

**DAW00227**

## Tactical Break Crop Agronomy in Western Australia

### 13CH22 – Plant density in low rainfall canola

#### Authors

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#### Location of trial

Mullewa RS annex

#### Summary (Key messages)

In stressed conditions canola yields and gross margins were reduced at plant densities above 20 plants/m<sup>2</sup>.

Despite being higher yielding and producing higher oil than CB Telfer TT, the higher seed costs of hybrid triazine tolerant variety Hyola 450TT resulted in lower gross margins.

Hybrid RoundupReady cultivar Hyola 404RR produced the highest yields and oil at Mullewa in 2013.

Despite higher upfront costs Hyola 404RR also produced the highest gross margins.

#### Background

Canola is now being grown in low rainfall areas. Primarily farmers choose open pollinated TT varieties. However breeding companies are favouring the development of hybrids in order to pay for breeding services. Hybrids provide growers with more vigorous seedlings, comparatively better plant establishment and generally higher yields. However growers have to purchase new seed of hybrid varieties every year in order to get these potential yield benefits. Seed for hybrid canola is 25 times more expensive than the seed of open pollinated canola. Inevitably if farmers are forced into hybrids they will wish to minimise seed costs by sowing at low densities.

#### Aim

To investigate the plant density response to yield and oil content of TT and RR hybrid canola in comparison with open-pollinated canola

#### Trial Details

- Property: Mullewa RS Annex
- Growing Season rainfall (GSR) = 171mm 74% of long term mean (1975-2012), GSR + stored water (estimate) = 190mm, 71% of long term mean.
- Soil type: Loamy sand (organic carbon 0.35%)
- Crop / variety: Canola
- Paddock rotation Wheat 2012, Lupin 1 t/ha 2011, Wheat 2010, Lupin 2009, Wheat 2008
- Fertiliser (kg/ha) 70 kg/h of Agstar Extra at seeding. 60 kg/ha of Urea, 400 kg/ha of gypsum (17% Ca, 14% S) topdressed over whole site 14/5/13.

## Treatment detail

- 36 treatments:
  - 2 HT - Herbicide tolerant canola (TT and RR)
  - 4 Cultivar
  - TT– OP = CB Telfer TT and Hybrid = Hyola 450TT
  - RR - OP = GT Viper, Hybrid = Hyola 404 RR
  - 8 densities of 5, 10, 15, 20, 30, 40, 60, or 80 plants/m<sup>2</sup>
  - 3 replicates

## Assumptions used in Gross Margins

Oil bonus +/- 1.5% per unit of oil (%) either side of 42%, with no oil ceiling, Non treatment costs \$147/ha.

RR costs – Hyola 404RR seed \$31/kg, GT Viper \$25/kg, herbicides \$28/ha and grain worth \$479/t (CBH Pool Geraldton 5/11/13).

TT costs – Hyola 450TT seed \$24/kg and CB Telfer TT \$2/kg which assumes farmers purchase new seed every 3 years at \$11/kg and bulk up seed on 25% of their canola program. Herbicides \$47/ha and grain worth \$499/t (CBH Pool Geraldton 5/11/13).

## Results

Conditions at Mullewa in 2013 after seeding were tough and crops were struggling with only 3 mm falling in June. Rainfall finally arrived in the second week of July but Mullewa still received less than 50% of average rainfall in July. In the dry conditions there was @40% plant death, with high density treatments being more affected. Dry matter at 100% flowering on the 1<sup>st</sup> of August indicated that low density treatments had fared the best in the dry conditions and produced 2 to 3 t/ha compared to less than 2 t/ha for densities above 40 plants/m<sup>2</sup> (targets above 60). Aphids were also problematic in the NAR and in particular at Mullewa, where they attacked stressed plants. Consequently high density plots appeared to be colonised to a greater extent than lower density plots.

Conditions improved by August and above average rainfall in September and October helped the canola recover and produce biomass in the range of 1 to 5 t/ha and grain yields in the range of 300 to 700 kg/ha.

Hybrids performed surprisingly well at Mullewa in 2013. Hyola 404RR was the highest yielding RR variety at 637 kg/ha, and Hyola 450TT the highest yielding TT variety. We might have expected the earliest flowering variety CB Telfer TT to have performed better than Hyola 450TT but perhaps the extended spring helped Hyola 450TT more than CB Telfer TT. Similarly the hybrid varieties produced the highest oil %. However the grain yields of Hyola 450TT were not high enough to cover the high seed costs, such that CB Telfer TT despite being lower yielding and producing lower oil produced similar low gross margins as Hyola 450TT. The RR hybrid's grain yield was sufficiently high to cover its seed costs and it produced higher gross margins than the RR OP variety GT Viper which performed particularly poorly.

