Department of Primary Industries and Regional Development
GOVERNMENT OF WESTERN AUSTRALIA

Oat agronomy trial report (Variety agronomy) – Yerecoin 2018

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KEY MESSAGES

・New variety Bilby (breeding line 06204-16) out-yielded Carrolup (by 0.3 t/ha), but did not out-yield Williams, and was between Williams and Carrolup in grain quality.

・Similar to 2017, a mild finish to the growing season meant all varieties met Oat1 quality specifications, and reduced the response of varieties to changes in plant density and applied nitrogen.

Introduction

This trial is the second year of the trial series comparing the performance and response of two breeding lines (03198-18, named Kowari, and 06204-16, named Bilby) and two benchmark varieties (Carrolup and Williams) to changes in nitrogen and plant density in medium rainfall environments.

Methods

Similarly to 2017, in 2018, three sites were established at Yerecoin, Brookton and Lake Grace, Yerecoin data is presented in this report. The seed rate (kg/ha) to establish the four target plant densities of 80, 160, 240 and 320 plants/m^2 varied for each variety and was adjusted based on their grain weight and germination percentage. Plant establishment was determined at 4 weeks after seeding and ranged from 82 to 388 plants/m^2. The four nitrogen (N) rates were 0, 30, 60, 90kg N/ha. Basal fertiliser comprised of CSBP Super CZM which was treated with Uniform (40ml/L) and banded below the seed at 120 kg/ha.

Site and environment

Growing season rainfall (May-October) was 239mm at Calingiri (nearest weather station) (Table 1). The site mean grain yield was 3.61 t/ha. Grain quality of all treatments was within the Oat1 limits (hectolitre weight ≥51kg/hL and screenings ≤10%).

Table 1. Location, soil attributes, growing season rainfall, seeding dates and site mean yields for the six trials.

Site No.	Location	Organic C (%)	Total N (kg N/ha)	pH $CaCl_2$ (0-10cm)	Soil type	May-Oct rainfall (mm)	Seeding date	Site mean yield (t/ha)
18WH11	Yerecoin	0.97	0.09	6.3	Brown loamy earth	239	22nd May	3.61

Results

Grain yield

Varieties differed in their grain yield. Williams (3.8 t/ha) consistently out-yielded Carrolup (3.4 t/ha) and Kowari (3.6 t/ha), although Williams did not out-yield the new variety Bilby (breeding line 06204-16) (3.7 t/ha) (Figure 1). Varieties did not differ in their response to nitrogen or plant density.

Applied nitrogen (N) had a greater influence on grain yield than plant density (Figure 1a and b). Increasing applied N increased grain yield by **1.1 t/ha** when applied N increased from 0 to 90kg N/ha, or **0.6 t/ha** when applied N increased from 30 to 90kg N/ha. Each nitrogen treatment had a significant effect on grain yield (0, 30, 60, 90 kg N/ha).

