CIRCULAR A-250 Revised FEBRUARY 1958

SOYBEAN PRODUCTION in North Dakota

SOYBEANS are now an important cash crop in North Dakota, with 184,000 acres harvested in 1957.

Soybeans at first were grown mainly in southeastern North Dakota, which also is the commercial corn area. This area is best suited to soybean production because of its favorable temperatures, longer growing season and generally satisfactory rainfall. However, soybeans for seed harvest are now grown as far north as the Canadian border in eastern counties.

Soybeans need favorable moisture throughout the summer and early fall. This limits their westward expansion in the state.

NDAC Extension Service, Fargo
NORTH DAKOTA AGRICULTURAL COLLEGE

SOIL PREFERENCE

Soil requirements for soybeans are about the same as for corn. A mellow, fertile, medium-textured loam soil will usually be best. Heavier soils should have good drainage. Sandy loam soils warm up faster and, when adequate rainfall is available, will hasten development of soybeans in a cool or short growing season.

A soil relatively free from weeds is very desirable to avoid serious weed competition. Effective weed control is important in obtaining profitable soybean production.

CHOOSING THE VARIETY

Choose a variety of soybeans which will mature under the average local growing conditions and produce a satisfactory yield of high-quality beans. In general, the farther north or west in North Dakota, the earlier the variety you need.

Suggested soybean varieties, based on corn maturity zones (Fig. 1), are listed here for North Dakota. Your location within any one zone, or your own experience, should be considered in selecting from the several varieties suggested. Table 1, listing Experiment Station yields and other crop data at Fargo and for Richland County, along with the maturity classification listed, may help you in selecting the variety to grow.

VARIETIES SUGGESTED FOR CORN MATURITY ZONES

Soybean varieties suggested for each of the state's corn maturity zones (Fig. 1) are listed in Table 1, in order of maturity. The earliest are at the top and the later maturing ones toward the bottom

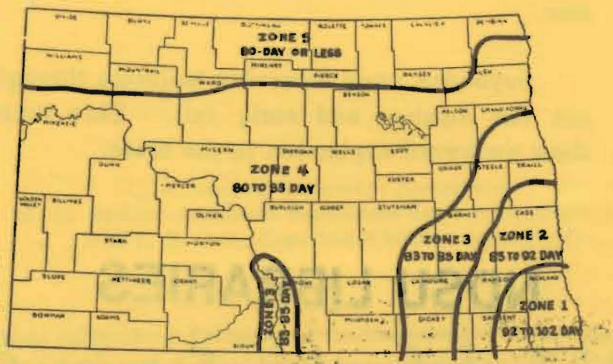

FIG. 1. - CORN MATURITY ZONES OF NORTH DAKOTA

Table I. Yields and other agronomic data of soybeans grown at Fargo and in Richland County. North Dakota Experiment Station and U.S.D.A. cooperating.

Variety	Zone 1/	Maturity	Height	Resistance to lodging	Seed Size	Yield-bu./ acre Richland Co. 1955-1957	Yield-bu./ acre Fargo 1956-1957
Acme	4,5	v.early	short	good	large	13.7 2/	27.0
Flambeau	3,4	early	medium	medium	med. large	22.1	30.0
Goldsoy	2,3	med. early	short	medium	large		32.4
Norchief	2,3	med. early	medium	good	med. large	24.2	30.0
Comet	2,3	med. early	medium	good	medium		29.8
Norsoy	2,3	med.	medium	medium	med. small	21.6	30.0
Mandarin (Ottawa)	2,3	med.	medium	good	large	23.4	30.6
Hardome	1,2,3	med.	tall	medium	medium	24.5	31.5
Early Manchu	1,2	med.	tall	medium	medium	24.1	32.4
Grant	1,2	med. late	medium	med. good	medium	24.2	32.6
Capital	1,2	late	medium	medium	small	22.9	30.3
Chippewa	1	v.late	tall	good	med. small	24.7	27.6

1/ See map, Fig. 1, corn maturity zones.

2/ Shattered badly 1955. Adjusted yield estimated 18 to 19 bushels.

The yield figures above indicate only slight yield differences among the several varieties best adapted to the area. If you are now planting a variety adapted to your area cultural practices such as early planting and weed control will affect yield more than selection of another variety.

COMPARATIVE VARIETY MATURITY

The approximate maturity-day classification shown in parenthesis after each variety does not indicate the maturity of the soybean variety, but rather indicates about how each variety compares with corn maturity classifications for North Dakota.

ACME - (75 to 79 day)
FLAMBEAU - (80 to 82 day)
GOLDSOY - (81 to 84 day)
NORCHIEF - (82 to 85 day)
COMET - (82 to 86 day)
NORSOY (Pridesoy) - (83 to 86 day)
OTTAWA MANDARIN - (83 to 87 day)
HARDOME - (84 to 86 day)
EARLY MANCHU - (85 to 90 day)
GRANT - (85 to 89 day)
CAPITAL - (88 to 93 day)
CHIPPEWA - (91 to 96 day)

INOCULATION

Soybean seed should be inoculated with "soybean bacteria" just before planting. This provides the necessary bacteria in the soil which will allow the soybean plants to function as a legume, utilizing and storing nitrogen from the air. This inoculant is different from that required for alfalfa, sweet clover and other legumes.

