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GROWING SOYBEANS IN THE COLUMBIA BASIN AND YAKIMA VALLEY

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INTRODUCTION

Soybeans have become quite important in American Agriculture and industry. During the past few years a few hundred acres of this crop have been grown on a trial basis in the Columbia Basin and the Yakima Valley. The crop has been shown to be well adapted to the area if certain varieties and cultural practices are used. Maximum yields have ranged from 40 to 50 bushels per acre.

The production of soybeans is being considered because it would provide a high protein feed in this deficient area, where other feed grains are abundant. Also, commercial processors are interested in the seed for industrial uses.

LAND SELECTION AND CROPPING SEQUENCE

Soybeans do not require soils high in nitrogen as it only increases lodging and delays maturity. Therefore, land which has been out of alfalfa for two or three years is suitable for the crop. Soybeans may follow any of the commonly grown crops in the area. Special attention should be given to selecting a field which is comparatively weed free.

Soybeans do well after soybeans, but successive crops on the same land increase the buildup of certain disease organisms in the soil. The crop does well on new land to be irrigated for the first time.

WHEN TO PLANT

It is well known that soybeans should be planted at corn planting time. In general, the best time to plant is from May 1 to May 15. This may be advanced a week in known "early localities." In case of cold, inclement weather always delay planting until conditions appear favorable. Planting in cold, wet soil will result in poor stands and makes weed control difficult.

Certain varieties may be planted as late as June 10 if it is to be used as a "catch crop." Yields generally decrease progressively with planting dates after May 15.

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ADAPTED VARIETIES

Only varieties which have been tested for adaptability should be grown, (see Table 1). Length of days and nights control the soybean flowering and maturity. Therefore, the varieties are limited to narrow belts running east and west which is governed by the latitude of the area. Varieties which are too early for our latitude produce lower yields, and those which are too late are damaged by early frosts before the seed is fully developed, which reduces both yield and quality.

Small seeded varieties emerge better in crusted soil than large seeded varieties as the cotyledons can push through the soil more easily. This is a minor point, however, as certain cultural practices may be used in case the soil becomes crusted.

The earliest maturing varieties are best for late seedings..

New varieties are being tested every year. These are released if superior to those listed in Table 1. Growers should keep in touch with recent developments through local county agricultural extension agents.

In order to avoid disease damage, only certified seed should be planted.

Table 1. List of adapted varieties and other pertinent data.

Variety*	Rank in earliness **	
Merit	4	A high yielding variety if planted the first part of May. Merit has medium size seeds.
Ottawa Mandarin	5	Ranks next to Merit in yield. May be planted 10 - 12 days later without reducing yields. It has large seeds.
Chippewa	6	A later maturing tall variety which should be planted the first part of May only. Emerges well in crusted soil due to small seeds.
Norchief	1	Norchief, Capital and Grant have medium size seeds and are good yielding varieties which are especially suited for later plantings.
Capital	2	
Grant	3	

\*All in maturity "Group 0" except Chippewa which is "Group I."

\*\*1 is early and 5 is late.

## SOIL TESTING AND FERTILIZING

Soybeans should not receive nitrogen fertilization. The soil where soybeans are to be grown should be carefully sampled and sent to the WSU Soil Testing Laboratory. This leguminous crop has a high phosphorus requirement, and must have an adequate supply of this nutrient and potassium.

Be sure to fertilize with zinc. This is extremely important with soybeans. This crop is different from certain other crops in that no nitrogen fertilizer is needed with the zinc fertilizer. The recommended rate is 10 pounds of Zn per acre which may be applied as zinc sulfate or any recommended zinc carrier.

Phosphate, zinc and potassium fertilizer may be easiest applied before plowing. Phosphate and zinc fertilizer may be banded after plant emergence six inches to the side of the row and six inches deep. Potash fertilizer, if needed, should be preferably broadcast and plowed under. If banded at high rates the bands should be at least nine inches to the side of the plants to avoid "burning."

## SEED BED PREPARATION

The soil should be plowed, harrowed, and packed to give a firm seedbed. A combination cultipacker-harrow will give a firm, smooth seedbed. It may be necessary to go over the field two times with the latter to get the necessary firmness.

On soils which have been spring plowed for some other crop, and are in good condition, disc harrowing can be substituted for plowing. In all cases the soil must be irrigated before the final seedbed preparation.

## SEED INOCULATION AND SEEDING

The seed must be inoculated just before seeding. Fresh, dated inoculum which has been stored in a cool place should be used. Directions for application are given on the containers. The inoculum may be applied dry, although the wet slurry method is equally satisfactory. In the latter case, the water is always added to the seed first. It must never be dried in direct sunlight as this will kill the bacteria.

