Canopy Management Evaluation in Canola 2008

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ABSTRACT

Neither canola yields, or seed quality were affected by cultivar choice, nitrogen timing or seeding rate in this trial conducted at Inverleigh, Southern Victoria, in the 2008 season.

The Clearfield hybrid 46Y78® produced significantly more dry matter than the Triazine Tolerant open pollinated cultivar Marlin® when assessed from green bud to pod set.

Planting populations between 20 – 80 plants/m^2 did not translate to increased seed yield, though again when assessed at yellow bud and pod set dry matter production was increased as plant population was increased from 20-30 plants/m^2 to 45-50 plants/m^2.

Upfront nitrogen deep banded at 50kgN/Ha was found to significantly increase dry matter production across both varieties and planting populations, when compared to in-crop applications applied at yellow bud.

Dry matter advantages of 1-2 t/ha derived from upfront nitrogen did not translate to increased seed yield in this trial.

The growing season at Inverleigh in 2008 was a decile 1, suggesting that yields that were achieved were in the lower range for typical regional potential.

INTRODUCTION

The research presented in this paper is part of a larger national canopy and disease management project, has the underlying objectives of defining whether the benefits of canopy management principles in cereals can be applied to autumn sown canola in the HRZ of southern Australia. This trial examines how two different cultivars (the Clearfield hybrid 46Y78® and non-hybrid TT Marlin®), three different planting populations & four different nitrogen timings, influence the structure of the canola crop canopy. Impacts of treatments were assessed in terms of crop structure, yield and quality.

The individual objectives within this trial were as follows:

- To determine how nitrogen timings developed for canopy management (based on stem elongation timings) apply to canola.
- To establish whether the interaction of hybrid and conventional varieties interact differently with plant population and N timing.

MATERIALS AND METHODS

Cultivars

Marlin TT (Conventional) and 46Y78 (Clearfield Hybrid)

Nitrogen timing

No nitrogen (0-60cm profile N across site was 35.1mg/kg or 307kgN/ha)
50 kg/ha N Seedbed
50 kg/ha N YellowBud
50:50 split between seedbed & GreenBud (25kg/ha N at each timing)

Seed Rates & Established Plant Populations

40 Seeds/m2 or 2kg/ha - (Marlin 22plants/m2 & 46Y78 30 plants/m2)
80 Seeds/m2 or 4kg/ha - (Marlin 45plants/m2 & 46Y78 52 plants/m2
120 Seeds/m2 or 6kg/ha - (Marlin 68plants/m2 & 46Y78 78 plants/m2

RESULTS AND DISCUSSION

The Clearfield hybrid 46Y78 produced significantly (p=0.05) more dry matter than the TT cultivar Marlin when assessed at green bud, yellow bud and pod set (Figure 1). Variety choice and nitrogen timing produced no statistical difference (p=0.05) in canola seed yields (Figure 1 & 2), however, nitrogen timing did result in significant differences in dry matter production (Figure 2). By the yellow bud and pod set growth stages, the upfront nitrogen treatments produced between 1 -2 t/ha more dry matter than the nil control. At pod set the later timed nitrogen application at yellow bud had produced significantly more dry matter than the nil N but was still approximately 1 t/ha inferior to the seedbed N treatment.

It was also found that seeding rate and resultant plant populations produced no significant difference in yield (Figure 3). Dry matter production was increased when plant population was increased from 20-30 plants/m^2 (40 seeds/m2) to 45 -50 plants/m2 (80 seeds/m^2), however, the difference was not significant (Figure 3) and was proven not to be a significant advantage. Variety had no significant effect on seed quality (Figure4); however 46Y78 was found to have a significantly greater plant establishment than Marlin when averaged across all seeding rates.

