Improving oil content and minimising green seeds in oilseed rape

Value of oil content
Most buyers of oilseed rape in the UK pay an oil premium of 1.5% for every 1% of oil content above 40%. A similar deduction is made for loads below 40%. Thus, growers can achieve higher returns on their crops by increasing either seed yields or oil contents.

The 2006 HGCA Recommended List (RL) for winter oilseed rape describes varieties with oil contents ranging from 42.3% to 46.1% and seed yields ranging from 96% to 107% of the mean of the controls. Oil content and seed yield are combined on the RL to produce ‘gross output’, which is seed yield adjusted for oil content. This single value can be used to compare varieties.

Recent HGCA-funded trials have assessed effects of key management factors. In these trials variation in oil content within a single variety was only up to 2%.

Crop nutrition
Figure 1 shows the effect of spring nitrogen fertiliser on the oil content and oil yield of rapeseed (variety Royal) in six trials over two years, on mineral soils with SNS indices of 1 or 2.

Increasing nitrogen dose consistently reduced seed oil content. Neither mean oil yield nor output value increased above the typical RB209 recommendation in SNS index 1 situations of 190kg N/ha. Altering application timing, by applying more in early spring, or delaying some until April, gave no advantage.

At a deficient site, not applying a sulphur-containing fertiliser substantially reduced both seed yield and oil content. Application of sulphur increased yield and sometimes also oil content at sulphur-deficient sites. Where seed yields responded to doses above 30kg S/ha, oil contents were not reduced (in contrast raising the nitrogen dose resulted in lower oil content).

Disease control
Spring fungicide strategy usually had no significant effect on oil content, except in one trial affected by light leaf spot in which the autumn fungicide had been omitted. However, where seed yields benefited from autumn or spring fungicides, oil contents were not generally reduced, and so oil yields were improved.

Therefore, autumn or spring fungicides that improve seed yield will also benefit oil yield.
Harvest method

Figure 2 shows the effect of desiccation with glyphosate or swathing, early or late (five days before or after the ideal stage) on the oil content and oil yield of rapeseed (variety Royal) in eight trials over three years.

Effects of pre-harvest treatment and timing varied between sites and seasons. Early swathing usually resulted in lower harvested seed yields, although in some cases higher seed losses through harvest delays were partly responsible for this. However, early swathing sometimes resulted in slightly lower oil contents, and therefore lower oil yields.

In most cases, time of desiccation with glyphosate had less impact on oil content and oil yields.

Green seed

The green plant pigment chlorophyll can remain in the seed at harvest and create problems for crushers. Extracted with the oil, chlorophyll interferes with subsequent processing.

A large proportion of immature seed in a sample, or conditions restricting the natural breakdown of chlorophyll during ripening, can lead to high chlorophyll concentrations. Whilst a red seed coat can indicate immaturity, seed coat colour is not the best indicator of seed quality.

A better test is to crush the seed and examine the cotyledons inside, which - in a good sample - should be yellow. Crushers may be unwilling to accept seed lots with more than about 5% green seed.

Results from HGCA-funded trials have shown that varieties differ in the amount of chlorophyll they retain, with Apex being one of the worst. In general crushers have had fewer problems with green seed since the decline in popularity of Apex.

Seed samples from the oil content trials described above were tested for sulphur. Application of sulphur-containing fertiliser at deficient sites reduced seed chlorophyll contents, whereas application of high rates of N fertiliser (above the RB209 recommendation of 190kg N/ha) increased chlorophyll (Figure 3).

Over three sites and three seasons there was no consistent effect of time of swathing or desiccation on seed chlorophyll content. There was also no difference in chlorophyll content between swathed and desiccated crops.