Scheduling of fertilization just means what kind of nutrient and how much must be applied at what growth stage. The accepted practice is to apply a fraction of the total amount of nutrients at planting and the rest during the growing season. However, it is a well-known fact that the application time of mobile nutrients, in particular nitrogen, is based on soil texture (clay content). For example, if the clay content of a certain soil is lower than 10%, then 50 – 60% of the total nitrogen is applied before tuber initiation, while 80 – 100% is applied at a clay content of 20% and higher. A three-year trial to investigate the influence of the amount and scheduling of fertilizers was carried out in the Dendron area.

How was the trial carried out?

BP1 seed potatoes were planted during June of every year (2001, 2002 & 2003) on the farm Zandput of Mr. Mossie Jongbloed. Fertilization of the control treatment was done according to Steyn & Prinsloo (2003) for a 70 t/ha yield. The amount of the macro nutrients (N, P & K) applied at each fertilizer level is presented in TABLE 1. Six treatments were applied:

- Daily fertilization at 50% (2/3X), 100% (1X) and 200% (2X) of the recommended amount of fertilizer.
- Weekly fertilization at 50% (2/3X), 100% (1X) and 200% (2X) of the recommended amount of fertilizer.

To overcome the technical difficulties in applying the different amounts of fertilizer at weekly or daily intervals, irrigation scheduling was done by means of the Soil Water Balance simulation model.

### TABLE 1: Fertilizer levels used during the three-year trial.

<table>
<thead>
<tr>
<th>Fertilizer level</th>
<th>Amount (kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>50% (2/3X)</td>
<td>130</td>
</tr>
<tr>
<td>100% (1X)</td>
<td>260</td>
</tr>
<tr>
<td>200% (2X)</td>
<td>520285</td>
</tr>
</tbody>
</table>

* 200% = 1.5X = 150% for P only.

1. Hennie du Plessis was employed by ARC-Roodeplaat when the trials were conducted. He currently works at Ag-Chem Africa.
2. Tielman Roos is employed by the Limpopo Department of Agriculture (Polokwane).
3. Mossie Jongbloed is the farmer on Zandput Farm, Dendron.
4. Pierre Fourie (ARC-Roodeplaat) is currently responsible for several field trials on potatoes, soybean and indigenous vegetables.

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The only significant differences occurred at fertilizer levels (averages across application methods). During the 2001 season total tuber yield at the 50% fertilizer level (1/2X) was significantly lower than at the 100% (1X) and 200% (2X) fertilizer levels (Lsd = 3.53) (Figure 2). Although the yield at the 50% fertilizer level treatment was the lowest, it still produced 92% of the tuber yield realized at the recommended fertilizer level (100% level) and 91.5% of the yield recorded at the 200% fertilizer level.

During the 2002 season no significant differences in tuber yield were observed between any of the treatments, indicating...
that the fertilizer levels used, did not have a significant influence on total tuber yield. The 50% treatment \((1/2X)\) produced 92.2% and 95.6% of the yield recorded at the 1X and 2X treatments respectively. During the 2003 season the average tuber yields (averages across application methods) at the 200% level was significantly not affected significantly by the fertilizer application method (daily vs. weekly application)(Figure 2). In 2001, the daily fertilization treatment appeared to be more beneficial than that of the weekly fertilization, but these differences were not statistically significant and the same trend was not observed in 2002 and 2003.

Valuable results were obtained as far as fertilizer level is concerned and the same tendency was observed during all three years. The yield at the 50% fertilizer treatment was higher than 91% of the control \((100\%\) of the recommended fertilizer) and the 200% fertilizer treatment during all three seasons. That meant that the producer could save on input costs and still obtain relatively good yield.

Conclusions

No significant differences between daily and weekly fertilisation treatments were obtained which implied that the additional cost of daily fertilisation could not be justified. Results obtained from the different levels of fertilisation showed that when using 50% less than the recommended amount of fertilizers, yields of up to 94% of the recommended rate are possible. Furthermore, production cost could be reduced using this practice. However, before producers are recommended to use less fertilizer to save on production costs, more research needs to be done with regard to scheduling of individual nutrient elements.