

# Crop Profile for Soybeans in Nebraska

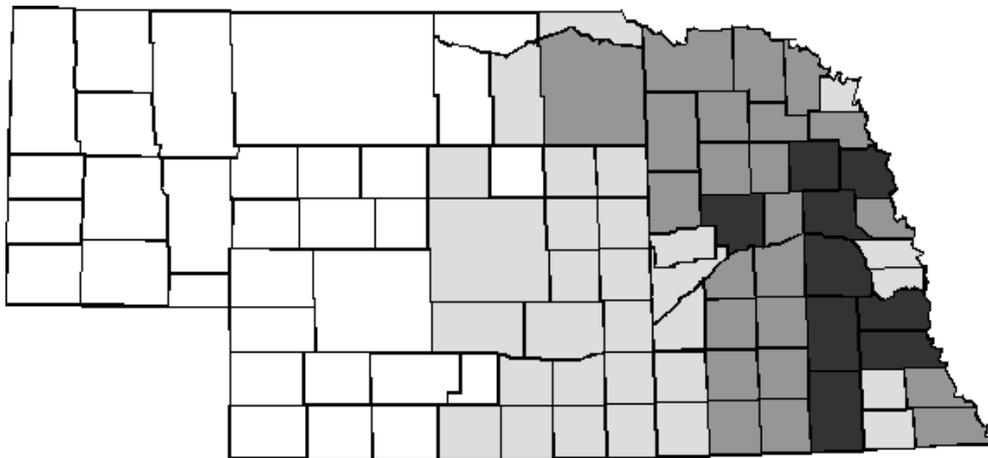
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## General Production Information



- Nebraska is ranked 5<sup>th</sup> in soybean production in the United States in 1999 (6.8% of the U.S. soybean crop).
- In 1999, Approximately 4,300,000 acres were planted and 4,250,000 acres were harvested in Nebraska. Soybeans are Nebraska's second leading crop.
- Nebraska soybean production was 180,625,000 bushels in 1999, valued at \$903,125,000 (assuming a \$5 market price per bushel). Average yield was 42.5 bushels per acre.
- Over 20,000 Nebraska farms plant soybeans.

## Production Regions



Soybeans are primarily produced in the eastern half of Nebraska. Production is highest in the eastern third of the state.

## Cultural Practices

Nebraska has a temperate climate with soils that range from sand in the west to the deep loess soils of the east. In the soybean growing region annual precipitation ranges from 21.7-23.6 inches in the west to over 33.5 inches in the southeast. About one third of Nebraska's soybean acres are irrigated.

Optimum planting date for soybeans in Nebraska is from May 20 to June 5. Soybean varieties in Maturity Groups II and III are best adapted to Nebraska conditions. A variety of production systems are used, including narrow- and wide-row planting under convention, reduced, and no-till cultivation.

Fertilizer is applied to less than 25% of Nebraska's soybean acres. The only fertilizer nutrients that have been observed to increase soybean yields are nitrogen and phosphorus. Lime is sometimes needed on some calcareous or saline soils in eastern Nebraska where the pH is above 7.4.

## Insect Pests

With the possible exception of bean leaf beetle, insect pests of soybeans in Nebraska are usually of minor concern. The following section briefly describes the effects and treatment of some insect pests commonly found in Nebraska soybean fields.

Bean leaf beetles overwinter as adults and colonize soybean fields as soybeans emerge, feeding on cotyledon and leaf tissue. Seedling injury, although severe in appearance, rarely results in economic damage. Early planted fields are most vulnerable to spring infestations. Treatment of early-season bean leaf beetle infestations is not recommended.

Late-season bean leaf beetle injury can occasionally result in economic damage. The beetles feed on leaf tissue, petioles, and developing pods. If late-season beetle infestations reach economic thresholds at pod-fill, treatment is recommended. Chemical controls include products containing the active ingredients carbaryl, chlorpyrifos, dimethoate, esenvalerate, lambda-cyhalothrin, methyl parathion, methomyl, permethrin, and thiodicarb.

Potato leafhoppers overwinter in the Gulf States and migrate to Nebraska on winds that move gulf moisture northward in the spring. Yearly infestation patterns are variable and dependent on weather systems. Late-planted soybeans coupled with a large leafhopper migration can result in economically damaging infestations. Local movement of leafhoppers from alfalfa into adjacent seedling soybean fields after first cutting also can result in economic damage. If economic thresholds are reached during seedling stages, treatment may be necessary. Chemical controls include products containing the active

ingredients carbaryl, dimethoate, esfenvalerate, lambda-cyhalothrin, permethrin, and tralomethrin.

Grasshoppers (several species) typically overwinter as eggs in undisturbed grassy areas and field margins. As grasses mature, grasshoppers may move into nearby soybean field. Relatively dry weather in early and middle summer is favorable for grasshopper build-up. If economic thresholds are reached during seedling stages, treatment may be necessary. Chemical controls include products containing the active ingredients carbofuran, chlorpyrifos, dimethoate, esenvalerate, lambda-cyhalothrin, methyl parathion, tralomethrin.

