South African Barley Breeding Institute

SABBI

PRODUCTION PRACTICES FOR THE MALTING BARLEY VARIETY COCKTAIL UNDER IRRIGATION

FINAL REPORT ON PLANTING DENSITY TRIALS

2008-2010 SEASONS COMBINED

During the 2008 winter season the Agricultural Services Department in the irrigation areas decided to investigate alternative production practices for the cultivation of the malting barley variety Cocktail.

AGRICULTURAL SERVICES: IRRIGATION

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2008-2010 SEASONS COMBINED

DISTRIBUTION: SABMaltings - Sec Team
Agriculturalist: Kimberley
Agricultural Advisor: Taung
Program Leader: SABBI
Breeder: SABBI

COMPILED BY: Burrie Erasmus
Agriculturalist: Projects – Hartswater

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Terms of Reference

During the 2008 winter season the Agricultural Services Department in the irrigation areas decided to investigate alternative production practices for the cultivation of the malting barley variety Cocktail.

The main objective was to evaluate and establish optimum planting density guidelines for the high yielding variety Cocktail. The trial would run over a minimum period of three years per locality.

Trials were planted under overhead pivot sprinkler systems in the Douglas and Hartswater areas.

Procedure for Planting Density trial

Trials were layout using a complete randomized block design with three replications.

Plot sizes were 6m x 1.52m. (9.12m²)

Seed planting densities were:

- 60 kg/ha
- 80 kg/ha
- 100 kg/ha
- 120 kg/ha
- 140 kg/ha

Previous crop rotation during summer seasons was Maize at both the Douglas and Hartswater locality.

Normal crop protection and irrigation practices were followed at both trial localities during the growing season.

Both trials were planted with a Wintersteiger plot planter and harvested with a Hege 125C plot harvester.

Samples were weighed and quality analysed by SABBI.

Data were analyzed by means of Agrobase statistical software, using the Analyses Of Variance method.

Analyses of variance were performed on a least significant difference (LSD) level at a 90% confidence interval.

Significant differences are represented by alphabetical letters in the following order:

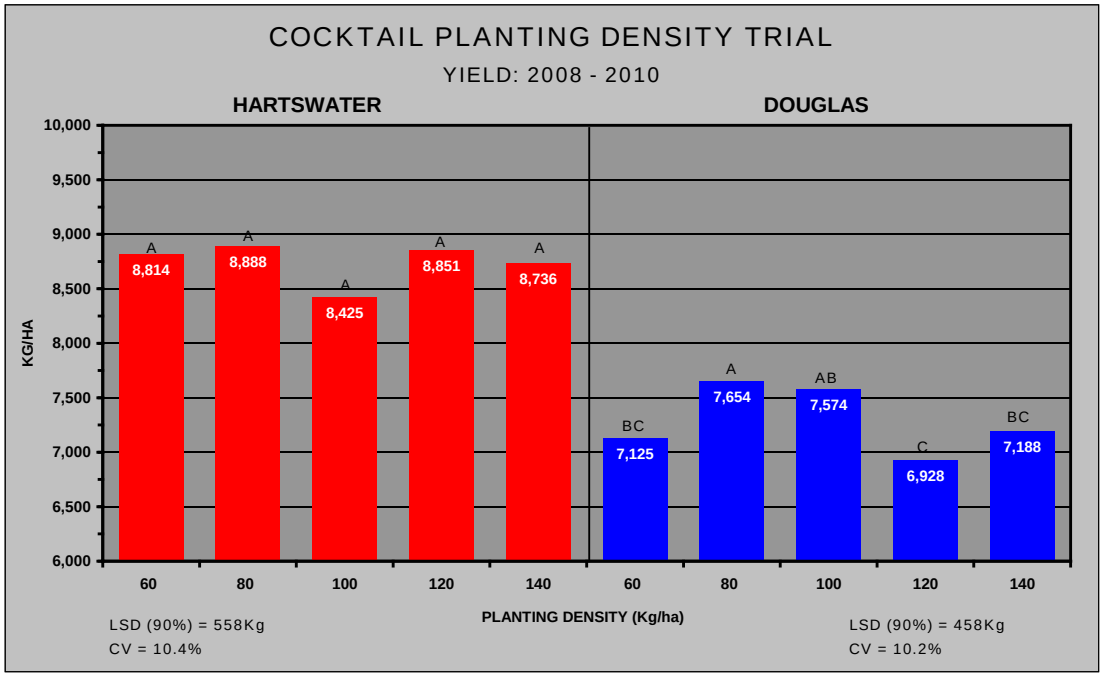
- Letters A – Z, with the letter A representing highest significance.
- The treatments containing a similar alphabetic letter do not differ significantly.

