# Annuello seeding rates

The aim of this trial was to investigate the effects of crop establishment density on yield and grain quality of Annuello wheat.


## Summary

In 2003 at the Berriwillock site, higher seeding rates resulted in higher yields (2.6 to 2.9t/ha) but had no affect on screenings (all sowing treatments less than 3%).

Numerous BCG-WFS seeding rate trials since 1997 have found that higher seeding rates often resulted in higher yields and better quality, never resulted in lower yields or reduced quality and always resulted in more competitive crops (fewer weeds).


## Background

Work undertaken by the BCG-WFS since 1997 has shown that:

- Increasing sowing rates usually increases yield
- Increasing sowing rates can reduce screenings, and
- Increasing sowing rates makes the crop more competitive against weeds

In all the trials undertaken, higher seeding rates never resulted in decreased yields or higher screenings.

The trial work since 1997 included many different varieties. Annuello, as a new wheat variety, had not been included in the previous trial work.

## Methods

This trial was conducted using a fully replicated (x4) randomised block design at the BCG Northern site (Berriwillock). Annuello wheat was sown at four sowing rates on May 15 with 50kg/ha Mallee Mix 1 and 60kg/ha EzyZinc.

Triflur 480® at 0.6L/ha was applied prior to sowing and Lontrel® at 100ml/ha on June 11. The site was relatively weed-free.

## Results

Higher seeding rates (at 84kg/ha or higher) resulted in significantly higher yield compared to the lower seeding rates. The levels of screenings were low (less than 3%) and were not affected by seeding rate. Protein levels were above 13% due to the high level of mineral N in the soil at sowing (145kg/N to a depth of 1 m) and were also not affected by seeding rate.

Table 1. The influence of sowing rate on grain yield and quality (gross income was calculated on yield and quality delivered Berriwillock).

| Target sowing rate (plants/m$^2$) | Equivalent seeding rate (kg/ha) | Actual plant establishment (plants/m$^2$) | Yield (t/ha) | Screenings (%) | Protein (%) | Gross income ($/ha) |
|---|---|---|---|---|---|---|
| **100** | 42 | 105 | 2.6 | 2.6 | 13.7 | 499 |
| **150** | 63 | 138 | 2.6 | 2.9 | 14.0 | 499 |
| **200** | 84 | 182 | 2.9 | 1.9 | 12.9 | 550 |
| **250** | 126 | 213 | 2.9 | 2.8 | 13.4 | 551 |
| | | **LSD (5%)** | **0.2** | **NS** | **NS** | |

## Interpretation

A germination rate of approximately 90% was achieved (loss of 10%) – this has to be taken into account when calculating seeding rate. Increasing seeding rate significantly increased yield – supporting results from previous work undertaken by the BCG. Screenings were low and there were no differences between the four seeding rates.

A notable aspect of this trial was that there was a $50/ha difference in gross income achieved between sowing at 150 plants per square metre and 200 plants per square metre. These extra dollars gained must start to influence sowing rate decisions. Based on a seed cost of $200/t, to sow at 200 plants there is only an extra seed cost of $4.20/ha, over and above the seed cost of sowing at 150 plants per square

metre. This extra $4.20/ha cost can lead to a gain of $46.25/ha. Over a 250ha paddock this is an extra $11562 that potentially could be realised!

## Commercial Practice

After numerous trials over 6 years and in paddock experience, it is now clear that higher seeding rates in wheat can increase yield and decrease screenings. In all the trial work undertaken there have been no situations where high seeding rates in wheat led to decreased yield or lower quality. This indicates that in most cases, by increasing seeding rates in wheat, there is an economic advantage to be gained. Only in very dry seasons is there no yield advantage (nor is there a yield penalty in dry seasons!).

Most importantly it is also well known that higher seeding rates do result in more competitive crops – the competitive effect on wild oats and other grass weeds has been well demonstrated by BCG work (see manuals from 1998/99 and 1999/00).

For the central Mallee, a plant establishment in wheat of at least 175plants/$m^2$ is required to optimise yield and quality. Grain weight will have a large impact on the seeding rate required to achieve this level of plant establishment (see Table 2).

Table 2. Seeding rate calculator based on grain weight, germination rate and plant density required.

| Variety | Estimated grain weight g/1000grains | Germination rate % | Sowing rate (kg/ha) required to achieve: 175pl/$m^2$ | 200pl/$m^2$ | 225pl/$m^2$ |
|---|---|---|---|---|---|
| **Yitpi / Frame** | 42 | 90 | 81 | 92 | 104 |
| **Other** | 35 | 90 | 67 | 77 | 87 |

A simple to use Excel spreadsheet which calculates the required sowing rate based on grain weight, germination rate and establishment is available from the BCG office.

## On-farm demonstration of seeding rates on two different varieties

During the 2003 the Boyle family (located 25km south-west of Birchip) undertook a farm demonstration of seeding rates using two varieties of wheat (Yitpi and Silverstar).

Plots were sown with a large scale airseeder into a cultivated seed bed, on June 4 (Yitpi) and June 10 (Silverstar). Harvest weights were determined with a weigh bin and grain samples were taken for quality analysis.

It was a very dry season with only 201mm of rain during the growing season (April to October).

There were no differences in yield, protein and screenings between the sowing rates on the two different varieties (Table 3). Grain yields were low (around 1.5t/ha) due to the very dry season and as expected in a dry year there are no benefits gained from higher seeding rates (also see the BCG-WFS manual for 2002-03).

Table 3. On-farm demonstration of seeding rates on two varieties of wheat.

| Sowing rate/ha | Variety | Yield t/ha | Protein % | Screenings % |
|---|---|---|---|---|
| 30 | Yitpi | 1.5 | 15.9 | 5.9 |
| 50 | Yitpi | 1.5 | 16.0 | 6.3 |
| 90 | Yitpi | 1.4 | 15.3 | 7.1 |
| 40 | Silverstar | 1.5 | 15.2 | 7.3 |
| 70 | Silverstar | 1.6 | 15.1 | 6.6 |