



SOYBEAN FACTS



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Checklist for Improving Soybean Yields

Mike Staton, MSU Extension Agricultural Educator
Kurt Thelen, MSU Extension Cropping Systems Agronomist
George Silva, MSU Extension Agricultural Educator

The following checklist summarizes management practices that are proven to contribute to high-yielding soybeans. The practices are organized chronologically, beginning with the fall before the soybeans will be planted. This list can be used to identify opportunities for increasing soybean yields.

Fall

- Avoid soil compaction during harvest and fall tillage operations**

Soil compaction limits root growth, reduces nodulation, inhibits potassium uptake and promotes diseases such as sudden death syndrome and phytophthora. Yield losses due to compaction are variable and closely related to the availability of soil moisture. Yield reductions are more severe under dry conditions. Yield losses of 15 to 40% can occur.

- Take soil samples for nutrient and pH analysis**
Maintain soil pH between 6.0 and 6.5. Researchers from the University of Wisconsin and Iowa State University found that soybean cyst nematode populations increased significantly at soil pH levels greater than 6.4.

- Collect and submit soil samples for soybean cyst nematode analysis**

Soybean cyst nematodes (SCN) cause more economic losses than any other soybean pest. Yield losses up to 15 bushels per acre can occur before symptoms are visible. Collecting and submitting soil samples in the fall before planting soybeans is the first step to reducing yield losses from SCN. Each farm can submit 20 samples to the MSU Nematode lab free of charge.

- Apply lime and broadcast potash if needed**
Apply lime in the fall before planting soybeans as lime typically takes at least 6 months to react in the soil.

Potash can be safely applied in the fall to mineral soils having cation exchange capacities of 6 meq/100 g or higher.

- Select high-yielding, well-adapted varieties**
Variety selection is one of the most important management decisions producers make. Utilize the Michigan Soybean Performance Report, information from seed companies and your on-farm trials to select high-yielding, well-adapted varieties. Consider the following characteristics: yield, SCN resistance, disease resistance or tolerance, standability and maturity.

Spring

- Inspect, repair and calibrate planting equipment**

Uniform seed spacing in the row will improve yields. Small seed will plant more evenly and will experience less mechanical damage than large seed when planted with a drill equipped with a fluted metering system. Always calibrate your drill by seeds per foot of row or seeds per acre. Recalibrate whenever seed size changes.

- Control weeds prior to planting**
Always plant into weed-free fields. Delayed burn-down applications have resulted in yield losses of 8 bushels per acre in MSU research trials. Tillage and/or herbicides can be used to control weeds.

- Broadcast potash on coarse-textured or organic soils if needed**

Fall applications of potash are not recommended on coarse-textured soils having CECs less than 6 meq/100 g or on organic soils due to the potential for leaching losses.

- Apply phosphate fertilizers if recommended**

□ **Plant into good soil conditions**

Adequate and uniform soil moisture, soil temperatures higher than 50° F and a level surface will promote uniform seedling germination and emergence.

□ **Plant soybeans early**

The first two weeks of May is considered the ideal planting window for soybeans in the lower half of the lower peninsula. Yield losses of .6 of a bushel per acre per day can occur when planting is delayed past May 15. Please see the SOYBEAN FACTS fact sheet entitled "Early-Planted Soybeans - Risks, Benefits and Recommendations" when planting prior to May 1.

□ **Inoculate seed whenever soybeans are planted**

Researchers from Michigan State University and Ohio State University report average yield increases of 1.3 bushels per acre from using inoculants on fields having a history of soybean production.

□ **Consider a soil-applied residual herbicide application followed by a post-emergence application**

Benefits include: reduced early-season weed competition, consistent control of weeds that emerge over a long time period, consistent control of hard-to-control weeds and herbicide resistance prevention.

□ **Plant at the optimum seeding rates**

Plant 175,000 seeds in 7.5" rows, 150,000 seeds per acre in 15" rows and 130,000 seeds per acre in 30" rows.

□ **Plant in narrow rows**

University research trials have shown that planting in narrow rows significantly increases soybean yields.

□ **Plant at the optimum depth**

Plant beans between 3/4" and 1-1/4" deep. In general, plant at the shallower end of the range when planting early and in no-till and plant at the deeper end of the range later in the season.

□ **Plant a range of maturity groups**

Planting a range of soybean maturity groups spreads your risk during the growing season, allows more of the crop to be harvested at the optimum stage and allows for timely wheat planting.

□ **Use seed treatments where warranted and provide uniform coverage of the seed**

Fungicide seed treatments are warranted when planting very early and/or where pythium is known to be a problem (Southwest Michigan). Insecticide seed treatments are warranted when seedcorn maggot, wireworm or bean leaf beetle damage is expected.

□ **Monitor fields closely beginning at emergence**

Diagnose emergence problems early.

Emergence can take 6 to 18 days depending on soil temperature and soil moisture conditions.

If slow and uneven emergence occurs, dig up the delayed plants and look for disease or insect damage. Plant stands of 100,000 plants per acre will produce optimum yields if the plants are relatively evenly spaced. After emergence, continue checking fields for bean leaf beetles and black cutworms. Monitor weed heights and use this information to time post-emergence herbicide applications.

□ **Apply post-emergence herbicides timely and properly**

Apply post-emergence herbicides before weeds exceed 4" tall as early emerging weeds cause the greatest yield reductions. Please see the SOYBEAN FACTS fact sheet entitled "Maximizing Glyphosate Performance".

Summer

□ **Identify and correct manganese deficiency symptoms**

Yellow, stunted plants growing in dark-colored or high pH soils are likely deficient in manganese. Manganese deficiency symptoms always reoccur in the same areas as manganese does not build up in the soil. Check for deficiency symptoms and make foliar applications of manganese when the plants are 6" tall. Manganese sulfate produces the most consistent results. Refer to the SOYBEAN FACTS fact sheet entitled "Maximizing Glyphosate Performance" for information on reducing antagonism when tank-mixing manganese carriers and glyphosate herbicides.

□ **Monitor and control soybean aphids**

Begin scouting soybean fields in late-June and continue through mid-August. Make an insecticide application when the aphid populations reach 250 aphids per plant and increasing.

Fall

□ **Harvest at the optimum stage and adjust combine settings to maximize yield and quality**

Harvesting soybeans when the moisture content falls to 15% for the first time produces the highest test weight and yield. The probability of experiencing harvest losses due to shattering increases when the beans undergo several wetting and drying cycles after drying to 13% moisture.

Additional information about increasing soybean yields and profitability can be found online at <http://web1.msue.msu.edu/soybean2010/>.

Reference materials include: "Adjusting a Grain Drill For Planting Soybeans", J. E. Beuerlein, Ohio State University, "Soil pH Influences Soybean Disease Potential Summary", C. Grau and N Kurtzweil, University of Wisconsin and G. Tylka, Iowa State University, "Soil Applied Residual Herbicide Benefits in Soybeans", C. Sprague, CAT Alert, Vol. 22, No.3, "Soybean Seed Applied Inoculation", K. Thelen and T. Shulz, CAT Alert, Vol, 22, No. 2