Managing oilseed rape canopies for yield

Action

Aim to grow a crop with 6-8,000 pods/m^2 and a GAI of 3.5.
Analyse soil N in February.
Estimate size and N content of canopy in February.
Calculate N rate and estimate N timing to achieve canopy of optimum size based on soil and canopy N.
For crops with a combined amount of N in the soil and crop in February of more than 100kgN/ha, **usually** delay N until after early March.
For crops with high yield potential, apply extra N for optimum GAI at a later timing (yellow bud / early flowering).

Always consider your local conditions and consult a FACTS-qualified adviser if necessary.

Optimising crop structure

An understanding of how yield forms in oilseed rape crops is essential to underpin agronomy and produce high yields. Canopy management aims to achieve an optimum canopy size through managing rate and timing of N fertiliser. Triazole fungicides with growth regulatory properties can also moderate canopy size; their use may be particularly useful in very large crops.

In oilseed rape, an optimum of 6-8,000 pods/m^2 is necessary to maximise seed number per unit of ground area and yield. If pod numbers are significantly higher or lower, full yield potential will not be realised.

To intercept most of the incoming light and produce these pod numbers the canopy should have a green area index (GAI) of about 3.5 units at flowering, ie 3.5m^2 of green leaf and green stem over 1m^2 of ground.

Building an optimum sized canopy

An estimate of N in the soil and crop is needed in February to calculate fertiliser N requirement. Each unit of GAI contains 50kg N/ha. GAI can be obtained by downloading a digital crop photograph at www.totaloilseedcare.co.uk, or by recording fresh weight (in kg) of 1m^2 of crop and multiplying by 0.8.

N rate

The crop must take up 50kg N/ha to build each unit of GAI or 175kg N/ha for an optimum GAI at flowering of 3.5. In order to work out how much fertiliser to apply first calculate how much N the crop would take up without fertiliser. This is done by adding the amount of N already in the crop to the amount of mineral N measured in the soil in February. Any shortfall from the target crop uptake of 175kg N/ha must be made up with fertiliser, which is taken up with 60% efficiency.

Table 1. Example for calculating N fertiliser to achieve optimum GAI of 3.5 by flowering

Target N needed in crop *(3.5 GAI x 50kg N for each GAI)*	175kg N/ha
February Crop N Soil mineral N	 50kg N/ha 25kg N/ha
Shortfall *(Target N minus crop N & soil N)*	100kg N/ha
Fertiliser requirement *(Shortfall ÷ 0.6)*	167kg N/ha

ADAS Boxworth, 2005-6

Applying enough fertiliser for a GAI of 3.5 should achieve a yield potential of about 3.5t/ha as shown in the example in Table 1.

If a higher yield is predicted then more N must be applied:

– for 4.0t/ha, 30kg N/ha extra
– for 4.5t/ha, 60kg N/ha extra
– for 5.0t/ha, 90kg N/ha extra.

A calculator using these principles for determining N rate can be found at www.growhow.co.uk/advice.

N timing

Oilseed rape can take up about 3kg N/ha/day before flowering; then uptake slows significantly. The N to build the canopy must be applied early enough to allow the crop to take up most of it by flowering. The latest safe date for applying N **based on mid-flowering dates of 15 April and 1 May** can be derived from the relationship overleaf (Figure 1).

For crops with high yield potential, apply additional N as late as possible to reduce the risk of over-shooting optimum canopy size at flowering. Delay applications until yellow bud, or even early flowering. However, ensure crop is not too large to allow even distribution, particularly if using a spinning disc fertiliser spreader on wide tramlines.

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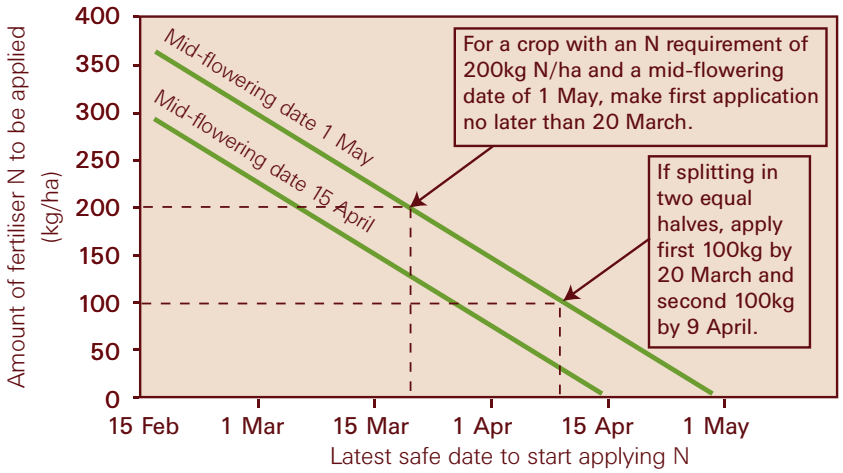
Figure 1. Latest safe date to start applying N fertiliser



Canopy management trials

In nine field experiments between 2005-6 and 2007-8 using varieties Winner and Castille, canopy management increased yield while a conventional N strategy (splits in late February/early March and late March/early April) led to an over-large canopy at flowering. This particularly applied to crops with a combined N amount in soil and crop at the end of winter of at least 100kgN/ha. These conditions often occurred for crops with large canopies of more than a GAI of 1.

In the example given in Table 2, the GAI in February was 1.4, with 50kg N/ha in the soil; 90kg/ha fertiliser N was needed to achieve a GAI of 3.5. The canopy-managed crop yielded 0.39t/ha more than the conventionally-managed crop. Shorter plants resulted in less lodging in the canopy-managed crop.

Where the combined soil and crop N is below 75kg N/ha, crops generally required such large amounts of N that there was limited scope for delaying applications after the conventional timings, especially on shallow chalky soils. This often applied for crops with a GAI of less than 0.5.

Table 2. Fertiliser applications and performance of canopy managed vs conventional crops

Treatments	Canopy managed	Conventional
27 Feb	0kg N/ha	60kg N/ha
4 April	90kg N/ha	60kg N/ha
5 May	30kg N/ha	0kg N/ha
Total N applied	**120kg N/ha**	**120kg N/ha**
Yield	4.01t/ha	3.62t/ha
Area lodged on 9 June	9%	32%

ADAS Boxworth, 2005-6

Folicur and canopy management

The fungicide tebuconazole (Folicur) has growth regulatory properties. Using canopy managed or conventional N timings had little effect on the yield response to Folicur. In experiments where disease had been minimised using other fungicides, Folicur applied at green bud increased yield by 0.21t/ha on the crops which responded most positively to canopy management. Yield responses to Folicur across all trials and N treatments were 0.15t/ha for Winner and 0.10t/ha for Castille. A rate of 0.5l/ha was used on crops with a February GAI of less than 1. A rate of 1.0l/ha was used on crops with a February GAI of more than 1.

Reductions in lodging were observed and possible greater seed set in response to Folicur.

Further information

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Canopy management principles have been incorporated into GrowHow UK Ltd's on-line N Calculator – www.growhow.co.uk/advice

This Topic Sheet is based on research and validation trials funded by HGCA, GrowHow UK Ltd, and Bayer CropScience.