



G R O W I N G

Organic Soybeans

O N C O N S E R V A T I O N R E S E R V E P R O G R A M L A N D

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Organic Soybeans Have Proven Market Value

Organic soybeans can be a very lucrative crop for Iowa farmers. Before entering the organic soybean arena, farmers should first become schooled in the history, philosophies, legalities, and markets of organic agriculture in general. A brief overview of organic agriculture follows; for further details, see Iowa State University Extension publication *Organic Agriculture* (PM 1880).



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Food-grade clear-hilum soybeans command the highest organic premium.

Organic Soybeans

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What Is Organic Agriculture?

In order to sell your crop as certified organic, you must be certified by one of the agencies approved by the USDA National Organic Program (NOP). A list of agencies in Iowa is provided in *Organic Agriculture* (PM 1880)*. The NOP requirements include the following:

- No synthetic fertilizers for 36 months prior to the crop's harvest.
- No synthetic pesticides (e.g., fungicides, insecticides, herbicides) for 36 months prior to the crop's harvest.
- Crop rotations, including a soil-building legume or small grain/legume mix should be planted, to help break weed, insect, and disease cycles and maintain soil fertility.
- No synthetic hormones or antibiotics for livestock may be used, and organic feeds and pastures/hay must be fed.

Soil fertility in organic systems is maintained through crop rotations (for example, soybeans-oats-alfalfa-corn or some variation of this system), applications of manure (manure from non-organic farms must be composted before application or applied 3 months prior to an agronomic crop harvest), and/or applications of seaweed, fish emulsion, or plant/animal-based products, such as feathermeal. Soybeans fix nitrogen for the crop needs, and can be grown without compost or manure, unless phosphorus levels are deficient. Soil testing is recommended to determine the need for supplemental amendments (see below). Subsequent crops must include rotations of grain crops and nitrogen-adding cover crops to maintain adequate fertility for future soybean crops. Sample the soil in at least four places per acre to determine if lime is needed to adjust the pH (to a pH of 6.5–7.0). Any ISU Extension county office can provide soil sample information and names of labs.

*See page 8 for ordering instructions.

The Market

How can organic soybeans be marketed? The majority of organic soybeans are used for tofu and other soy products in the United States and exported to Japan and other countries. Food-grade soybeans are clear-hilum beans (no black mark on the seed). Other organic markets include soybeans for organic livestock feed and for oil or lecithin processing.

The Iowa Department of Agriculture and Land Stewardship Directory of Iowa Organic Producers, Buyers, and Processors handbook contains a list of buyers of organic grains. Check with buyers to learn their contract prices. (Contracts based on acreage

[regardless of yields] vs. bushels provide growers the greatest flexibility.) Farmers have reported increased production as the farm progresses from conventionally-farmed land to organically-farmed land. Soil health improves and beneficial insect populations become more numerous once pesticide applications cease.

Over a four-year period in Iowa, average organic soybean yields ranged from 25 bushels/acre to 56 bushels/acre. From 1998–2001, prices ranged from \$12/bushel to \$20/bushel (see variety selection under *Land Preparation*) for certified organic soybeans, depending on variety and condition of seed.

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Many organic farmers plant a cover crop of winter rye on ridges or tilled CRP land prior to their soybean crop to assist in erosion and weed prevention.

Land Preparation

Conservation Reserve Program (CRP) land must be adequately prepared for organic soybean production. Pasture grasses and legumes in the CRP land must be adequately degraded before planting soybeans. To be sure CRP plants are degraded, organic farmers often moldboard plow in the fall and plant a cover crop of winter rye to help control erosion, aid weed control (the rye deters weed establishment), and provide some organic matter when turned under in the spring.

In the event of delayed rye planting (past October is generally not feasible), plowing is still recommended to kill grasses and legumes. In the spring, additional tillage will be needed to prepare a seed bed and kill any remaining vegetation before planting. A field cultivator may prove adequate for these operations, or a disk may be needed if plants are more robust or soil is cloddy. The soil should be relatively smooth and friable before planting to allow good seed-to-soil contact.

