

GROWING SOYBEANS IN MASSACHUSETTS

*Stephen J. Herbert & John Creighton
Department of Plant & Soil Sciences
University of Massachusetts*

Soybean Varieties

Daylength is a key factor in the development of the soybean plant. It also determines which varieties are best adapted for use in Massachusetts. Soybeans initiate flowers where a critical night length has been reached, thus soybeans are classified into maturity groups as a function of their photoperiodic response. Group 00, group 0 and group I soybeans can be grown in Massachusetts for seed production. Group II or later maturing soybeans will not always mature before they are damaged by frost. In our studies Evans, a group 0 soybean, has performed better than Altona, a group 00 variety.

Seeding Rate and Row Spacing

Soybean plants adapt well to a wide range of plant densities. As the plant density increases, stem diameter decreases, plants grow taller, there is less branching and the number of pods per plant decreases. Soybeans can compensate for errors in planting by changing both branch number and pod set per node. Growers are urged to use narrow rows for soybeans. Consistently, yields should be improved by narrowing rows to 7-10 inches. Mostly changing to a narrow row does not require a greater plant density. Plants will simply be spaced more uniformly over the ground. In very narrow rows where cultivation is impossible, a slightly heavier seeding rate will help form a complete leaf canopy sooner, thus shading weed seedlings before they are able to compete with soybean plants. Recommended seeding rates range from 150,000 to 200,000 plants per acre. Care needs to be taken in choosing the seeding rate to adjust for row width, seed size and seed germination.

Planting Date

Time of planting is important but there is no single calendar date that will be consistently better than others. Soybeans should not be planted as early as corn. They need a minimum air temperature of 50°F and soil temperature of 60°F for growth. Optimum growth rate occurs at 75°F. When conditions are most favorable soybeans will emerge 5 to 7 days after seeding. Rapid development means more uniform stands, stronger competition against weeds and fewer disease problems with seedlings. The period May 20 to June 1 is considered best for planting. For any given variety there is a close relationship between plant height and bean yields. If a slight delay doesn't have much effect on plant height it probably will not reduce yields.

Lime and Fertilizer

Soybeans obtain most nitrogen required from the air and some nitrogen and all phosphorus and potassium from residual sources in the soil. Nitrogen fixing bacteria function best at pH values of 6.0 or above. For this reason alone a sound liming program to ensure optimum soil pH is advised. There are many other reasons, including the faster organic matter decomposition releasing nitrogen and other necessary nutrients, the release of phosphorus from fixed forms and the available but non-toxic levels of micronutrients.

Soybeans should be inoculated with *Rhizobium* bacteria specific to soybeans to promote the greatest amount of favorable plant-symbiotic bacteria to form root nodules. Inoculation is especially important if soybeans have never been grown on the land being used, or if it has been a number of years since soybeans were grown. Fertilizer nitrogen is not recommended. Responses to phosphorus and potassium are not great and generally soybeans will grow well on 'left over' fertilizer from previous crops provided soils are testing at least between medium and high. General recommended rates without a soil test are 60 lbs of phosphate and 60 lbs of potash per acre.

Weed Control

During the early stages of growth, soybeans are not very competitive with weeds. This is especially true if soybean seed is poor and if soybeans are planted when the soil is cold. Several chemical weed control programs are available, including trifluralin, alachlor, linuron, dinoseb, and others. If cultivation is used, try not to make hills or ridges. Hills and ridges can prevent the cutter bar from getting close enough to the ground to gather the lowest pods.

Planting Depth

The seed bed should be smooth for a uniform planting depth of 1-2 inches. Plant seed just deep enough to be in moist soil but not deeper than necessary. If soil forms a crust before beans emerge, break it with a rotary hoe or spike tooth harrow but harrow very shallow.

Harvesting

Combine when moisture in beans is 14 per cent. Pods are brown and dry and seeds are in hard dough. The cutter bar should be kept low to gather the lowest pods. Seed losses before and from the machine can be severe. Four beans per square foot left in the field equals one bushel per acre. Average field loss is 16 per cent!