Analyses to be reported for the 2008 to 2010 combined data include the following:

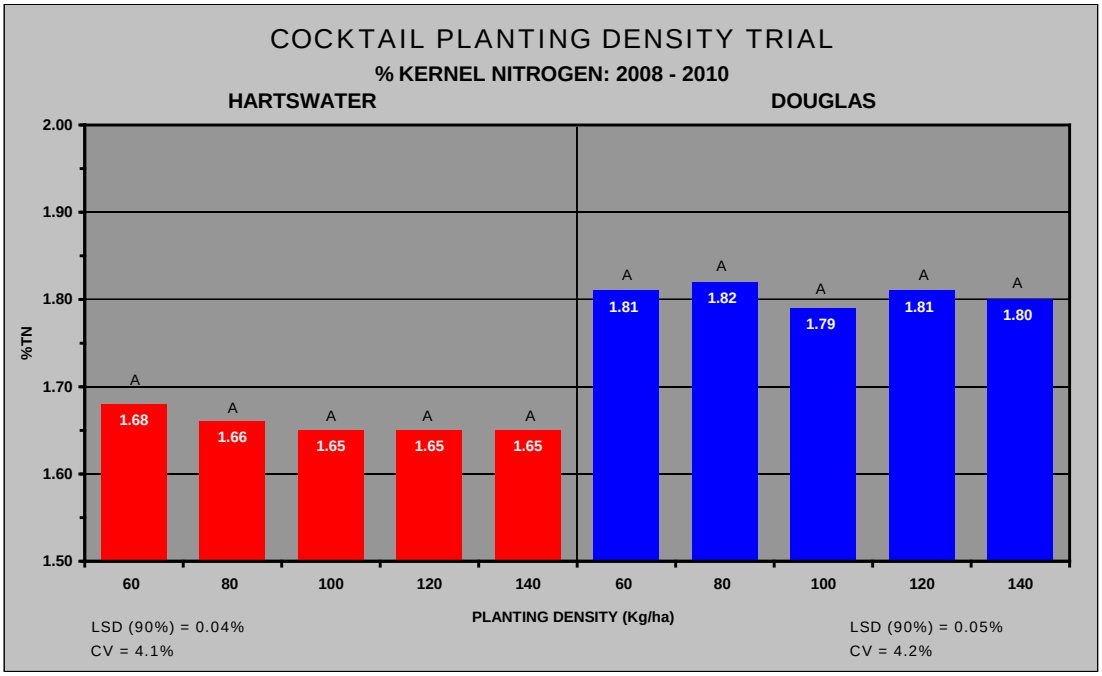
- Yield (kg/ha)
- Kernel Nitrogen Content (TN; Percentage)
- Kernel Plumpness (Percentage)
- Screenings (Percentage)
- Gross Income Less Seed Cost (Rand per hectare)

Findings:

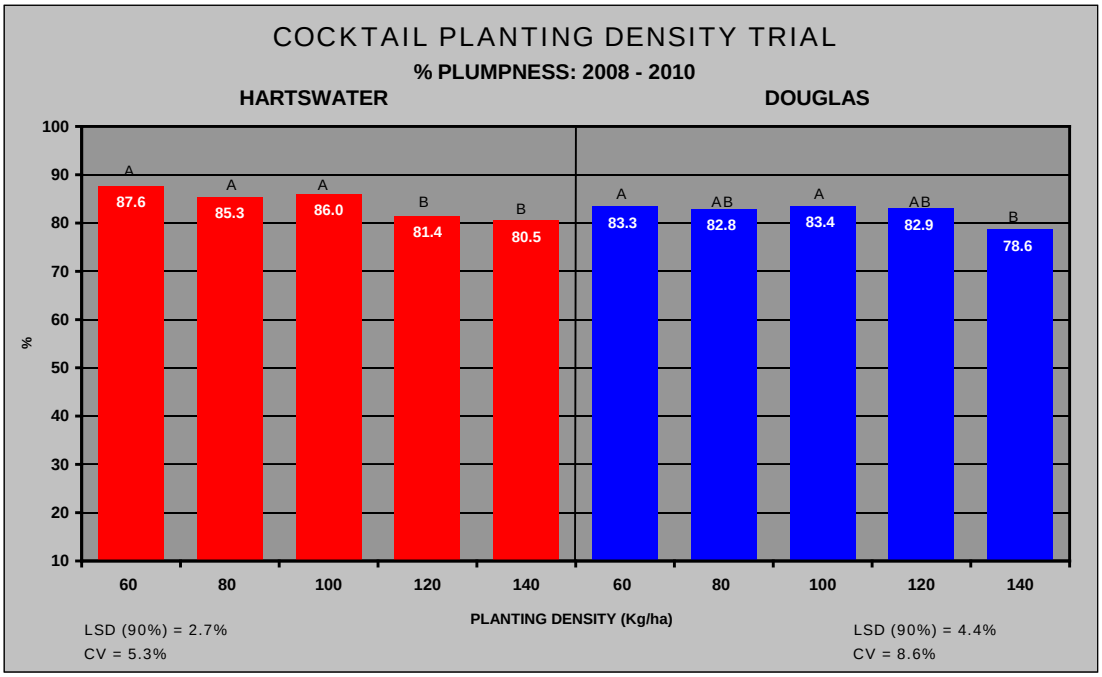
Yield: 2008 – 2010 Combined - Average per treatment