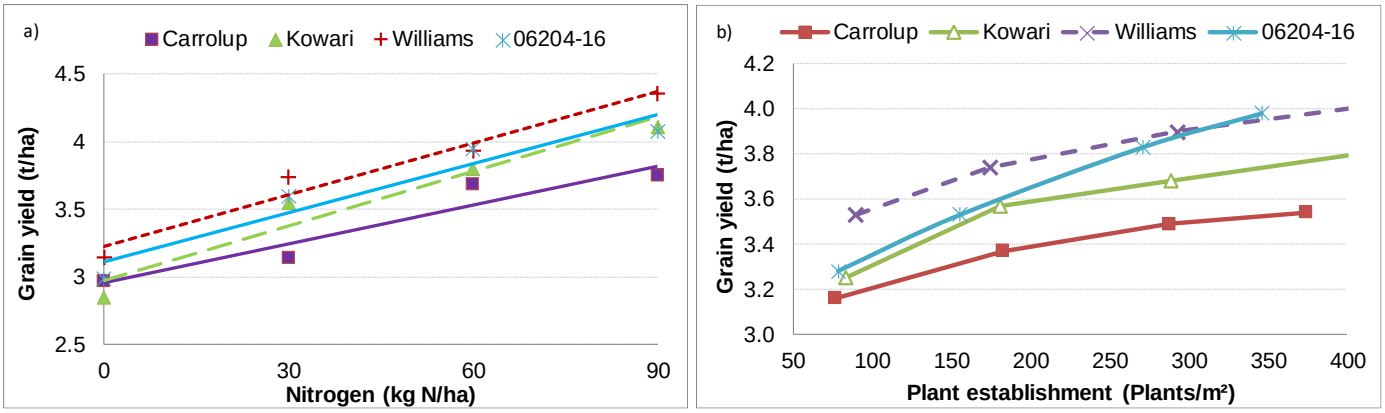

Figure 1. Grain yield of four oat varieties in response to changes in a) applied nitrogen (kg N/ha) Lsd (P = 0.05) = 0.2 t/ha, and b) plant density (plants/m²) (no significant difference between varieties) at Yerecoin.

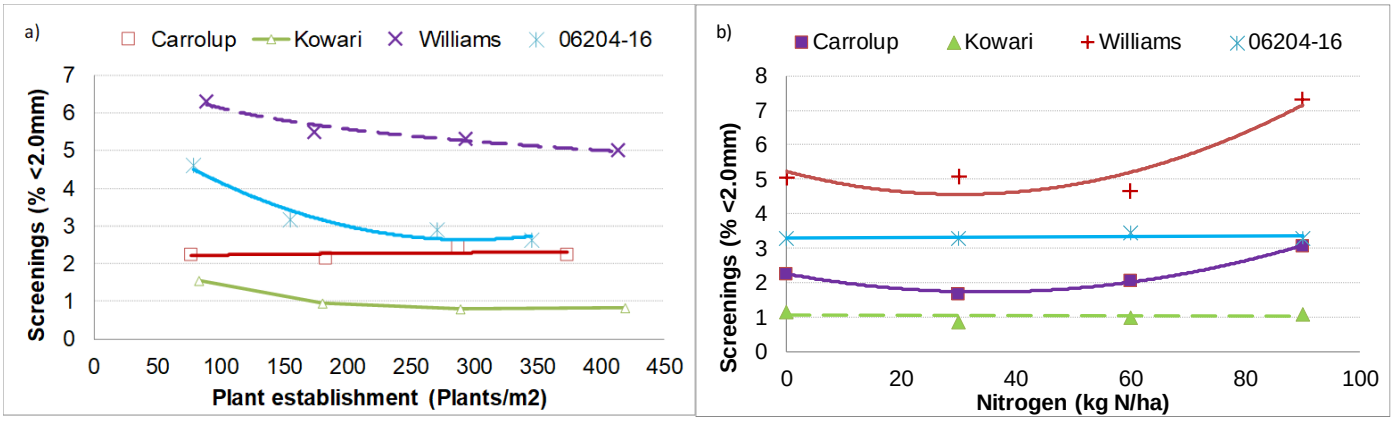

Figure 2. a) Screenings (%< 2.0mm) response to changes in plant density (plants/m²) Lsd (P = 0.05) = 0.7%, and b) to applied nitrogen (kg N/ha) at Yerecoin Lsd (P = 0.05) = 1%.

Grain quality

All varieties met the Oat1 minimum hectolitre weight of 51kg/hL and maximum screenings percent of 10%. Carrolup had significantly higher hectolitre weight than the other three varieties, which is similar to its performance in 2016 and 2017 trials (Troup et. al 2017, 2018), which also had cool conditions at the end of the growing season. Changes in plant density and applied nitrogen had no significant effect on hectolitre weight in 2018.

At Yerecoin, the screenings percent was most influenced by variety selection (Kowari had the lowest screenings of 1%, while Williams had the highest at 5.5%). Plant density and nitrogen also influenced screenings percent, albeit to a lesser extent. Similar to 2017, the new variety Bilby (breeding line 06204-16) was more responsive to increasing plant density (reducing screenings percent) from 80 plants/m² than the other varieties (Figure 2a), however **results do not suggest that growers need to change from the current recommended plant density of 200-240 plants/m²**. Additionally, applying greater than 60kg N/ha significantly increased screenings percent (Figure 3b).

References

Troup GM (2018). Oat Agronomy Trial Report – Yerecoin 2017.

Troup GM, Seymour M, and Malik R (2017). Variety specific agronomy requirements of recently released oat varieties; Durack, Banister and Williams. 2017 GRDC Research Updates, Perth, WA.

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