IMPACT OF SEED SPACING ON POTATO YIELD AND SIZE:

A demonstration by PotatoLink

Potato growers know that seed is an expensive input not to be wasted. Yet inefficient planting and spacing, including skips and doubles, can be costly. Optimising seed spacing provides a real opportunity to minimise inputs while maximising yield. To evaluate the economic impact of poor planter performance, PotatoLink conducted a demonstration on the impact of seed spacing on potato yield and size.

Figure 1. Example skips and doubles, 21.12.22

Planting seeds further apart than intended, for example when spaces are skipped, is a poor use of paddock space and leads to an uneven crop, with varying plant and tuber sizes. Uneven crops need uneven inputs and water, which quickly becomes a management headache.

Doubles, in contrast occur, when two seeds are dropped in the same space, leading to competition for nutrients, light, and space, and ultimately also an uneven crop (Figure 1).

There are many factors that can influence successful, even planting including:

- Speed of the planter - 5.8-6.1 km/hr is ideal
- Seed uniformity
- Seed shape
- Cut versus whole seed
- Planter functionality
- Best practice, for example planter should always be calibrated prior to planting

Generally, the optimal seed spacing distance is determined by several factors. Seed age, variety, end use market (for example seed crop vs processing crop), and disease management (for example closer space results in smaller tubers which helps with the management of hollow heart) all need to be considered.

THE DEMONSTRATION SET UP

For this trial, potato processing variety FL 2215 tubers were planted in November 2022 on a paddock that had a long history of growing lucerne crops (Figure 2). Seeds, planted in November, enjoyed an ideal growing season.

The soil was light textured. It was the first time that the paddock was planted with potatoes, so volunteers and disease did not present a problem. *A Grimme 6 row* planter was used with spacing set to 26cm between seeds and a planting speed of 6km/hr.

To assess seed spacing variability and the efficiency of the planter, the team opened the furrow after the planter had planted the crop (on the same day of planting) to confirm the actual distance. Space between seeds was manually measured and recorded. By

Figure 2. Planter on day of planting – 21.11.22

Figure 3. Demonstration layout, precision spacing, demonstration area (22 cm spacing left row, 30cm spacing right row) – 21.12.22

Figure 4. Crop at flowering in demonstration area

way of comparison, a small test area was then planted with three different seed spacings: 22cm, 26cm, and 30cm, which could then be compared to the control (26cm by the planter) (Figure 3 and 4). Please note this demonstration was not a replicated trial.

The crop and demonstration area were grown under usual conditions, with data collected from the demonstration as the crop neared harvest. Data collected included:

- Number of plants
- Number of stems per plant
- Number and size of tubers (<40mm, 40-60mm, 60-90mm, >90mm)
- Weight of tubers from the control (machine planted) and demonstration (hand planted) areas

RESULTS

The degree of variance of the planter was assessed by analysing a 10m row. On average, the planter planted at the desired rate (26cm) of seed per hectare. However, the average deviation between seed spacing was 8.8 cm or 33%. The Potato Manual provided an example where a spacing of 25cm should have 40 seed pieces within a 10m area. It suggests that +/- 2/40 seed pieces (5% variability) in 10m is an acceptable variability. The planter performance, including planting speed, has room for improvement, and economics justify it.

In this demonstration, the 30cm spacings returned the highest **yield**, outyielding the closer spacings (26cm and 22cm) by around 4% for this variety (Figure 5). All precision plantings outyielded the planter. However, it is important to note that tubers <40mm and >90mm were excluded from yield calculations as they are not accepted by the processor. Also, yield from the '26cm planter' was calculated from a low number of repetitions.

Tuber size by count revealed a greater number of larger tubers in the 30cm and 26cm spacings, highlighting that bigger spacings returned larger potatoes. 30cm = 61% at 60-90mm, 22cm = 54% at 60-90mm (Figure 6)

The 30cm spacings also returned a greater average number of tubers per plant (Figure 7). 30cm = 11 tubers/plant, 22cm = 9 tubers/plant - which concurs with expectations.

Also as expected were the results for Tubers/m (Figure 8). Total tubers per metre was greater for 22cm = 39 tubers, compared to 30cm = 37 tubers - i.e. smaller seed spacing = more plants in a given space = more total tubers.

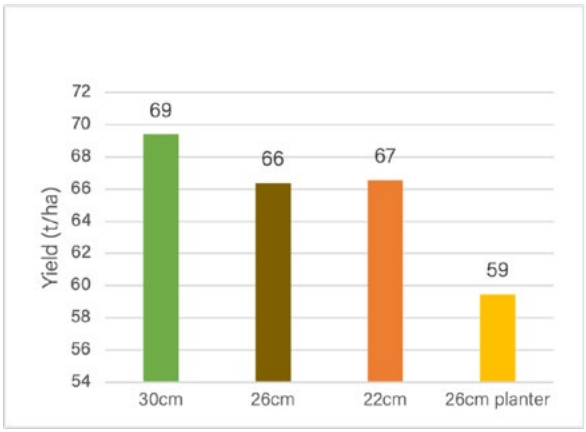

Figure 5. Marketable yield

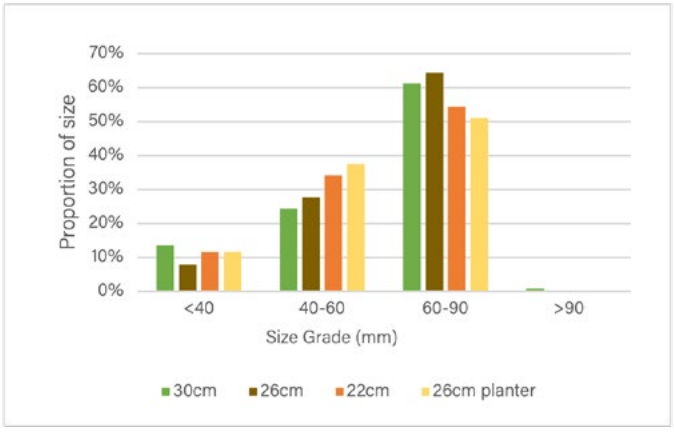

Figure 6. Tuber size at different spacings

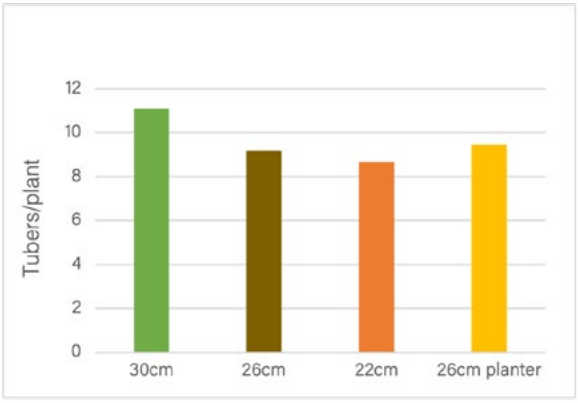

Figure 7. Tubers/plant

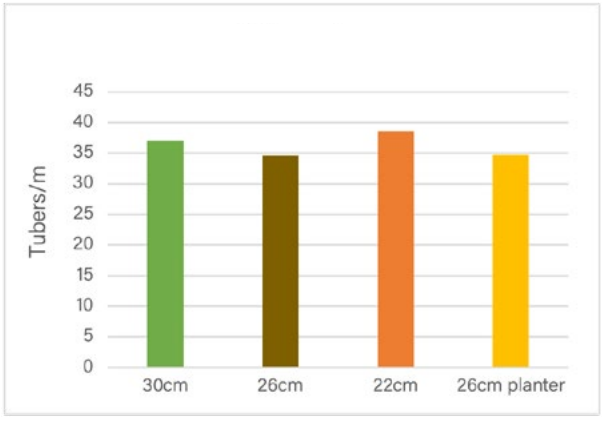

Figure 8. Tubers/metre

THE ECONOMIC BOTTOM LINE

Calculations in Figure 9 are based off an average seed size of 65g, costing $1000/tonne of seed.

For this particular crisping variety in this situation, 30cm spacing returned the best yields, greatest tuber size and lowest cost of seed/ha.

The 59t/ha of yield obtained in the 26cm planter area of the demonstration was lower than the 64t/ha predicted by the grower, highlighting the importance of seed spacing on potato yield and size. An increase in seed spacing can significantly reduce the overall amount of seed required and cost, however it is important to consult with your seed supplier on the optimum spacing, as it will vary from variety to variety.

The Potato Manual suggests calibrating the planter before planting and conducting regular in-paddock checks to ensure seeds are placed at the correct spacing in the row. This can help to reduce costs and improve yields and quality.

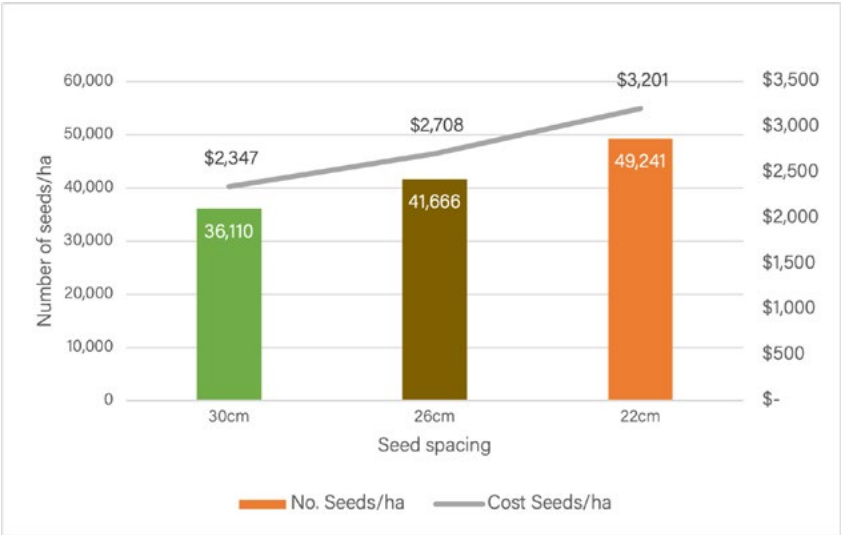

Figure 9. Number and cost of seed/ha