Planting populations depend on the soybean variety planted, but seeding rates generally range from 175,000 to 225,000 seeds per acre to provide quick in-row shading and weed management. Again, check with buyers; some require large-seeded soybeans (e.g., Vintons), and others prefer smaller sizes (e.g., Pioneer 9305 or ISU varieties) with higher seeding rates.

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Early weed management is essential in preventing problems later in the season.



Row cultivators are used two to three times to control weeds between rows.

Planting and Weed Management

Field cultivators will kill most rye cover crops between 6" and 8", using harrow attachments to bring residue to the surface. Taller rye can be cut with a stalk chopper or mowed first to aid in plant degradation. Cultivate again about a week after first tillage operations to kill germinating weed seeds that have developed as a result of soil disturbance. Plant soybeans at least 1" deep when the soil has reached temperatures of 50° F. Some organic farmers believe that adequate soil temperature is key to a successful crop and may delay planting their soybean crop until June when soils are warmer, and bean leaf beetles have colonized other earlier-planted fields. Past June 1, a decrease in yields may be anticipated, however.

Weed control is the most critical element of organic soybean production. Tillage operations require planning and precise timing. Three to five days after planting (depending on weather conditions), rotary-hoe weeds at a slow speed (5 mph) for good penetration. Once the soybeans have emerged and are beyond the "crook" stage, at seven to 10

days, hoe again a little faster (7–9 mph) to enhance surface aggressiveness. Check the hoe's penetration, weed kill, and crop response to determine optimal speed and depth. Row cultivation can begin as soon as soybeans reach an adequate size to withstand soil around the base of the plant. In mid-growing season, when the plants are flowering, cultivate again at a faster speed to throw about 1" of soil up around plants. The last cultivation should be slow (5 mph). Organic farmers use a variety of cultivator additions, including guidance mirrors, disk hillers, metal tent shields, and sweeps configurations (e.g., 26-inch one-piece sweeps in 36-inch row spacings). The USDA Sustainable Agriculture and Research Education (SARE) Sustainable Agriculture Network can provide details on cultivators and recommended tillage operations in the book, *Steel in the Field* (EDC 125).

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Harvesting and storing are important steps in collecting a premium price for organic soybeans.

Harvest and Subsequent Crops

Your certification agency will provide specifications on how organic farmers harvest, clean, and store certified organic soybeans. All certified organic soybeans must be separated from conventional soybeans. Therefore, combines, cleaners, and bins must be thoroughly cleaned between conventional and organic harvests. This is particularly important for farmers who hire operators or rent machinery.

When harvesting and storing clear-hilum soybeans, it is essential that the soybeans be clean and free of discoloring soil and/or weed seeds, such as nightshade. Clean, whole soybeans will receive the highest market price. There are various methods to keep soybeans whole and as contaminant-free as possible during harvest. Methods include using combines with dual rotating screens and raised at least 6 inches above soil level; “dirt guards” and smooth plates also help prevent contamination. If fields are weedy, organic farmers often delay harvest until a killing frost destroys any remaining weeds. Staining in organic soybeans can be helped through late planting and variety selection.

Storage bins must be free of other products and used only for organic soybeans. It is best to purchase a separate storage bin for organic soybeans. Methods to keep soybeans dry in storage, such as fans or heaters, should be installed. Moldy soybeans cannot be sold as food or feed. Buyers usually require samples from each load. Clean-out soybeans that are cracked, small, or stained usually average 10–15 percent of the load. These can be sold for organic feed. There may be a market for transitional soybeans (those in the three-year transition phase between conventional and organic). Buyers can provide information on those markets.

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A minimum of three crops in a rotation is usually found on Iowa organic farms.

Some organic farmers follow their soybean crop with corn, although the majority rotate to a small grain following soybeans. If corn is selected, oats may be planted for a winter cover. Oats can be overseeded into soybean fields at leaf yellowing. Freezing weather kills the oats, but stalks remain on the surface to protect the soil from spring erosion. Organic corn currently is priced at a greater price premium than organic oats, but we may see an increase in price of organic small grains with the need for organic livestock feed increasing around the world. If following organic soybeans with small grains, soybean stubble is generally left

through the winter and disked or field cultivated in the spring prior to planting small grains. Rotations always will be key in a properly functioning organic farm to help break up insect, weed, and disease cycles; thus, it is best to plan for a minimum three-year rotation if growing organic soybeans on CRP land.

