Good management practices are essential if optimum fertilizer responses are to be realized. These practices include use of recommended varieties, selection of adapted soils, weed control, disease and insect control, good seed bed preparation, proper seeding methods, and timely harvest.

Because of the influence of soil type, climatic conditions, and cultural practices, crop response from fertilizer may not always be accurately predicted. Soil test results, field experience, and knowledge of specific crop requirements help determine the nutrients needed and the rate of application.

Recommended soil sampling procedures should be followed in order to estimate fertilizer needs. The Oregon State University Extension Service agent in your county can provide you with soil sampling instructions and soil sample bags and information sheets.

**Plant Population**

The fertilizer applications suggested in this guide are based on a population of 20,000 plants/A. Where the plant population exceeds 20,000/A, fertilizer rates should be increased by 10% for each additional 5,000 plants/A. Fertilizer rates should be reduced similarly for populations less than 20,000/A.

**Area 1** and **Area 2**

Fertilizer response in western Oregon differ between:

Area 1: Willamette Valley and northwest Oregon

Area 2: Southwest Oregon

**Nitrogen (N)**

- **Irrigated Corn**
  1. Following grain, silage corn, or non-legume crops: Apply 150 to 200 lbs N/A.
  2. For corn following a good growth of legumes: Apply 50 to 70 lbs N/A.

- **Non-Irrigated Corn - Area 1 only**
  1. For corn following grain or other non-legumes: Apply 60 to 90 lbs N/A.
  2. For corn following a good growth of legumes: Apply 50 to 70 lbs N/A.

For best results, part of the N should be banded 2" to 3" to the side and 2" to 3" below the seed. To avoid salt injury to young seedlings, the total of banded N plus added potash (K₂O) should not exceed 100 lbs/A. When fertilizer is banded within 1" of the seed N + K₂O should not exceed 40 lbs/A.

Additional N can be applied broadcast or as a top dressing.

Factors affecting salt injury are:

- Injury is aggravated as the fertilizer band comes closer to the seed.
- The danger of injury is greater with sandy than with fine textured soil.
- Immediate irrigation at the first sign of burn should reduce further injury.

**Phosphorus (P)**

P fertilizer should be banded 2" to 3" to the side and 2" to 3" below the seed at the time of planting. Immediately available P is necessary to assure good seedling growth and a good root development, especially when corn is planted early before the soil is warm.

If the OSU soil test for P reads (ppm): Apply this amount of phosphate (P₂O₅) (lb/A):

<table>
<thead>
<tr>
<th>Area 1</th>
<th>Area 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 7</td>
<td>80-100</td>
</tr>
<tr>
<td>7 - 15</td>
<td>60-80</td>
</tr>
<tr>
<td>15 - 30</td>
<td>40-60</td>
</tr>
<tr>
<td>Over 30</td>
<td>30-40*</td>
</tr>
</tbody>
</table>

*If banding equipment is not available, little response from P can be expected with P soil test values above 30 ppm in Area 1 or above 15 ppm in Area 2. Where banding equipment is not available, P fertilizer should be plowed down or worked into the seed bed and the rate of application should be increased by 50%.

These fertilizer rates assume that soil pH is greater than 5.5.
POTASSIUM (K)

If the OSU soil test for K reads (ppm):

<table>
<thead>
<tr>
<th>Area 1</th>
<th>Area 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 75</td>
<td>80 - 120</td>
</tr>
<tr>
<td>75 - 100</td>
<td>60 - 80</td>
</tr>
<tr>
<td>100 - 150</td>
<td>40 - 60</td>
</tr>
<tr>
<td>Over 150</td>
<td>0</td>
</tr>
</tbody>
</table>

Apply this amount of potassium (K₂O) (lb/A):

Up to 50 lbs of K₂O/A can be included in the fertilizer band when the band is located at least 2" from the seed. The total of banded N and banded K₂O should not exceed 100 lbs/A. When fertilizer is banded within 1" of the seed, N + K₂O should not exceed 40 lbs/A. The remainder of the K should be broadcast prior to seeding.

On poorly drained Dayton and related soils K should not be banded, and with these soils potassium sulfate may give better results than potassium chloride.

SULFUR (S)

Plants absorb S in the form of sulfate. Fertilizer materials supply S in the form of sulfate and elemental S. Elemental S must convert to sulfate in the soil before the S becomes available to plants. The conversion of elemental S to sulfate is usually rapid for fine ground (less than 40 mesh) material in warm moist soil.

The S requirements of field corn can be provided by:

1. The application of 10-15 lbs S/A in the form of sulfate at planting time.
2. Applying 30-40 lbs S/A as fine ground elemental S the preceding year.
3. Applying coarser ground elemental S at higher rates and less frequently.

Responses to S fertilization may not occur for period of at least 4 or 5 years on "red hill" soils which have a history of high S fertilization. These soils have a comparative high ability to adsorb S and frequently have a history of high S fertilization through the use of S-containing fertilizers such as ammonium sulfate.

MAGNESIUM (Mg)

Responses of field corn to Mg have not been observed in western Oregon. The application of Mg is suggested when soil test levels are below 0.8 meq Ca/100g of soil.

Mg can be banded at 10 to 15 lbs/A at planting. Mg can also be supplied in dolomite, which is a liming material that reduces soil acidity to about the same degree as ground limestone. Dolomite should be mixed into the seed-bed at least several weeks in advance of seeding.

An application of dolomite will supply magnesium and reduce soil acidity for several years.

ZINC (Zn)

The application of Zn has increased the yields of sweet corn in the Stayton area, especially on the gravelly, dark colored soils.

Field corn and sweet corn have similar Zn requirements.

If the OSU soil test for Zn reads (ppm):

<table>
<thead>
<tr>
<th>Less than 0.8</th>
<th>3-4 banded or 10 broadcast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over 0.8</td>
<td>None</td>
</tr>
</tbody>
</table>

When the soil test is below 0.8 ppm Zn, a response to Zn is expected on all soils. When the soil test is between 0.8 and 1.5 ppm Zn, a response to Zn is expected on most soils in the Stayton area.

Where Zn is required, either 10 lb/A of Zn should be broadcast and worked into the soil prior to planting or 3 to 4 lbs/A of Zn should be banded with the fertilizer at planting time. A broadcast application of 10 lb/A Zn/A should supply Zn needs for 2 or 3 years.

BORON (B)

Responses of field corn to B applications have not been observed in western Oregon. Trial applications of 0.25 lb/A B are suggested when soil test levels are below 0.5 ppm. B should be applied uniformly to the field and should not be banded.

LIME

Experimental work has shown that corn will produce good yields over a fairly wide range of soil acidity. Lime applications should be made when the soil pH is 5.5 or below, or when calcium (Ca) levels are below 5 meq Ca/100g of soil.

If the OSU SMP Buffer test for lime reads:

| Below 5.2 | 4 - 5           |
| 5.2 - 5.6 | 3 - 4           |
| 5.6 - 5.9 | 2 - 3           |
| 5.9 - 6.2 | 1 - 2           |
| Over 6.2  | 0               |

The liming rate is based on 100-score lime. Lime should be mixed into the seed bed at least several weeks before seeding. A lime application is effective over several years.

Do not apply lime when the soil pH is above 6.0. Yields were reduced in Willamette Valley experiments when lime raised the soil pH to 6.5. Responses of field corn to lime have not been observed in Jackson or Josephine counties.