Soybeans should be seeded in rows 22 inches apart with the seeds spaced one inch apart in the row. Four and six-row bean and beet planters with soybean plates are the most suitable for this. The seeding depth for most soils conditions is two inches. On very firm, moist soil a depth of one inch may be used. Depth bands should always be used on the planter as soybeans will not emerge if planted too deeply.

The seeding rate will vary with seed size ranging from 60 to 80 pounds per acre to give a one-inch seed drop in the row. Although varieties vary in seed size, each lot of seed will vary in size depending on the conditions under which the seed was produced. Do not rely on the machine adjustment record from the previous year.

### WEED CONTROL

As soon as the soybeans have emerged and true leaves have formed the field should be tine-weeded. This will kill the weeds in the "white" stage. Under some conditions two or more tine-weedings may be desirable.

For the first very early cultivation, discs may be set closely to the plants. Blade weeders should be set in back of the discs in such a manner that the "cut out" portion of soil is filled back with the blade. A duckfoot is used in the center of the row. When the leaves become large, only blade weeders on each side of the row in conjunction with duckfeet should be used. Diamond points may also be set in front of the weeder blades in such a manner as to throw soil around the plants. The diamond points must never be set deeply.

Later cultivations with weeder blades in front of "Sinner" weeders are also very effective. The "Sinner" weeder blades should be carefully adjusted to move soil in between the plants.

### DITCHING AND IRRIGATING

Ditching shovels are used on the rear tool bar with the early cultivations; small narrow ditching shovels, preferably the type with a diamond point and flanged smoothing device which does not cover the small plants. With later cultivations the ditches should be made wider and deeper so that they will not "silt in."

Because the soil is well supplied with water before planting, the first between-row irrigation is not usually necessary until about a month later, depending on the soil type. There can be no set rule for irrigating due to climatic and soil factors. An average irrigation interval for most soils is from 10 to 14 days.

Irrigation should be continued until about September 10, at which time the seeds will be well developed. Late irrigations are not advisable particularly if the plants lodge. In the latter case the foliage "mats" on the ground, dries more slowly, and delays harvesting.

### INSECTS AND DISEASES

Wireworms: On land known to be infested with wireworms, apply 100 pounds of 10 percent DDT, or other formulations to give 10 pounds of the active ingredient per acre or 20 pounds of 25 percent aldrin per acre, and thoroughly plow and disc the soil to a depth of 9 inches.

Seed Corn Maggot: Where this is a problem the seed should be treated with 1 ounce of 50 percent wettable powder of dieldrin per 100 pounds of seed, as a dry powder or as a slurry with methyl cellulose sticker. Do not use treated seed as food or feed.

Mites: Late mite infestations after the seed is well formed do little or no damage. Early mite-infestations should be treated with 30 pounds of 3 or 4 percent Trithion dust per acre. Do not apply Trithion later than 7 days before harvest. Do not feed treated forage to livestock.

For more detailed information on these pests see Extension Mimeo. 635, "Control Program for Insects and Other Pests of Truck Crops" and USDA Farmer's Bulletin 1868, "Wireworms."

Plant Diseases: The primary means of controlling soybean diseases are the use of disease-free seed and crop rotations to reduce the time that disease organisms will survive in the soil. For further information see "Diseases of Soybeans", Circular 931, USDA.

#### HARVESTING AND STORING

Samples of soybeans should be taken from the field at close intervals for moisture determinations when the leaves begin to turn yellow and drop. The seed on the plants mature quite uniformly. The moisture content should be from 12 to 14 percent at harvest. As the seed moisture drops below 12 percent, shattering and seed cracking becomes a problem in combining. Soybeans grown on soil high in nitrogen are slow to drop the leaves, and special attention should be given to the seed moisture content for determining when to harvest.

The instruction manual for a given make of combine should be carefully followed. Because many of the pods on the soybean plants are produced near the ground level, it is essential that the sickle bar is adjusted near the ground at all times. Vine lifters are helpful in combining lodged plants.

Chemicals are not recommended for defoliating soybeans. The final maturing of soybeans is very rapid. The application of chemicals early to defoliate the plants reduces yields.

Each load of soybeans to be stored should be checked to see that it contains 13 percent or less of moisture. Dry clean bins should be provided for storage.

#### EROSION CONTROL

Following harvest, a green manure crop of hairy vetch, or winter wheat should be seeded to protect the soil from wind erosion during the winter and spring. Another alternative is to ditch and irrigate the soil. The soil following a crop of soybeans is very susceptible to wind erosion.