TO: Malheur County Onion Growers
FROM: Warren A. Henninger, Malheur County Extension Agent
SUBJECT: Onion Fertilization, Malheur County

1) 1970 ONION FERTILITY SURVEY
   a) Plant Analysis
   b) Soil Analysis

2) ONION FERTILITY TRIALS CONDUCTED IN 1953 and 1954

3) THOUGHTS ON ONION FERTILIZATION

4) SUMMARY

1) 1970 ONION FERTILITY SURVEY

During the 1970 onion growing season fifteen onion plant samples were drawn from fifteen different onion fields in the Nyssa and Ontario areas. These samples were drawn near the end of the season when the bulbs were about 2-3 inches in diameter and just before watering was to be stopped. This was an effort to evaluate the nutrient level in the onion plant as it was reaching its maturity stage. A soil sample was also drawn at these same locations after the onions were harvested to determine the carry-over of nutrients in the soil.

a) Plant Analysis:

The 1970 onion plant sampling project was the first year in this area that any onion plant sampling was done to evaluate the nutrient level of the plant. Guidelines must still be determined for this area.

Nitrate nitrogen analyses were run on the plant samples but values obtained were all very low. The thought is that very little nitrate nitrogen is in a plant sample at this stage of growth.

All the samples did show very high levels of phosphorus and potassium especially for late season sampling. Based on values reached through research in the Lalish area of Oregon, phosphorus values around 0.3-0.4% at early bulbing are probably adequate and potassium values of 3.0 to 4.0% at early bulbing are probably adequate. These are some values obtained from plant samples drawn late in the season in the Ontario-Nyssa areas:

<table>
<thead>
<tr>
<th>Field Location</th>
<th>% Phosphorus</th>
<th>% Potassium</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.61</td>
<td>5.15</td>
</tr>
<tr>
<td>5</td>
<td>.85</td>
<td>5.15</td>
</tr>
<tr>
<td>6</td>
<td>.73</td>
<td>5.45</td>
</tr>
<tr>
<td>8</td>
<td>.83</td>
<td>5.63</td>
</tr>
<tr>
<td>10</td>
<td>.52</td>
<td></td>
</tr>
</tbody>
</table>

Zinc, manganese, and copper values obtained were all adequate.
b) Soil Analysis:

Soil samples that were drawn at the same locations after the onions were harvested showed big carry-overs of nitrate nitrogen. The following table shows some of these values:

<table>
<thead>
<tr>
<th>Location</th>
<th>Level Drawn</th>
<th>Nitrate Nitrogen PPM</th>
<th>Nitrate Nitrogen Pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>0-12&quot;</td>
<td>54.0</td>
<td>216.0</td>
</tr>
<tr>
<td></td>
<td>12-24&quot;</td>
<td>23.1</td>
<td>92.4</td>
</tr>
<tr>
<td>15</td>
<td>0-12&quot;</td>
<td>12.3</td>
<td>49.2</td>
</tr>
<tr>
<td></td>
<td>12-24&quot;</td>
<td>3.1</td>
<td>12.4</td>
</tr>
<tr>
<td>18</td>
<td>0-12&quot;</td>
<td>32.3</td>
<td>129.2</td>
</tr>
<tr>
<td></td>
<td>12-24&quot;</td>
<td>22.6</td>
<td>90.4</td>
</tr>
</tbody>
</table>

These values show the big carry-over of nitrate nitrogen that was measured in some of the fields. Values varied from one field to another even though the same crop was grown last year.

Most phosphorus and potassium levels in these soil samples were found to be quite high. Again, each field sampled did differ in the values obtained.

2) **ONION FERTILITY TRIALS CONDUCTED IN 1953**

Onion fertility trials conducted in 1953 by Turner Bond, potato and onion specialist at that time, have shown that 100 pounds of nitrogen per acre applied at planting time was distinctly beneficial in terms of yield increase over no nitrogen but 200 pounds was no better than 100 pounds per acre. No response to phosphate or potash as measured by onion yields were found.

This information is from research done in 1953 and this same response may not hold true today. Fertilizer trials to be conducted this year and ones to be conducted in the future will tell what rate may be adequate for today.

3) **THOUGHTS ON ONION FERTILIZATION**

A committee set up by the Malheur County Onion Growers Association has come up with the following points on fertilization versus quality:

1) Excess nitrogen delays maturity.
2) Timing of last nitrogen application is critical. The later nitrogen is applied, the more chance there is of poorer quality onions.
3) Excess nitrogen can retard growth.

Dr. Thomas Jackson, Oregon State University Soils Department, brought out the following points: "As far as onion quality and fertilization is concerned, primarily dealing with nitrogen, growers need to pay attention to residual carry-over of nitrogen from other crops. There are a lot of soils with a build up of nitrogen levels where similar fertility programs as conducted ten years ago are still being conducted.

The following statement was made by Luther Fitch, agronomist at the Malheur Experiment Station, on the herbicide effect on the quality of onions: "If herbicide effect has been severe enough during the period of germination and early growth to thin the onion stand, there will be fewer onions to "feed on" the
fertilizer (particular nitrogen) present. If the soil has been effectively fumigated, the onion - after a slow start - may develop a very healthy root system which "forages" widely for nitrogen and water, grows rapidly and may be still growing rapidly when it is time for harvest. As a result, this onion with excessive food and growing room generally is physiologically less mature, and normally has a large neck which is difficult to cure down."

In this area, there is a lot of winter fertilization. Growers should take soil samples when crops are harvested to see what residual or carry-over nutrients are in the soil. Another point to keep in mind is that onions tend to grow more vigorously in soils that were fumigated and as a result these plants may need less fertilizer since they have better feeding roots.

Growers in this area are applying large amounts of nitrogen. Many have been using these higher rates because of the pink root disease problem. It is true that a plant with reduced vigor and "foraging" ability of plant roots nitrogen applications are not being fully utilized. Applying luxury amounts of nitrogen is a poor second best practice when disease control measures are available.

Size and tonnage are important to an onion grower in this area since the demand for this area's onions is for the jumbo size. But some thought might be given to sacrificing tonnage for quality.

4) SUMMARY

a) Plant samples showed high levels of phosphorus and potassium.
b) Soil samples drawn showed big carry-overs of nitrate nitrogen.
   Phosphorus and potassium levels were quite high.
c) There is a real difference in nitrate nitrogen carry-over between different fields that produced the same crop last year.
d) Trials conducted in 1953 have shown that 100 pounds of nitrogen per acre applied at planting time was beneficial in terms of yields increase over no nitrogen and that 200 pounds was no better than 100 pounds per acre. Yield results from various nitrogen rates may differ under today's conditions.
e) Excess nitrogen delays maturity.
f) Growers should take soil samples when crops are harvested to see what residual nutrients are in the soil.