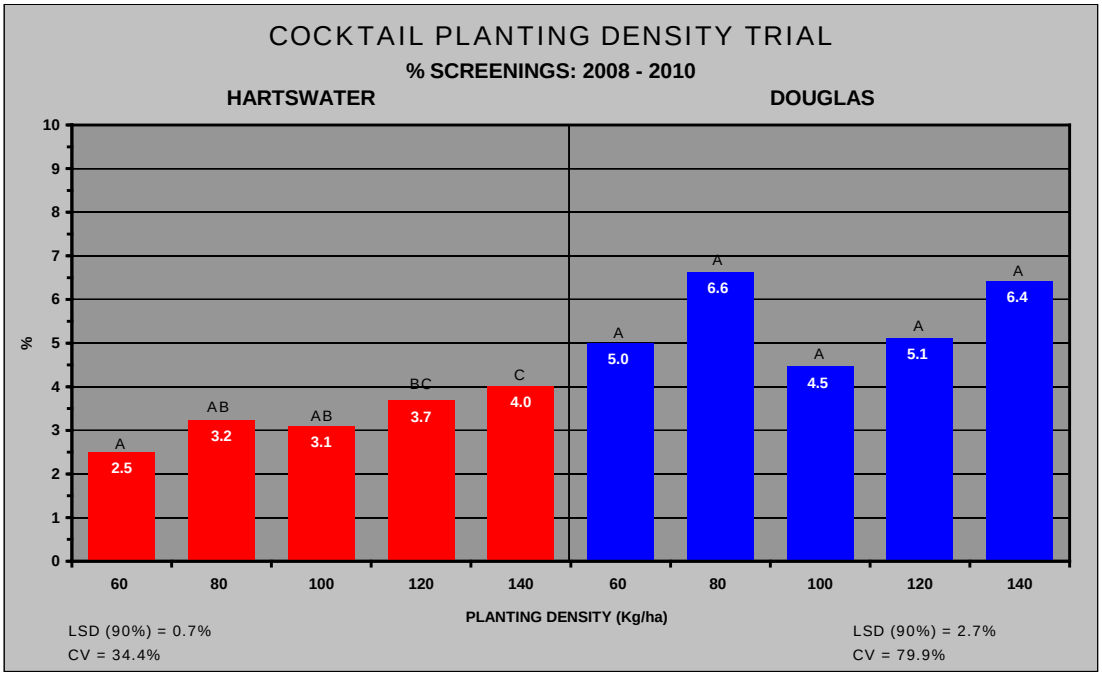
%TN (Kernel Nitrogen)