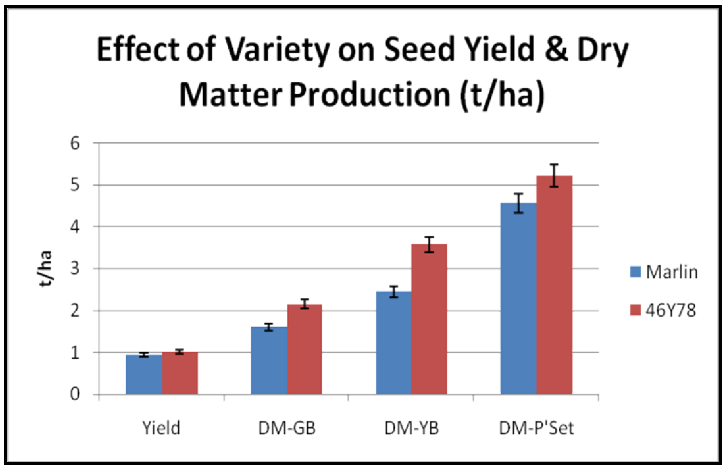

Fig. 1. Effect of Variety on Seed Yield & Dry Matter Production (t/ha) – mean of 3 seed rates and 4 nitrogen treatments.

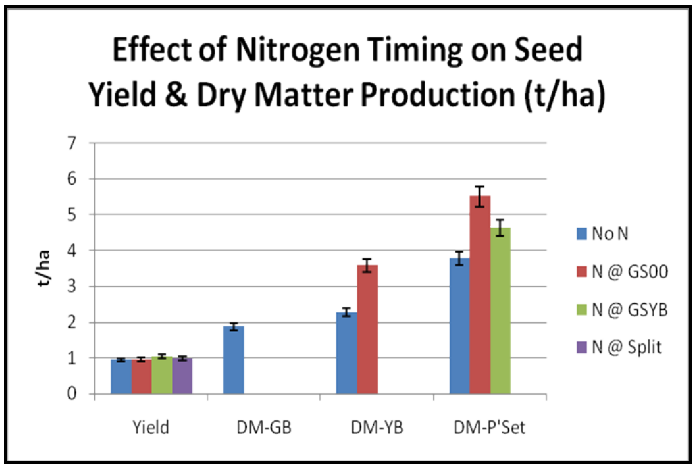

Fig. 2. Effect of Nitrogen Timing on Seed Yield & Dry Matter Production (t/ha) – mean of 3 seed rates & 2 varieties.

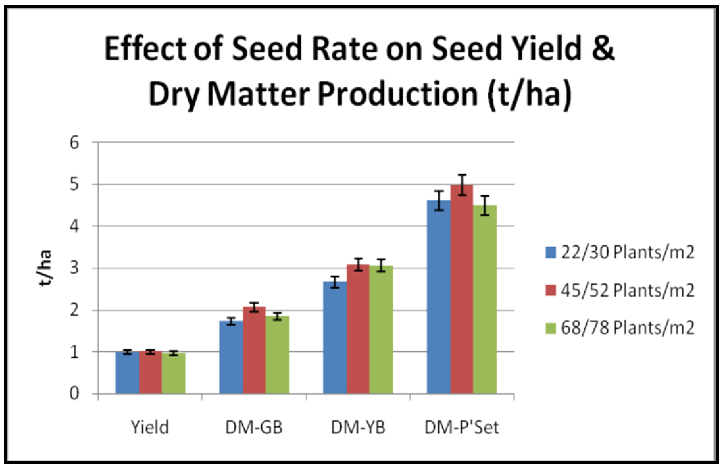

Fig. 3. Effect of Seed Rate on Seed Yield & Dry Matter Production (t/ha) – mean of 4 nitrogen treatments.

