# 11. PULSE AGRONOMY TRIALS

## 11.1 BENEFIT OF IRRIGATION FOR HIGH VALUE GRAIN LEGUMES – SYMMONS PLAINS

**Location:** Symmons Plains

**Researchers:** Geoff Dean (TIAR)
Peter Johnson (TIAR)
Rob Howard (TIAR)

**Acknowledgements:** GRDC.
Thanks to Andrew Legro, Simon Munford and Brett Davey for assistance.

**Growing season rainfall:**
Broad beans (Apr-Nov): 489 mm
Marrowfat peas (Sep-Dec): 134mm

**Background:**
The grain legume project conducted by Tasmanian Institute of Agricultural Research (TIAR) has identified a number of grain legume crops with potentially high returns. In particular lupini beans (albus lupins), kabuli chickpeas, marrowfat peas, broad beans and large green lentils have shown excellent quality characteristics and promising yields. Trials were conducted to determine the potential benefits of irrigation.

For lupini beans and kabuli chickpeas, excess vegetative growth may be a potential problem. This is often to the detriment of seed size and given the importance of seed size, different timing of irrigation treatments were also evaluated. A timing of irrigation trial was also conducted on marrowfat peas to assess yield differences. (Not reported here).

**Aim:**
To determine yield and quality benefits from irrigation of high value grain legumes. Further studies will determine the most appropriate timing of irrigation.

**Methodology:**
Grain legumes
- lupini (cv Super Lupe)
- kabuli chickpea (cv Bumper)
- marrowfat pea (cv Midichi)
- broad bean (cv Aquadulce)
- green lentil (line 128/85)

Treatments were either irrigated (Netafim drip irrigation) or left un-watered. Buffer strips separated the treatments. Five replicates

**Sowing date:**
Lupini & broad beans -30 May 2003
Chickpeas, marrowfat peas, lentils -14 Oct 2003

**Harvest date:**
Broad beans -8 January 2004.
Marrowfat peas (-) irrigation – 23 Jan 2004
(+) irrigation – 5 Feb 2004

**Fertiliser:** 250kg/ha 4:13:7:9 + Mo

**Weed Control:** PSPE - Stomp 2l/ha,
*Broad beans:* PSPE Gesatop 2l/ha,
Fusilade 500ml/ha
*Marrowfat peas:* PSPE Sencor 450ml/ha,
Fusilade 500ml/ha

**Results and Discussion:**

Early growth was reasonable and waterlogging damage for autumn sown plots was largely avoided as the trial was conducted on raised beds. After mid October the season dried off and watering of irrigated plots commenced on 5th November for autumn sown and 26th November for spring sown plots. To date only broad bean samples have been fully processed and the irrigated lentils, chickpeas and lupini beans have not been harvested yet.

*Broad beans:* Irrigation initially prolonged flowering and maintained some green leaf into mid December. Irrigated plants were significantly taller than unwatered plants and produced significantly more pods and larger seed (see table 91) There was a trend towards an increase in number of seeds per pod but this was not significant. Grain yield from irrigated plots was significantly higher than unirrigated plots. Yields are presented on a per hectare basis to take into account the area of furrows between raised beds.

**Table 91: Effect of Irrigation on Growth and Yield of Broad Beans at Symmons Plains, 2003-04**

| Treatment | Final density (plant/m²) | Height (cm) | Pods/m² | Seeds/pod | 100 seed weight | Yield (t/ha) |
|---|---|---|---|---|---|---|
| unirrigated | 16.0 | 82.3 | 171.6 | 1.98 | 124.2 | 2.77 |
| irrigated | 13.9 | 91.7 | 206.2 | 2.22 | 146.3 | 4.45 |
| **LSD** | **ns** | **8.4** | **30.9** | **ns** | **2.4** | **0.89** |

*Marrowfat peas:* Irrigated plots continued to flower until mid January – nearly 3 weeks longer than unirrigated plots. The variety Midichi is listed as resistant to powdery mildew but the disease appeared in mid-late January and before spraying, had some impact on plant growth particularly in the irrigated plots.

Although not statistically significant, irrigation appeared to increase plant survival. This is perhaps not surprising given the very dry spring and summer that also adversely affected grain yield of unirrigated plots .

**Table 92: Effect of Irrigation on Growth and Yield of Marrowfat Peas at Symmons Plains, 2003-04**

| Treatment | Final density (plants/m²) | 100 seed weight | Yield (t/ha) |
|---|---|---|---|
| unirrigated | 54.4 | 34.0 | 0.90 |
| irrigated | 58.3 | 36.1 | 3.65 |
| *lsd* | ns (P=0.08) | 0.5 | 0.42 |

Hand harvested samples are currently being processed. 100 seed weight was significantly higher for the irrigated treatment. As all plots were taken through to dry grain maturity there was a significant amount of bleaching but visually there was no difference between treatments. Commercially the amount of bleaching would be dependent on the time of windrowing.

**Conclusions:**

- Irrigation resulted in a 60% and 400% increase in grain yield for broad beans and marrowfat peas respectively.
- Irrigation resulted in a 17% and 3% increase in seed size in broad beans and marrowfat peas respectively. This is critical in producing for markets requiring large seed size.
- It is likely that the dry finish to the season (decile 1) enhanced the positive effects of irrigation particularly for the marrowfat peas and other spring sown crops.
- In addition to the capacity to irrigate and a cool seasonal finish, Tasmania has other advantages in marrowfat pea production that can be capitalised upon ie
  - excellent adaptation of overseas spring germplasm
  - freedom from pea weevil.

## 11.2 THE BENEFIT OF RAISED BEDS FOR ALBUS LUPIN PRODUCTION – SYMMONS PLAINS

**Location:** Symmons Plains

**Researchers:** Geoff Dean (SFS Ltd)
Peter Johnson (TIAR)

**Acknowledgements:**
GRDC, Simon Munford, Andrew Legro,

**Growing Season rainfall (April-Nov):** 489 mm

**Aim:**
To compare the performance of crops on raised beds versus strategic field drainage.

**Background:**
Raised beds have provided an environment largely free of waterlogging for crops that are sensitive to excess water. The down-side has been more rapid drying of the soil profile in late spring and early summer during grain fill. Another approach is to use strategically placed drains at regular intervals to allow good crop growth (little waterlogging) without the same loss of water from the soil profile at the end of the season.