Competitive crops to reduce weeds

SUMMARY

Barley was more competitive than wheat in reducing ryegrass numbers. Sowing with narrow rows (23 cm or less) and at rates of at least 90 kg/ha also reduced ryegrass numbers. Crop yields were optimised at a sowing rate of 90 kg/ha and row spacing of less than 23 cm. In a high weed-seed bank situation, the technique of increasing the competitiveness of the crop is a good practice but is insufficient to control the ryegrass problem. It is one of the tools in effective ryegrass management.

Chemical control is expensive and options for resistant grass weeds are very limited and other practices need to be utilised to reduce numbers and allow cropping to remain viable. Some of these options are to use crops, varieties and establishment techniques that are more competitive. Old cereal varieties were very bulky and highly competitive, and weed control was reasonably successful. In the 1970's, new chemicals came on the market that allowed growers to become much more efficient with weed control and intensify rotations. At the same time new cereal varieties were bred to be less competitive (dwarf wheats which are higher yielding with less dry matter). In the mid 1990's fop and dim herbicide resistant ryegrass and wild oats became a common problem through out the grain growing areas of Australia.

METHOD

At the Resistant Ryegrass Site (St Arnaud), wheat (Rosella and Goldmark) and barley (Arapiles) were sown at 60, 90 and 120 kg/ha and at 18, 23 and 36 cm (7, 9 and 14 inch) row spacings. Crops were dry sown in mid May, without prior weed control, in a replicated randomised design.

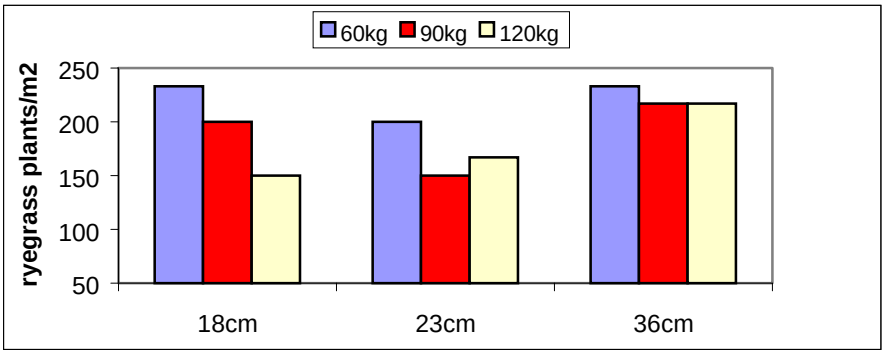
RESULTS

Ryegrass population was very high at establishment with more than 200 plants per square metre. The population was resistant to fop and dim group herbicides.

Arapiles barley was more successful in reducing ryegrass numbers compared to the two wheat varieties that were similar to each other in competitive ability (ryegrass numbers measured at flowering were Arapiles 137, Goldmark 185 and Rosella 196 plants/m^2, $P<0.001$, LSD=26).

In wheat, the sowing rate and row spacings both influenced ryegrass numbers. Significantly lower populations were observed at the narrowest row spacing and highest sowing rate (ie. 18cm and 120 kg/ha sowing rate) (see Figure 2.4).

Figure 2.4 Ryegrass numbers at flowering in Rosella wheat at three sowing rates and three row spacings



In barley, the higher sowing rate decreased ryegrass numbers significantly (60kg/ha - 172, 90kg/ha -122 and 120kg/ha - 117 plants/m^2). Row spacings had no effect on ryegrass numbers

Crop yields were significantly better for the crops sown at the higher sowing rates (90 and 120 kg/ha were significantly higher in yield compared to sowing at 60 kg/ha). For Arapiles and Goldmark there were no benefits in yields due to row spacing effects. However, for Rosella the best yields were obtained at 18 and 23cm spacings, compared to the 36cm spacing. For more information on row spacing and sowing rate effects on yield see the article on row spacings and sowing rates in this issue.

INTERPRETATION

Arapiles barley was more competitive and had less ryegrass compared to the two wheat varieties. In all three crops increasing the sowing rate decreased the ryegrass population. In the two wheat varieties sowing at 36cm resulted in a higher ryegrass population compared to sowing with 18 and 23cm row spacing. This indicates that barley is more competitive compared to wheat and that it is less important to sow with narrow rows in barley to reduce ryegrass pressure compared to in wheat.

Even though ryegrass numbers can be reduced through crop type selection and by increasing the competitiveness of the crop with high sowing rates and narrow row spacings, the combined techniques did not reduce the ryegrass population down to commercially acceptable levels. The amount of seed produced by 150 ryegrass plants per meter will be significant and will lead to problems in following years.

Highest yields were obtained for all three crops when sown at 90 kg/ha. There was no change in yield when the crop was sown at 120 kg/ha. .

COMMERCIAL PRACTICE

Sowing rates at a minimum level of 90kg/ha and sowing at row spacings no wider than 23cm (9 inches) resulted in highest yields and lowest ryegrass populations. Barley was more successful in reducing ryegrass numbers compared to wheat.

In situations with high ryegrass seed banks the combined techniques of increased sowing rate and sowing with narrow rows are insufficient to hold ryegrass numbers at acceptable levels. Other practices, in combination with competitive crops, are required for acceptable levels of ryegrass control. (Refer to 1998/99 BCG Manual).