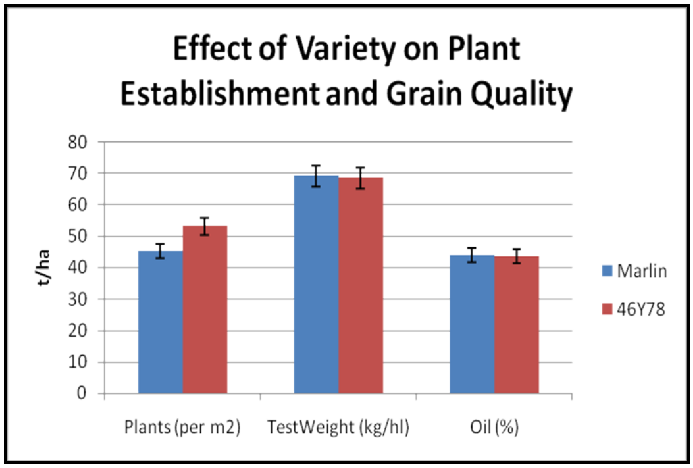

Fig. 4. Effect of Variety on Plant Establishment (plants/m2) and Seed Quality (test weight kg/hl & oil content).

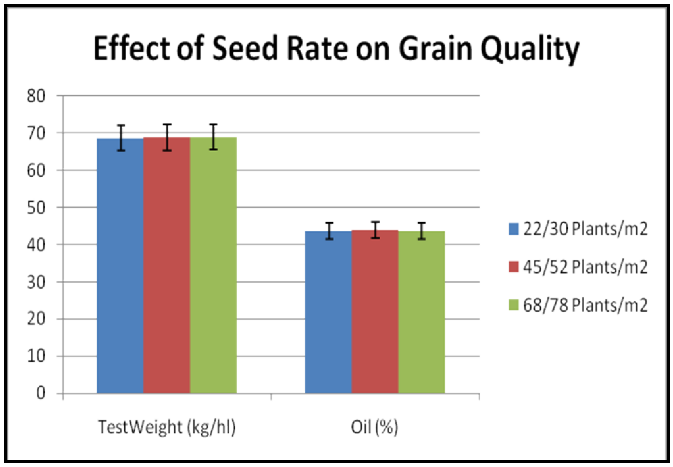

Fig. 5. Effect of Seed Rate on Grain Quality (test weight kg/hl & oil content).

Figure 5 and 6 demonstrate that there were no significant differences in seed quality with regard to seeding rate or nitrogen timing. Plant establishment was found not to be affected by nitrogen timing (Figure 6).

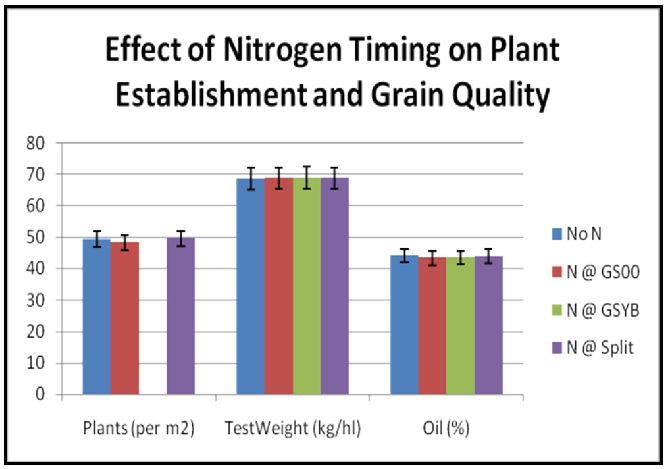

Fig. 6. Effect of Nitrogen Timing on Plant Establishment (plants/m2) and Seed Quality (test weight kg/hl & oil content).

CONCLUSIONS

In a decile 1 climatic scenario this season, established plant populations of 20 - 80 plants/m^2, produced no significant difference in yield or quality. Similarly, neither cultivar or nitrogen timing had a significant effect on yield or seed quality. The hybrid canola cultivar 46Y78 did achieve a greater plant establishments and dry matter production compared to Marlin, however, again this did not translate into a significant yield advantage.

With this overall trial outcome for 2008, farmers should be confident that reduced seeding rates used across both triazine tolerant and hybrid seed varieties can yield to their district potential when compared to traditionally used higher seeding rates. Up front nitrogen did produce large amounts of biomass compared to the nil nitrogen treatment, but did not translate to increased seed yield. This trial will continue for a further two seasons to fully evaluate these canopy management principles in the cooler HRZ canola production regions of SW Victoria.

ACKNOWLEDGEMENT

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