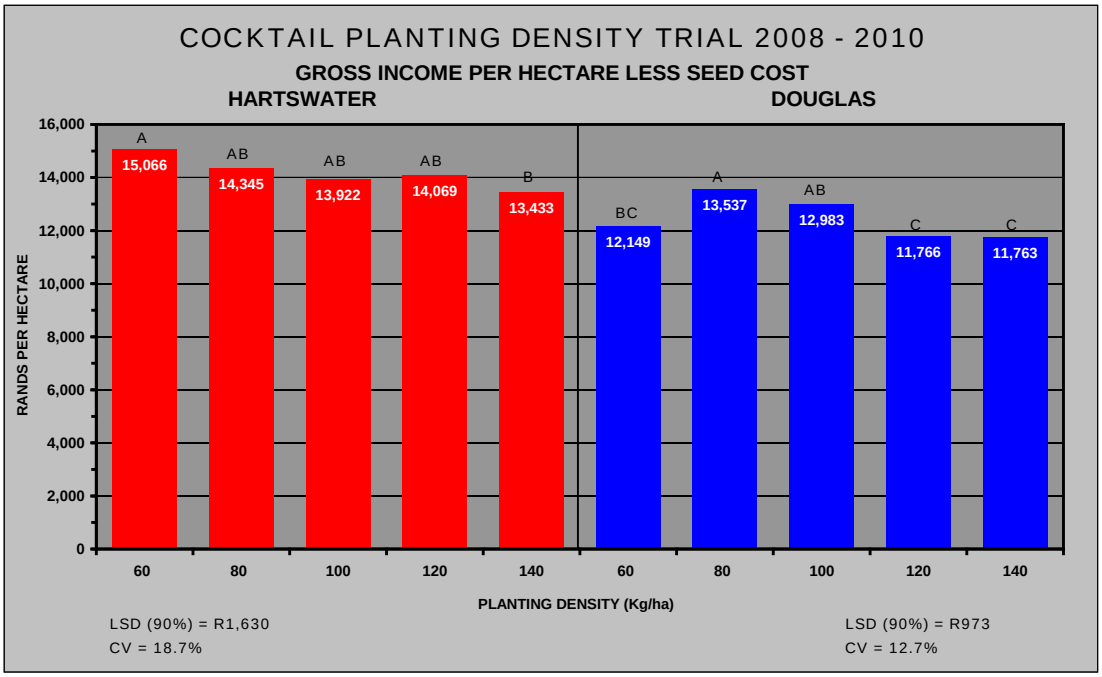
% Plumpness (>2.5mm)



% Screenings (<2.2mm)



Gross Income Margin per hectare less seed cost



Conclusions: (For the three years combined data)

Effect on Yield:

- **Douglas locality**
  - The highest yield was obtained with a planting density of 80 kg/ha. This was significantly higher than the yield obtained with the 60, 120 and 140 kg/ha planting density treatments, but not significantly higher than the 100 kg/ha treatment.
- **Hartswater locality:**
  - The highest yield was obtained with a planting density of 80 kg/ha. This was however not significantly higher than the yield obtained with the 60, 100, 120 and 140 kg/ha planting density treatments.

Effects on Kernel Nitrogen content: (%TN)

- **Douglas locality:**
  - The highest %TN was obtained with a planting density of 80 kg/ha. This was however not significantly higher than the %TN obtained with the 60, 100, 120 and 140 kg/ha planting density treatments.
- **Hartswater locality:**
  - The highest %TN was obtained with a planting density of 60 kg/ha. This %TN was however not significantly higher than obtained with the 80, 100, 120 and 140 kg/ha planting density treatments.

Effects on % Plumpness:

- **Douglas locality:**
  - The highest % Plumpness was obtained with a planting density of 60 kg/ha. This % Plumpness was significantly higher than obtained with the 140 kg/ha planting density treatments, but not significantly higher than the 80, 100 and 120 kg/ha planting density treatments.
- **Hartswater locality:**
  - The highest % Plumpness was obtained with a planting density of 60 kg/ha. This % Plumpness was significantly higher than obtained with the 120 and 140 kg/ha planting density treatments, but not significantly higher than the 80 and 100 kg/ha planting density treatments.

Effects on % Screenings:

- **Douglas locality:**
    - The lowest % Screenings was obtained with a planting density of 100 kg/ha. This % Screenings was however not significantly lower than obtained with the 60, 80, 120 and 140 kg/ha planting density treatments.
- **Hartswater locality:**
    - The lowest % Screenings was obtained with a planting density of 60 kg/ha. This % Screenings was significantly lower than obtained with the 120 and 140 kg/ha planting density treatments, but not significantly lower than the 80 and 100 kg/ha planting density treatments.

Effects on Gross Income Less Seed Cost:

- **Douglas locality:**
    - The highest Gross Margin per hectare was obtained with a planting density of 80 kg/ha. This Gross Margin per hectare, was significantly higher than obtained with the 60, 120 and 140 kg/ha planting density treatments, but not significantly higher than the 100 kg/ha planting density treatment.
- **Hartswater locality:**
    - The highest Gross Margin per hectare was obtained with a planting density of 60 kg/ha. This Gross Margin per hectare was significantly higher than obtained with the 140 kg/ha planting density treatment, but not significantly higher than the 80, 100 and 120 kg/ha planting density treatment.

Recommendations:

- From the trial data of the three years combined, it can be observed that a planting density of **80 kg/ha** will provide the highest yield, optimum quality and gross income for the variety Cocktail in the **Douglas** area.

- From the trial data of the three yeas combined, it can be observed that a planting density of **60 kg/ha** will provide the highest yield, optimum quality and gross income margin for the variety Cocktail in the **Hartswater** area.
- It is recommended that both trials are to be redesigned to include lower planting density treatment rates of **40, 50, 60, 70** and **80 kg/ha**. These new trials will then be continued for at least another three seasons starting from 2011.