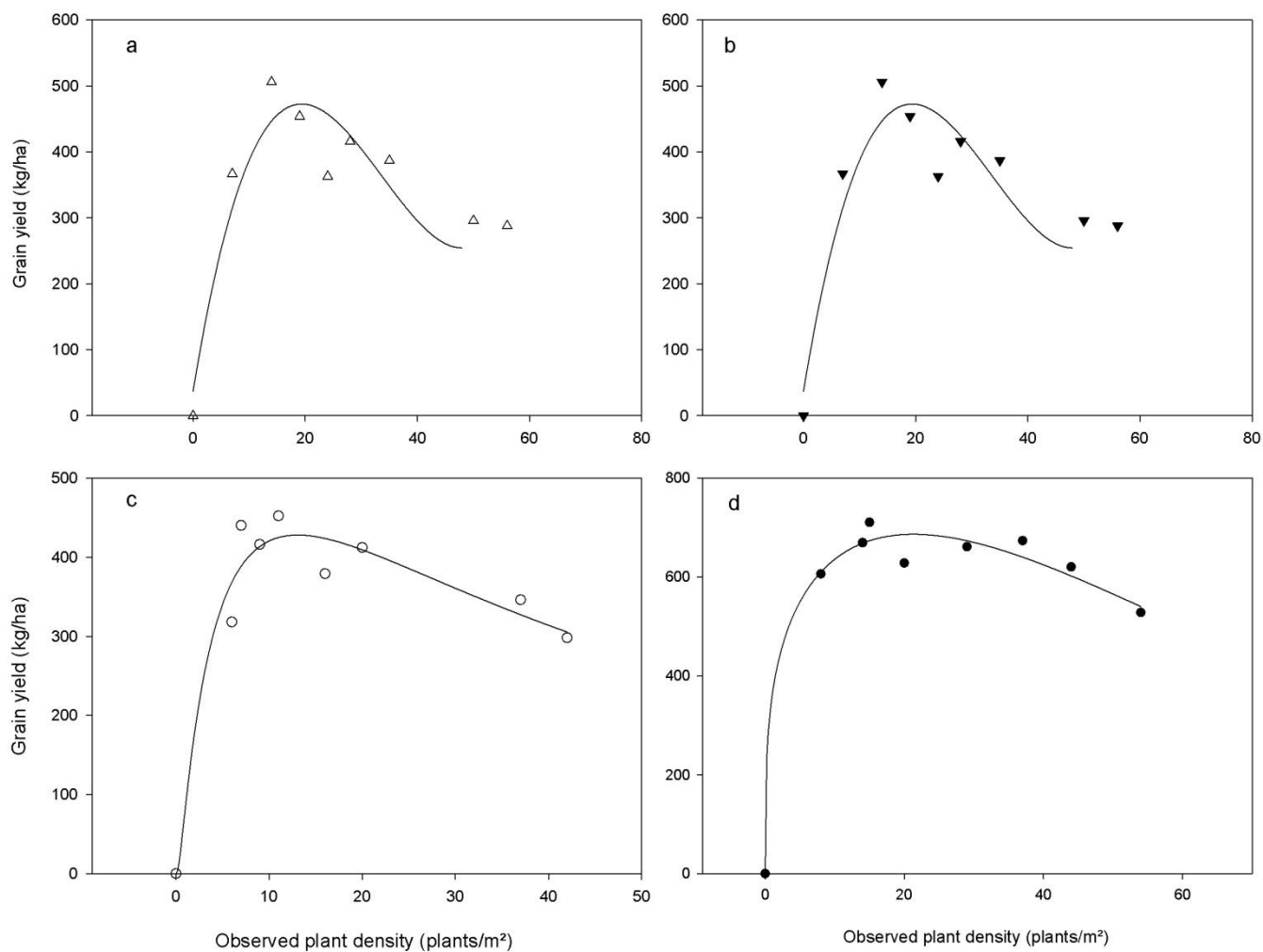


Figure 1 More than 20 plants/m<sup>2</sup> at Mullewa in 2013 reduced the grain yield of canola, (a) CB Telfer TT, (b) Hyola 450TT, (c) GT Viper and (d) Hyola 404RR

