The Potential for Soybean Production In Western Nevada

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Introduction

Nevada agricultural producers are in dire need of alternative crops in order to diversify their operations. Alfalfa or grass hay is produced on over 92% of all cropland in Nevada. This over reliance on hay production generally results in decreased profits and increased risk to the producers when compared to more diversified operations. Unfortunately, factors associated with climate, soils and location have limited production of other crops and resulted in the dominance of hay. However recent and historical needs assessment results conducted by Cooperative Extension faculty indicate a strong desire for the development of alternative crops by Nevada agricultural producers. Therefore, soybean production was evaluated in 1999 and 2000 as a potential alternative crop. A word of caution. Do not plant any crop unless there is a market close enough that transportation costs are affordable.

Project Procedures

The evaluation effort comprised three soybean varieties that were planted in 1999 and 2000 at the Newlands Research and Extension Center in Fallon. Each variety was planted in a plot that averaged approximately 0.5 acres in size. The purpose of the project was to complete a preliminary un-replicated evaluation of the survival and production potential of soybeans in western Nevada. If the preliminary results indicated a likely potential for commercial production further replicated trials were to be completed.

Soybeans varieties are normally classified by maturity groups that are correlated to latitude. The maturity groups range from 00 to IX. Soybeans in maturity groups 00 and 0 are adapted for use in the most northern regions of North America and are very early maturing, while maturity groups IX and X are used in the most southern latitudes and mature later. However, in some instances early maturing groups are planted in areas suited to later maturing varieties. This is sometimes done when the soybeans will be irrigated, which delays maturity, or when hot weather is expected.

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Soybeans are available with determinate or indeterminate flowering growth habits. Determinate flowering varieties begin flowering at all plant nodes at once and the beans mature at the same time. Vegetative growth stops once flowering begins on determinate varieties. Indeterminate varieties begin to flower on the lower plant nodes and flowering progresses up the stalk. Vegetative growth continues throughout the flowering period on indeterminate varieties. The soybeans are produced and ripen over a longer time period with indeterminate varieties.

The soybean varieties planted at Newlands were recommended and provided by representatives of the Dekalb Company. The varieties planted in 1999 were CX256RR and CX266RR. They are transgenic mid-group II maturity soybeans that are resistant to glyphosate herbicide. The variety planted in 2000 was CX196RR which is a mid-group I maturity soybean and it is also resistant to glyphosate.

The varieties planted at Newlands were indeterminate in flowering habit. The beans continued to grow until mid-October, when the first frost stopped vegetative growth. Harvest began approximately 15 days after 95% of the pods had turned brown. The Soybeans were harvested on November 9, 1999 and November 6, 2000.

Soybeans seeds vary greatly in size and as such, in number of seeds per pound. Therefore, seeding recommendations are normally provided in “seeds/acre” rather than “pounds per acre” as is common with other field crops in Nevada. Charts are available to convert seeding rates in pounds/acre to seeds/acre in order to simplify the seeding process. The recommended seeding rate from areas where soybeans are normally grown commercially is approximately 150,000 pure live seeds/acre (PLS). When conditions are less than ideal such as poor soil-seed contact, or the seeding dates are later than desired, higher rates are often used. The varieties planted at Newlands were small seeded varieties, which averaged approximately 3,150 seeds per pound. A seeding rate of approximately 48 lbs/acre PLS was necessary to achieve the desired rate of 48 lbs PLS/acre. Because the seeds were planted later than normal the rate was increased to approximately 60 lbs/acre PLS.

The soybeans were seeded on June 16, 1999, and June 7, 2000. They were planted approximately 1.5 inches deep in rows spaced 12 inches apart. They were flood irrigated immediately after planting and frequently enough thereafter that water was not limiting. They were not inoculated with rhizobia prior to seeding although for profitable soybean production they normally would be inoculated.

A starter fertilizer consisting of 11-52-0 at 100 lbs/acre was disked into the soil prior to seeding. The beans were fertilized again in early August with approximately 75 pounds of actual nitrogen, 15 pounds phosphorous, and 15 pounds potassium to the acre.

Weed control was consisted of applying glyphosate at 1 lb active ingredient/acre, in 30 gallons of water/acre as a carrier. Weed control was nearly 100% and weeds were not a factor in production.

The soybeans were harvested with a standard grain combine adjusted to the manufacturer’s recommendations for soybeans. The recommended fan speed was too high and was reduced until seed loss was eliminated. Seed moisture content was estimated to be less than 12%.

Seed loss due to shattering and harvest activities was estimated by counting seeds per square foot following the harvest. Slightly over 20% of the total harvest had been left in the field after harvesting. This would be considered excessive in most instances, as losses of less than 10% are desirable.

Results

The plants grew vigorously throughout the trial. They produced plants that averaged over 24 inches in height. The leaves were large and quickly formed a closed canopy. No insect pests or disease were noted in either year of the trial.
The highest yielding variety was CX256RR with harvested yields of 35 bushels/acre. The total yield, which includes the losses due to shattering and harvest, was 42 bushels/acre.

The second highest yielding variety was CX266RR. It produced 26 harvested bushels per acre and 31 total bushels on a per acre basis.

The maturity I variety CX196RR only yielded 18.5 bushels/acre when harvested. It produced a total of 24 bushels/acre when harvest losses were included in the totals (Table 1).

Table 1 Yield results for three soybean varieties grown at Newlands Agricultural Research and Extension Center.

<table>
<thead>
<tr>
<th>Variety</th>
<th>Maturity Group</th>
<th>Yield (bu/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CX256RR</td>
<td>II</td>
<td>42</td>
</tr>
<tr>
<td>CX266RR</td>
<td>II</td>
<td>31</td>
</tr>
<tr>
<td>CX196RR</td>
<td>I</td>
<td>24</td>
</tr>
</tbody>
</table>

Conclusions

The yield totals were compared with similar trials completed on the same varieties in South Dakota by South Dakota-State University agronomists in 1998. In all cases the yields were higher in South Dakota than those obtained in Nevada. The maturity II varieties, CX256RR and CX266RR yielded 58 and 59 bushels/acre respectively in South Dakota. The variety CX196RR yielded 40 bushels/acre in the South Dakota trials. In no case were these varieties among the highest yielding varieties tested. However, the yields in South Dakota were much higher than those obtained in Nevada during the same time period.

The lack of acceptable yield in Nevada may be due to several factors. The seeds were planted a little later than optimum for maximum production with these varieties. The late seeding date could have reduced flower production and seed yield. The maturity dates tested (I, II) may have been too short for western Nevada conditions. Generally a maturity group performs best in an area within 150 miles north and south of where it was developed. This is because flowering and seed production in soybeans is heavily dependent on day length. The latitude of the Newlands station in Fallon is over 330 miles south of the latitude in Brookings, South Dakota where the same varieties are considered as “adapted”. The high heat and low humidity could have reduced flower and seed production. The yields obtained in this preliminary trial were not promising enough to carry on full-scale trials, or to recommend that local producers attempt to grow soybeans on their farms. They may be suitable for growing in the home garden as a fresh vegetable and harvested by hand when the beans are still green.

Resources used in preparation of this fact sheet:


