Sugarbeet Seed Production

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CSS 460/560 Seed Production
Sugarbeet

- Most US sugarbeet seed production occurs in the Willamette Valley, with smaller acreages in central and southwestern Oregon. The region is the only significant sugarbeet seed production area in the US.

- Acreage of this crop ranges from 2000 to 6000 acres, but has declined from the 1990s. Technological advancements in production of sugarbeets has resulted in reduced but stable seed production acreages.
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- Sugarbeet seed yields have been stable over time with seed yields ranging from 2000-3000 lb./A.
Sugarbeets are a biennial crop, but essentially cultivated as a winter annual seed crop.

Planting of new sugarbeet seed crops takes place at nearly the same time as harvesting of the previous season’s seed crop. Low temperatures in winter are needed for vernalization of the seed crop.

The most common type grown are monogerm hybrids. Both diploid and triploid cultivars are grown for seed.
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- **Field History** - The field must be out of sugarbeet seed crops for at least 5 years.
- Most of the sugarbeet seed grown in Oregon is not certified.
- **Isolation distances** – vary depending on whether the cultivars are OP or Hybrid, and whether the crop is GMO or not.

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<thead>
<tr>
<th>Crop</th>
<th>OP non-GMO</th>
<th>Hybrid non-GMO</th>
<th>GMO</th>
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<tbody>
<tr>
<td>OP Sugarbeet</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Hybrid Sugarbeet</td>
<td>2</td>
<td>1</td>
<td>3</td>
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<tr>
<td>Hybrid red beet, fodder beet, Swiss chard</td>
<td>4</td>
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- **Planting Date** - Mid-August to mid-September. The crop grows in autumn, becomes dormant over winter, then bolts in the following summer.

- **Seedbed** - Seedbed should be firm and is irrigated prior to planting.

- **Plant Populations** – The final population is 4-5 plants per foot of row. The crop has been traditionally sown in 24-inch rows at 8-10 seeds/foot of row, but 30-inch rows are becoming more common. Seeding rate is 4-10 lb./A. Seed quality of planting stock can sometimes cause stand problems. Planting Depth - 3/4 inch.
Parental Types – Most sugarbeet seed crops are hybrids. There are two parental types, pollen parents (male) and seed parents (female).

- Pollen parents are planted on one-fourth to one-third of the field in an alternating pattern with the seed parents. Typical plantings include 2-4 rows of pollen parents for every 5-12 rows of seed parents.
- Pollination takes place in late June and early July. The pollen parents (male) are not harvested. Only the seed parents (female) are harvested for seed.
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- Sometimes the crop is transplanted as stecklings in the field rather than established from seed. The acreage of transplanted seed fields has increased in the last few years.
- For steckling production, seed are planted in beds, and are dug for later transplanting.
- Planting stecklings rather than direct seeding uses less stock seed and provides the seed company with more flexibility in determining what cultivars they want to grow for seed production.
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• The stecklings are transplanted during the winter into a field (before late March). Transplants are laid out in 30-inch rows on the pattern of 4 male rows for every 8-12 female rows.

• Transplanting can also be combined with direct-seeding.

Transplanting of male stecklings, female rows were direct seeded in fall (photos - Greg Loberg West Coast Beet Seed)
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- **Fertilizer Management** - Two applications during production of the crop.
  - The 1st application is made prior to planting and consists of a balanced fertilizer containing nitrogen (70 lbs N/acre), phosphorus, potassium, sulfur, and sometimes boron. This is incorporated into the seedbed.
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- The 2nd application is made during the spring, and is often split between early spring (late February) and late spring. The early spring application contains N, S (20-50 lbs S/acre), and B (1-2 lbs/acre). The late spring application is all nitrogen. Total spring N ranges from 100 to 160 lbs N/acre.
- Availability of nutrients during seed development can affect seed quality. Nitrogen availability can sometimes affect seed germination.
- Lime is applied when pH declines below 6. A liming rate of 1-3 tons/acre is often used prior to planting to bring the pH of the seedbed up to 6 or greater.
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- **Diseases** - Downy mildew, powdery mildew and Cercospora leaf spot can be major problems as well as *Phoma* leaf spot.

- Powdery mildew can be controlled with sulfur or fungicide applications. Downy mildew is a worse problem with excessive N applications and can be controlled in young plants by fungicides but not when flowering.

Downy mildew on sugarbeet (top left - Melodie Putnam photo), Cercospora leaf spot (bottom left - Phil Hamm photo)
Insects - Lygus bugs may be the greatest insect pest because of the potential for great losses in seed yield. Cucumber beetles and aphids can also cause problems.

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Green peach aphid (top left), lygus bug (bottom left) photos by Ken Gray
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- **Weeds** – Bedstraw, dog fennel, field bindweed, and wild radish are problem weeds. These weeds are controlled with cultivation and herbicides.

- Herbicides can be applied post-emergence and again during winter. The crop is cultivated after emergence of the crop. This cultivation aids in the winter survival of the crop. Cultivation must cease when the crop bolts.

Bedstraw - Photo by Jed Colquhoun
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- **Irrigation** – Irrigation is required for the production of sugarbeet seed crops.
- Spring irrigation begins in mid-May to early June.
- Water is applied to avoid stress prior to flowering. Each application ranges from 1 to 1.5 inches.
- Irrigation must cease 10 days prior to swathing.

Big gun irrigation in sugarbeet seed field
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- **Harvesting** - Prior to harvest, pollen parents must be separated from seed parents as they become tangled. Custom-built separator machines are used to separate the plants. Pollen parents are destroyed by flailing or tilling prior to harvest.

- Harvest is in late July and early August. Timing is important; early seed harvest can result in lower seed germination, often caused by under-developed seed. Maximum seed maturity is reached at about 45 days after peak anthesis.

- The crop is swathed and dried in the field, and then combined.

- Post-harvest - Residue remaining after harvest is irrigated to germinate volunteers and then killed by tillage or herbicides. Do not plow as volunteer seed will be buried.
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- A coalition of environmental and organic agriculture groups have filed a lawsuit against the USDA, protesting the release of GMO (Roundup Ready) sugarbeets in the Willamette Valley.

- Among the concerns is that GMO sugarbeets could harm the organic seed industry by contaminating chard and table beets. They also claim that the prescribed 3-mile isolation distance between beet cultivars will not be sufficient to avoid spreading the Roundup Ready trait.

- Sugarbeet seed producers claim that the process is safe as is the resulting sugar. Sugarbeet growers have chosen to grow predominantly GMO crops and if the local seed producers cannot supply this seed, then this industry will be lost to the Willamette Valley.