VEGETABLE CULTIVAR AND CULTURAL TRIALS 2001

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Low Input Potato Production

Rising input costs coupled with increasing market demand for “safer” products has lead many growers to consider “organic” or other reduced input production systems. This trial evaluated the yield potential of potatoes grown without synthetic fertilizers or pesticides relative to standard high input production.

The trial was conducted on the University of Saskatchewan Potato Research plots. The trial area was part of a conventional cropping program and as such did not meet established standards for “organic” production. The previous barley crop had been sprayed to control weeds. The field was disked twice prior to planting. Heavy applications of manure in previous seasons had raised the fertility levels to close to the optimum for potatoes (110 #/a N, > 120 #/a P2O5 and > 1000 #/a K2O). No supplemental fertility was added to the “low input” regime, while 20 #/a of N, P2O5, and K2O were applied close to the seed in the standard regime. The trial was planted in mid-May utilizing Elite 3 seed of Norland and Russet Norkotah. As whole seed was used, no seed treatments were applied in either regime. The seed was planted at 23 cm in-row spacings with 1 m between rows. Each plot consisted of two 20 m long rows of each cultivar.

**Weed control**

<table>
<thead>
<tr>
<th>Standard regime</th>
<th>Low Input Regime</th>
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<tr>
<td>- preplant disking</td>
<td>- preplant disking</td>
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<tr>
<td>- preplant Eptam+Sencor</td>
<td>- 2 hilling operations</td>
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<tr>
<td>- Lorox at ground crack</td>
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<tr>
<td>- Poast at 4 weeks post ground crack</td>
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<tr>
<td>- 2 hilling operations</td>
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The plots were irrigated as needed. No insecticides were applied in either regime and there were no significant insect problems. The standard plot was treated with fungicide 4 times as a preventative measure for control of early and late blight. No late blight was observed in either regime, but early blight was prevalent in the “low input” regime. The standard plots were topkilled by applying Diquat followed 10 days later with a flail. The “low input” plots were flailed. The crop was harvested in early October after the first killing frost and the crop was weighed and graded.

**Results**

Emerge and stand establishment were equivalent in the two regimes. Weed pressure was heavy in the test area with extensive infestations of volunteer grain, and the weeds introduced in the manure. The chemical regime provided excellent weed control for the duration of the season. Initially the cultivation appeared to be adequately controlling the weeds in the “low input” regime. However flushes of volunteer grain and late season weeds following the second hilling operation were problematic. The extensive weed growth in the low input regime appeared to reduce the vigor of the Russet Norkotah crop more than Norland. Norland is renowned as a robust, early maturing cultivar well adapted to low input situations. The extensive weed growth in the “low input” regime made topkill and harvest difficult. Reliance on flails as a top-killing method resulted in relatively poor skin set in the low input regime.
Yields:

**Norland**
- Standard Regime - **19.9 t/a marketable** with an average tuber weight of 223 g
- Low Input Regime - **17.2 t/a marketable** with an average tuber weight of 214 g

**Russet Norkotah**
- Standard Regime - **20.1 t/a marketable** with an average tuber weight of 254 g
- Low Input Regime - **5.9 t/a marketable** with an average tuber weight of 146 g

Norland appeared well suited to low input production, while Russet Norkotah was clearly not suited. The key difference appeared to lie in resistance to weed competition. Norland emerges quickly to produce a robust sprawling canopy that effectively smothers weeds. Norland also completes its growth cycle quickly, which renders it less susceptible to late season competition by weeds for fertility and moisture. By contrast, Russet Norkotah produces a relatively small canopy and it is prone to nutrient deficiencies and requires careful management of fertility and pest control inputs. All these factors render it less suited to low input production. The additional cost of inputs in the standard regime (ca $ 220/a) are roughly offset by the additional yields obtained for Norland (2 tons/a @ $ 200/t). However, with Russet Norkotah, the standard regime resulted in far superior returns even with a hypothetical price premium for a “low input” product.