Two-spotted spider mites are generally controlled by a natural fungal disease. However, under conditions of low humidity, the fungus is suppressed and spider mite populations can increase and economic damage to soybean can occur. Spot treatments are sometimes recommended. Chemical controls include products containing the active ingredients dimethoate and chlorpyrifos.

Other insect pests that are found in Nebraska soybean fields, but rarely treated, are wireworm, seedcorn maggot, blister beetle, green stinkbug, various defoliating caterpillars, and cutworms.

## Diseases

Soybeans are threatened by several diseases, the most common being soil-borne fungal diseases. Cool, wet spring weather is favorable conditions for many pathogens of seedling soybean. Common genera involved in seedling damping-off and root rots are *Fusarium*, *Phytophthora*, *Pythium*, and *Rhizoctonia*.

Non-chemical management practices for of seedling diseases include planting high quality seeds with intact, unbroken seed coats, use of conservation tillage techniques to carefully manage soil moisture in fields with a history of disease problems, and use of disease-resistant soybean varieties when available. Seed applied fungicides also are available containing one or more of the active ingredients metalaxyl, captan, carboxin, ethazole, PCNB, thiabendazole, and thiram.

Diseases that occur at various plant stages later in the season include *Sclerotinia* stem rot, brown stem rot, charcoal rot (also expressed in seedlings), and sudden death syndrome (SDS).

*Sclerotinia* stem rot is favored by cool, wet summers. Inoculum builds up in continuous soybean fields or in fields with weeds such as pigweed or wild sunflower. Measures used to manage *Sclerotinia* stem rot include using row spacing wider than 15 inches to increase air circulation, use of less susceptible varieties, and use of clean seed.

Brown stem rot occurs late in the growing season and is favored by temperatures under 80° F and moisture stress. Management of brown stem rot includes crop rotation, use of resistant varieties, and tillage that buries infested crop residues.

Charcoal rot symptoms can occur in seedling or late-season soybean stages. Known as "dry-weather wilt" or "summer wilt", the disease is favored by limited soil moisture and soil temperatures from 83 to 95° F. Management of charcoal rot includes crop rotation, planting early, maintaining adequate fertility and moisture, avoiding high plant populations, and drilling soybeans or planting highly branching varieties that shade and cool the soil.

Sudden death syndrome is spread with soil, so equipment sanitation is an important management practice. Cool, wet growing conditions favor this disease. Other management strategies include selection of tolerant varieties, avoiding early planting dates in cool-wet soils, using ridge-till in fields with a history of SDS, and maintaining adequate fertility and moisture.

Soybean cyst nematode (SCN) is becoming an increasing problem in Nebraska and is established in at least 18 counties in eastern Nebraska. Nematodes are spread with anything that moves soil, such as farm equipment, water, and wind. Symptoms of SCN infestations can be confused with other problems or may not be evident. Management recommendations are based on the number of eggs/100 cc of soil and include equipment sanitation, use of resistant varieties, and crop rotation.

## Weeds

Early emerging grass and broadleaf weeds are a significant problem with Nebraska soybean production. Currently, the ten most troublesome weeds in Nebraska are pigweeds, foxtails, velvetleaf, sunflower, volunteer corn, shattercane, cocklebur, Pennsylvania smartweed, common lambsquarter, and kochia. Other weeds include hemp dogbane, field bindweed, buffalobur, morning-glory, and black nightshade.

Because of the large number of weeds a soybean producer must deal with it is essential that weeds are dealt with as a complex. Keeping a good field management history is important to making decisions during any specific year. An integrated approach to weed management (Integrated Weed Management) should be used involving cultural and chemical weed management practices. Cultural weed management practices may include crop rotation, timely cultivation, adjusting row spacing, varying planting date, using highly competitive soybean varieties, and using clean seed.

Herbicides are used on over 90% of Nebraska's soybean acreage. They are applied as preplant incorporated herbicides, surface blended or preemergence herbicides, and postemergence herbicides.

The four most widely used herbicide active ingredients in 1998 were glyphosate, trifluralin, imazethapyr, and pendimethalin. The advent of genetically engineered glyphosate-resistant soybean varieties has increased the current use of products containing glyphosate.

Making a decision to use herbicides depends on a variety of factors. Fields should be scouted and economic thresholds used where available. University of Nebraska weed scientists have developed the decision support software, WeedSOFT, to aid producers in decision-making. Some factors that should be considered when selecting a herbicide are weed species to be controlled, weed densities, soil texture, organic matter, pH, crop rotations, and field history.

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## References

Information addressing soybean production in Nebraska can be obtained from Nebraska Cooperative Extension, Institute of Agriculture and Natural Resources, University of Nebraska-Lincoln. Most information is available at: <http://www.ianr.unl.edu/pubs/>

Statistical information can be obtained from the Nebraska Agricultural Statistics Service homepage: <http://www.agr.state.ne.us/agstats/index.htm>

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