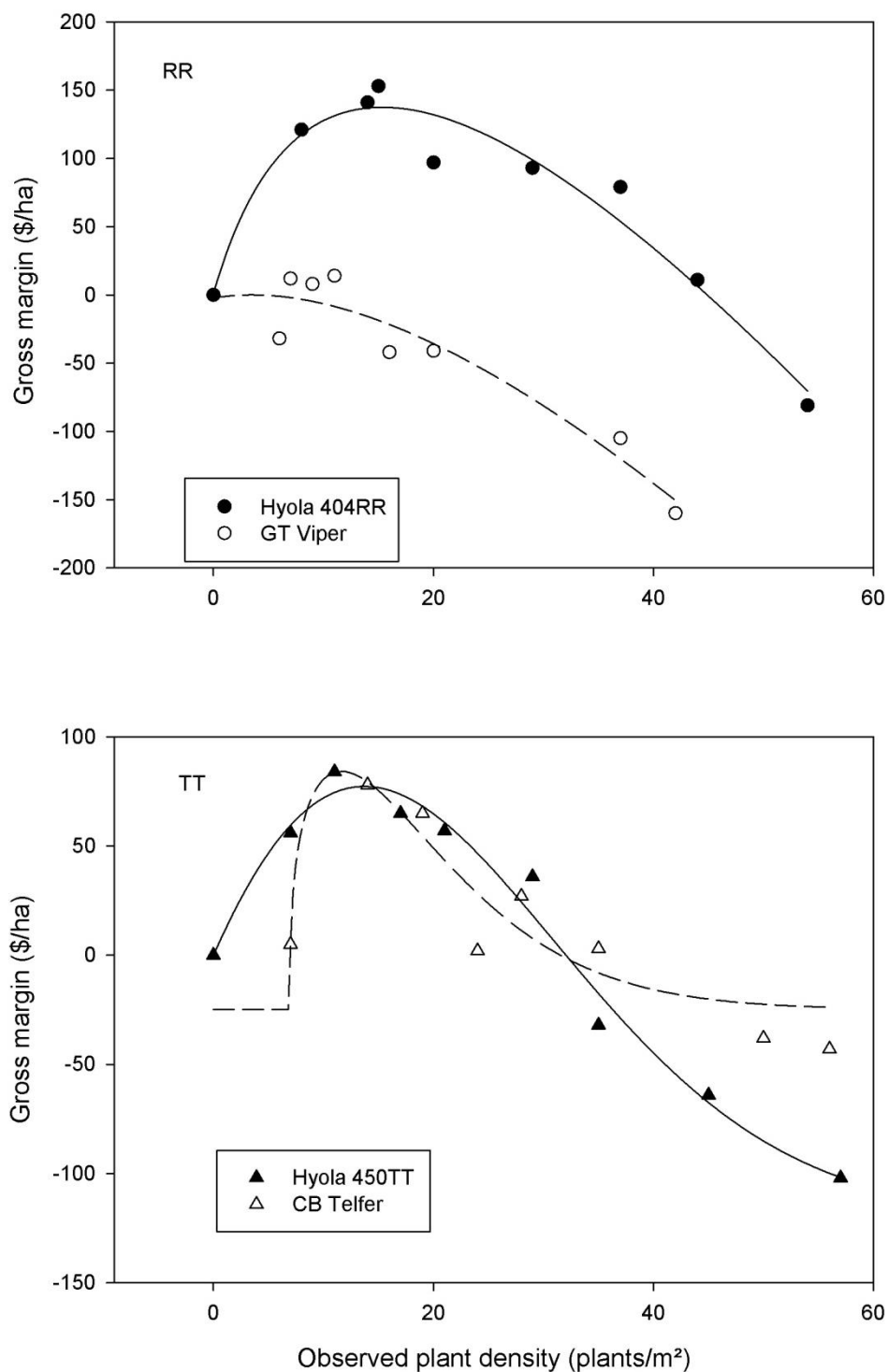


Figure 2: More than 10 to 15 plants/m<sup>2</sup> at Mullewa in 2013 reduced the gross margins of RR and TT canola

## Conclusion

All varieties responded similarly to plant density. Grain yield peaked at a less than 20 plants/m<sup>2</sup> and increases in plant density above 20 plants/m<sup>2</sup> produced either similar yields and gross margins or reduced yield and gross margins.

## Acknowledgements

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