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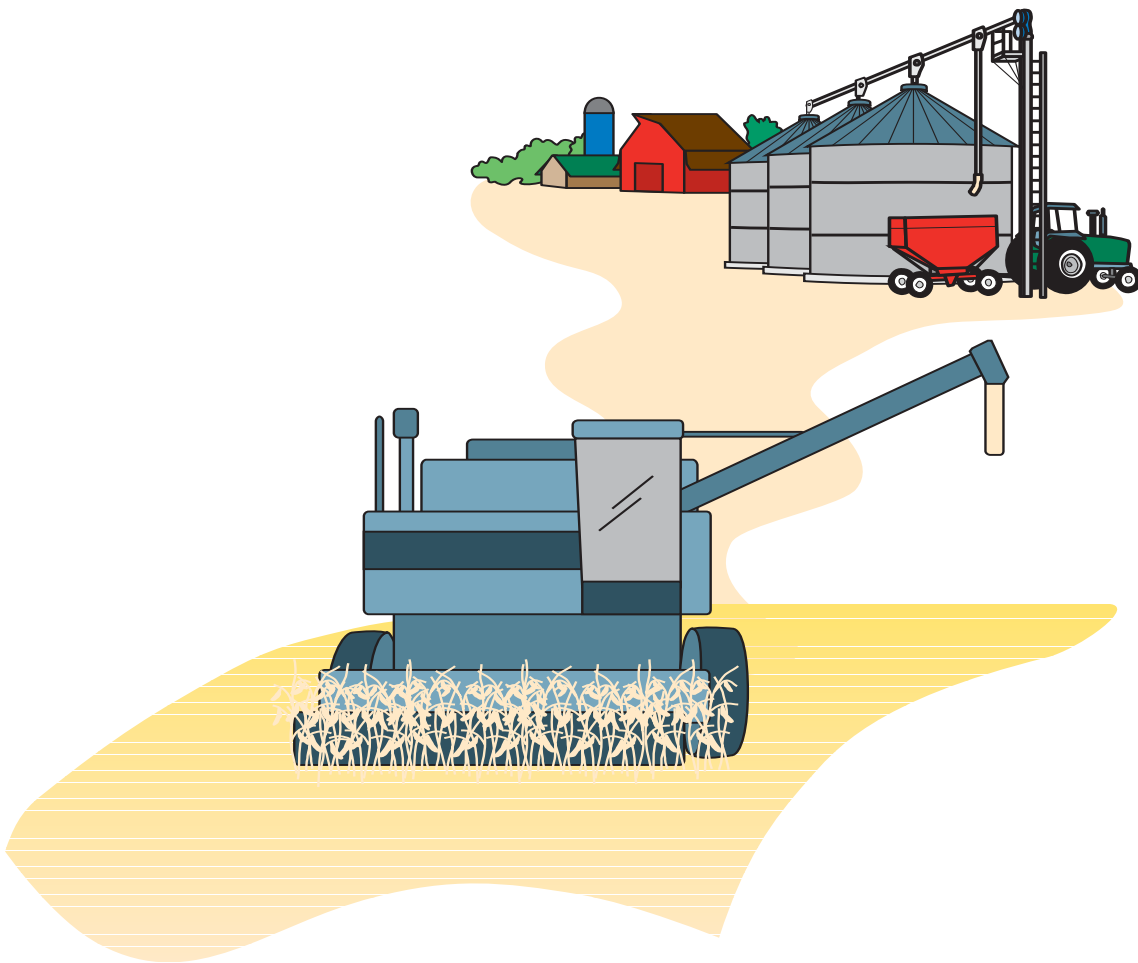
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For the latest on organic agriculture from Iowa State University go to <http://extension.agron.iastate.edu/organicag/>.

Publications mentioned in this booklet can be ordered by contacting any ISU Extension county office or the ISU Extension Distribution Center at (515) 294-5247. There is a charge, plus shipping and handling, for some publications.

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