

Assessing winter oilseed rape nitrogen requirements

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Oilseed rape crops have produced large canopies due to early sowing and good crop establishment. At the time of writing, there has been little crop grazing by pigeons. These crops have taken up nitrogen over the winter period which may reduce the crops' overall fertiliser N requirements. As a result, there may be scope for you to reduce nitrogen fertiliser rates.



In early February, assess canopy size by taking a measure of the crops' Green Leaf Area Index (GAI). You, or your advisor, can do this by taking a picture of the crop and entering it into a smartphone GAI Index App (for example www.totaloilseedcare.co.uk).

The optimum canopy size at flowering has a GAI of 3.5. This GAI is needed to maximise the seed number produced by the crop, which in turn is required to achieve high yields. Incorrect nitrogen management at this stage (February) will result in oversized canopies, reducing seed production and increasing crop lodging risk.

Measuring the crop's GAI now will help determine crop nitrogen uptake over the winter. For example, each crop GAI is equal to 50 kg N/ha. At flowering, we aim for a crop GAI of 3.5 which is equal to a crop N uptake 175kg N/ha. This will deliver a crop yield of 3.5t/ha. To calculate the remaining level of chemical N now required follow steps one to four:

- Measured crop GAI (using a phone app).
- Estimate soil N supply (10kg to 50kg N/ha).
- Calculate required applied N (efficiency of applied chemical N is 60%).
- Additional N for higher crop yields (60kg for each extra 1t).

Calculated example for Figure 1 – a crop of oilseed rape with a GAI 2.6 in February with an expected seed yield of 5t/ha.

1. Measured crop GAI: this crop has 130kg N/ha in its canopy. ($2.6 \times 50 = 130\text{kg N/ha}$).
2. Soil N supply is estimated to be 30kg N/ha, which is used at a 100% use efficiency by the crop.
3. Required applied N: the crop and soil have $130 + 30 = 160\text{kg N/ha}$ available. This crop requires an extra 15kg N/ha ($160 - 175 = 15$) to reach target GAI 3.5.

Chemical N is used at 60% efficiency by the crop. Therefore, the crop requires 25kgN/ha as bag fertiliser ($15 \div 0.6 = 25$).

4. Additional N for higher crop yields: each additional tonne of seed yield above 3.5t/ha requires an extra 60kg N per tonne. 1.5t/ha above (3.5t/ha) therefore add an additional 90kg N/ha. Crop N requirement is $25 + 90 = 115\text{kg N/ha}$.

Fertiliser programme for our example crop

- First split – 0kg/ha.
- Second split – 55kg/ha (mid-March).
- Third split – 60kg/ha (yellow bud to mid-flowering) (mid to late April).

Sulphur (S)

Oilseed crops generally require 25kg S/ha. Where crops have large canopies (GAI 2.5 or greater) their S requirements will be lower. Therefore, apply 50% of the crop's S requirements to these crops as they will have taken the S up over the winter period.



Farmer profile

Eddie Fitzpatrick, pictured left with Stephen Collins, farms near Stradbally in Co Laois. He grows a mixture of spring and winter crops including winter oilseed rape (WOSR) which he finds a very useful break crop. "We generally fit the WOSR into the rotation after spring barley and before winter wheat," says Eddie.

"As a result of breaking the continuous cereal cycle we have noticed a definite increase in the yield of the following wheat crop."

The variety of OSR is SY Harnas which was sown on 23 August. Like a lot of oilseed rape crops sown last August, the higher than normal soil temperatures combined with high levels of residual nitrogen allowed crops to grow on very well during the autumn.

In fact some of the crop was almost "too advanced", according to Eddie. Another noticeable aspect of the crop this year is the yellowing of plant leaves especially under the rows of straw. The yellowing is possibly caused due to the competition for nitrogen between the WOSR and the breakdown of cereal straw chaff.

The GAI was assessed in early December resulting in a GAI of 2.6. "The GAI of the crop will be assessed again in February as pigeons have been a problem in the past in this area," according to local tillage advisor Teagasc Stephen Collins.

Stephen uses the GAI app on his smartphone which gives a good guide when planning nitrogen requirements and timings.

"The GAI of oilseed rape crops has often dropped from 2.0 to 0.5 due to grazing which has a significant effect on the amount of nitrogen required for the crop during the spring.

"The plan for the crop if the GAI remains above 1.5, is to delay the first application of nitrogen (N) plus sulphur (S) until early March as the leaves will have enough nitrogen stored in them to keep the crop growing," according to Stephen.

"However, if the crop is heavily grazed and the GAI drops below 1.0 for example, then approximately 50kg to 70kg/ha of N and S will be applied before the end of February.

"The target is only to apply as much N as the crop requires," concludes Eddie Fitzpatrick. "Too much can cause problems such as lodging and increased costs."

Tips

- Measure crop GAI now to estimate canopy crop N.
- Target crop GAI for early February of 1.0 to 1.5 units.
- Where GAI is greater than 1.5, delay first N split until early March.
- Each GAI = 50kg N/ha. Use GAI measurement to determine crop N requirements.
- Aim for canopy GAI of 3.5 at flowering.
- Apply additional 60kg N/tonne for seed yields greater than 3.5t/ha.