the canopy can achieve better light penetration — improving the level of photosynthesis and in turn, the yield. Branching also helps to lock the plants together, minimising wind damage in the run up to harvest.”

Metconazole also helps to reduce the degree of lodging, continues Clare Tucker. “Lodging is probably less understood in rape than it is in wheat but research suggests the

yield impact can be as much as 50%.

And as well as losing seed at harvest, a lodged crop slows down harvesting.”

Trials show metconazole can reduce lodging by 28%, so it's worth applying the product for that reason alone, she claims.

“However, metconazole also has a positive effect on rooting leading to 25% more root development at depth in trials — with improved water uptake leading to extra yields of between 0.22-0.34t/ha.”

Clare Tucker claims SunOrg Pro will be an essential part of OSR agronomy programmes this spring, together with adjusting N inputs. “But you really need to measure the GAI twice — once for nutrition in February and again in March for metconazole.”

BASF's recommendation is to apply 0.8 l/ha of SunOrg Pro when the GAI exceeds one in March, or two in April.

“Applying metconazole at the mid-stem extension stage maximises the stem shortening effect, as well as improving rooting. Moreover, when used from the late green bud stage onwards, SunOrg Pro will also contribute to sclerotinia control.”

► fungicide use is increasing in the crop, it's still well below wheat with the average rape crop getting just two sprays per season."

Nitrogen arithmetic

With nitrogen, the goal should be to ensure the total amount of N available to the crop — and the timing at which it's applied — is geared to delivering a GAI of 3.5 at flowering, he continues.

"To establish how much bagged N is needed requires some quick arithmetic in late Feb. First, growers should decide how much N is available in the soil by sampling, or at least using published figures.

"Then they should decide how much N is already held in the crop in February. This might seem quite challenging but each unit of GAI equates to around crops containing 50kgN/ha — so a crop with a GAI of 2 will contain 100kgN/ha."

Last year's thin crops fell well below a GAI of 1, representing less than one layer of leaf per unit of ground. For example, ADAS trial crops achieved

GAIs of just 0.1-0.6 (equivalent to just 5-30kgN/ha respectively) last season while this year's far bigger crops will contain a lot more, he says.

Next, the two figures should be added together to get the total N supply. "This assumes 100% uptake efficiency and can be deducted from the 175kgN/ha total the crop needs to achieve a 3.5 GAI at flowering. The result is the amount of N required from fertiliser — which is taken up with just 60% efficiency — hence it needs multiplying by 1.666 to get the actual amount of fertiliser N that needs applying."

Crops with a higher yield potential need a further 30kgN/ha of fertiliser N for each 0.5t/ha of "genuine yield potential" above 3.5t/ha, he adds.

The key issue with the top dressing timing is to delay applications for crops with a large amount of N in the crop and soil (i.e. 100kgN/ha or more) until after the start of stem extension. "For crops with a high yield potential, it's worth holding about 60kgN/ha back for a final treatment between yellow bud and early-flowering.

"The aim is to deliver sufficient N to drive the yield once seed-set is underway but without overloading the crop with nitrogen too early, which tends to encourage a big canopy — limiting the yield potential.

Allison Grundy of GrowHow agrees growers need to focus on canopy management when planning their nitrogen strategies. "We've supported Pete Berry's work for the past five years and canopy management principles underpin all of our advice for OSR nutrition.

"It's an area where growers need to look at repeating what Mother Nature did for them last year."

Users of GrowHow's N-Min soil nitrogen testing service can use N-Calc for an on-line approach canopy management ([see www.growhow.co.uk](http://www.growhow.co.uk)), she suggests.

The final word goes to Pete Berry: "Last season showed just how important canopy size is and this year, growers and agronomists need to achieve the same results for themselves, rather than relying on the weather to do it for them." ■

Care and not chance with OSR



Russell McKenzie typically uses four OSR disease sprays and last year, his crops averaged 4.7t/ha — around 0.5t/ha ahead average.

One grower who doesn't leave his OSR to chance is Russell McKenzie of Howson's Lodge Farm, near Huntingdon, Cambs.

His 95ha of conventional and hybrid rape is more than just an entry for wheat — it's a profit earner in its own right. So the yield is pushed with a robust fungicide strategy, tailored N use and care when establishing the crop.

The strategy paid dividends last year with rape averaging 4.7t/ha — around 0.5t/ha ahead of the farm's five-year average.

"To us, it's all about how you approach the crop. If you put the effort in, you'll get the returns back out again. We always budget to use four disease sprays, where most UK crops get three or less."

He believes there are three critical goals for profitable rape — good establishment, disease control, nutrient choice and input timings.

"Rape is so sensitive to compaction — if it sits in a shallow, compacted layer it won't go anywhere. Although it puts more pressure on resources, rape needs to get its roots down. I know it has a great ability to recover but you're then into 'chance territory'.

"However, if you get decent plants to start with, you've established the potential for a high performing crop."

From there, it's all about maintaining healthy plants, believes Russell McKenzie. "You only have to look at research carried out by Dr Peter Gladders of ADAS to appreciate the value of good disease control. Most rape diseases aren't difficult to manage but it's important to make the effort to do so."

Autumn disease control is all about timing it right with the sprayer, continues Russell McKenzie. "Keep a watchful eye on phoma and you'll be fine. In some seasons, you might get away with a single spray but

it's safer to opt for a split approach. Typically, this would be a prothioconazole-based programme as it does offer a week or two of extra cover."

However, the disease he's most concerned about is sclerotinia. "We adopted a split spray strategy long before the big 2007 outbreak and I reckon this is a significant factor in our crop performance.

"The gap is just too big for a single mid-flower spray and the disease is just too aggressive. Our typical approach is to use Puri Extra (azoxystrobin+ cyproconazole) at the first timing, followed by Provaro (prothioconazole+ tebuconazole) or Compass (iprodione+ thiophanate-methyl)."

For canopy manipulation, Russell McKenzie looks to agronomic factors, as well as using a PGR. "Sometimes you need to manipulate the canopy, so a product like tebuconazole is useful. However, we try not to get carried away with nitrogen too early.

"I believe last year's yield average of 4.7t/ha was down to holding back some N. At the pod formation stage, the plants were still taking up nitrogen due to the dry period after the last fertiliser application. We've found foliar N at the pod set stage has produced some positive yield results in the past as well."