SEEDBED PREPARATION

Soybeans respond to good seedbed preparation. On fall plowed fields shallow spring tillage to kill weeds before planting is effective. On soils where spring plowing is practiced, plowing is usually done just before planting time. A firm, moist seedbed, as free from weed seed as possible, is desired. The sooner soybeans are planted after the last cultivation the better their chance to compete with the weeds.

FERTILIZING

Soybeans do best in fertile soil but have been rather erratic in their response to commercial fertilizer. If a soil test of the field or response in other crops indicates a distinctly low phosphate availability, a row application by planter attachment of 0 to 10 pounds of nitrogen and 20 to 40 pounds of phosphate is recommended. Fertilizer results have varied considerably, so experience on your farm is your best guide. Leave an unfertilized check strip for comparison. Not over 10 pounds of nitrogen should be applied per acre in the row to prevent possible injury to the seed.

PLANTING

Soybeans should not be planted until the soil has warmed up and air temperatures are favorable. This usually is about corn planting time, or slightly later. This slightly delayed seeding allows time to kill early starting weeds before planting.

On good land, where weeds are not a serious problem, planting as early as favorable conditions permit allows the beans to take advantage of the entire growing season and results in higher yields. Late planting may be justified for weed control but yields will be considerably lower most years.

Planting in rows is the most common method used and permits cultivation for weed control which is important in obtaining good yields. A corn planter with the proper plates, a grain drill, or a sugar beet planter, may be used. Plant about 1-1/2 to 2 inches deep to place the seed in moist soil. Planting too deep, or in a soil which crusts, may result in poor emergence.

The most common row spacing is 40 to 42 inches, the same as for corn. This makes it possible to use regular corn planter and cultivator equipment. Row spacings narrower than 36 inches have not given higher yields except for short, early maturing varieties, especially when planted late. Such narrow rows will require special planting and cultivation equipment.

Close drilled, or solid, seedings will produce satisfactory yields only if the land is relatively free from weeds. Some weed control early in the season, with a harrow or rotary hoe, can be obtained but, if there are very many weeds in the field, weed control is often unsatisfactory.

RATE OF SEEDING

In row plantings for best yields and competition with weeds, plant soybeans about 1 to 1-1/2 inches apart in the row. This takes about 45 to 60 pounds of seed per acre, depending on the row spacing and size of seed. There are about 3,000 medium-sized soybeans in 1 pound. For 20 to 24-inch row spacing about 90 to 100 pounds of seed per acre are required. About 120 pounds per acre should be seeded for solid seedings. In all cases adjust the seeding rate for size of seed and germination test.

WEED CONTROL

Effective weed control is important in obtaining high soybean yields. Cultivate early. A rotary hoe, spike-tooth harrow or weeder can be used between planting and emergence of the beans.

When the beans are 3 to 8 inches tall, frequent cultivations with a rotary hoe, light harrow or weeder is very effective in killing weed seedlings in the rows with little damage to the beans. Do this when the beans are slightly wilted during the warm part of the day.

Row plantings can be cultivated with ordinary corn or beet cultivators. Two or three cultivations are usually needed. Shallow cultivation with sweep-type cultivator shovels is recommended to prevent ridging, which makes harvesting more difficult, and to prevent serious injury from root pruning. Avoid cultivating soybeans when the leaves are wet to prevent the possibility of spreading diseases which may be present.

Soybeans are somewhat susceptible to injury from 2,4-D or MCP. Selective chemical control of weeds in growing soybeans is not recommended. Annual grass weeds (except wild oats) can be

controlled by CDAA (Randox) applied pre-emergence at the rate of 4 to 6 pounds of active ingredient per acre. Band application can be used to reduce per acre cost. Control is effective for 4 to 6 weeks. Covering slightly by pulling a loop of logchain over the sprayed area increases effectiveness in dry years.

HARVESTING

Straight combining is the most satisfactory and commonly used method of harvest. It is important to follow the combine manufacturer's recommendations for necessary adjustments to prevent splitting and breaking the beans. Cylinder concaves or bars should be opened up as required and cylinder speed reduced by about one-half. If the beans are very dry it may be necessary to combine only in the morning or evening when humidity is high.

Harvest soybeans when the plants mature and the beans are dry, containing not more than 14 percent moisture. When very dry (8 to 10 percent moisture) more shattering and injury to the seed in harvesting will generally occur. Shattering of about 40 beans per square yard represents a loss of 1 bushel per acre.

STORING

Soybeans may be safely stored for short periods of time during the fall or winter with a moisture content as high as 14 percent. For safe storage during the spring or summer months soybeans should not contain more than 12 percent moisture. Beans free of foreign material and split beans store better and stay in condition longer.

L. A. Jensen, Extension Agronomist;
R. E. Bothun, Assistant Experiment Station Agronomist,
and T. E. Stoa, Experiment Station Agronomist

North Dakota Agricultural College and the United States Department of Agriculture Cooperating. E. J. Haslerud, Director of Extension Service. Distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914.