Harvesting High-Quality Organic Grain

Part 2 — Soybeans

by Mary-Howell & Klaas Martens

Studies show that most consumers of organic products generally buy them because they perceive organic food to be of higher quality. It is imperative, therefore, for organic farmers to focus on producing and maintaining high-quality products. The days of organic crops selling easily simply because they are "organic" are over. There is too much supply to continue that luxury, with organic grain and beans coming into the United States from all over the world.

We must make sure that "organic" is never an excuse for selling and delivering moldy corn, buggy wheat, stained soybeans, checked red kidney beans. We must make sure that the organic products we deliver are of the highest quality.

Last issue, we discussed small grains in detail. In this installment, we will look at soybeans.

Food-grade soybeans are the premier crop of our farm in western New York, as they are for most organic grain farmers. They are our reliable high-profit crop, the one that buyers come to us asking for. But farmers in Argentina, Brazil and China have learned this too, and the supply of organic food-grade soybeans is rapidly increasing on the world market. There are a lot more organic soybeans on the market now than there were five years ago.

Reprinted from
ACRES USA
A Voice for Eco-Agriculture
November 2002 • Vol. 32, No. 11

So what can we do to insure our share of this market? Well, we probably can't raise soybeans more cheaply, nor do we have the luxury of virgin, newly-cleared rainforest soil and cheap labor. Perhaps our greatest strength is in delivering *high quality.* New York climatic conditions can produce high-protein, high-quality, attractive soybeans that make superior soymilk, tofu and other soy products. But the challenge of delivering high quality to your buyer is only partly agronomic. The rest is in the harvesting, handling, storage and transport.

DELIVERING BETTER BEANS

Moisture. Harvest the soybeans at a moisture level that will not cause spoilage or damage during storage. Soybeans will keep at 13 percent moisture. Most contracts specify a certain moisture level at which beans must be delivered. The 2002 Vinton contract from Agriculver Inc., in Trumansburg, New York, states that the beans must be delivered at 10.5-12.5 percent. Peter Shuster, who buys organic soybeans from many New York farmers, recommends that farmers harvest at 15 percent, when the beans are most resilient, to avoid cracking and other damage, and then dry the beans with ambient-air aeration. Vinton 81s often mature unevenly, so it is important to wait until all the beans are mature. But once the beans are fully mature, don't wait any longer! Prompt harvest prevents shatter losses and weather damage, especially when the beans get below 12 percent moisture.

Weeds. Green weeds and green stems can cause dust and dirt to stick to the seed coats, they can stain soybeans beans black, and nightshade gives the seed a purple stain that cannot be removed. It is, obviously, best to grow in fields that are free of weeds, but that is not always possible, especially in years with erratic weather. Therefore, you must develop other strategies to avoid staining. In weedy fields, make sure to combine later in the day, when plant leaves are fully dry. Waiting until frost — when the weeds are no longer full of juice — may be necessary in some particularly weedy fields. Several years ago, Floyd Hoover, Guy Christiansen and Klaas Martens invented a device that, when mounted on the front of a tractor, mows off the tops of weeds poking up through the soybean canopy with 12 lawnmower blades. Where there is a high population of vigorous lambsquarters, velvetleaf and pigweed, this can eliminate much of the juicy green material that will stain beans during harvest. It also will greatly reduce weed seed production. While over-the-top mowing does do some damage to the soybean plants, overall there are substantial benefits when weed pressure is high.

Disease. Diseases in soybeans can cause significant quality problems. Whenever possible, start with disease-free seed and disease-resistant varieties. Green Stem Syndrome, probably caused by a combination of virus, insect, soil conditions, weather and variety, can cause uneven maturity in soybean fields. The soybean mosaic virus and the pod mottle virus, probably a part of this syndrome, can cause beans to develop a brown or purplish stain around the hilum that may make food-grade beans unsalable to premium markets. Using virus-free seed is essential. White mold can really reduce yield and damage the quality and appearance of the beans. Since white mold is associated with high humidity at bloom, poorly aerated conditions, such as in low-lying fields or where there is heavy weed infestation, may increase susceptibility. Carefully plan your crop rotations to avoid alternating with crops that are also

The "weed topper" was designed to mow weeds that rise above the soybean canopy, greatly reducing bean-staining problems at harvest.

susceptible to soybean diseases. If any of your fields show significant levels of disease or early frost damage, be sure to harvest and store those fields separately — don't mix bad beans with good ones!

Keep the corn out. Soybean fields must be free of corn. Cleaning soybeans often does not adequately separate corn from soybeans. If you have a field of soybeans with a lot of volunteer corn, don't mix them with beans from clean fields. Hand-rouging soybean fields for volunteer corn is often time well spent. Gravity tables and spiral cleaners will remove a lot of corn from beans, but they are not 100 percent effective. Disking corn fields in the fall after harvest will often eliminate much of the volunteer corn the following year. Keep in mind the requirements of your contract — the Agriculver 2002 contract, for example, states that excessive crop seed, weed seed, dirt and foreign matter that can not be easily removed are grounds for rejection, as are excessively high levels of splits, staining, immature, green and discolored beans.

Reprinted from
ACRES USA
A Voice for Eco-Agriculture
November 2002 • Vol. 32, No. 11

Dirt and stones. Prevent dirt chunks and mud from entering the combine. Forget about those beans too low to the ground, and keep the cutter bar out of the dirt. Small stones may not separate well from soybeans, and can cause major problems for tofu and soymilk producers by damaging the pressing equipment. Woodchuck holes can cause the combine to take in quantities of dirt and stones which can damage the beans, may throw the combine out of adjustment, and will be hard to remove.

GMO alert. Combines and field wagons must be completely free of other soybean varieties to avoid contamination. Are you hiring a custom combine? Here's a sobering fact: over 80 percent of the New York conventional soybean crop are genetically modified Roundup Ready varieties. So, in this area, there is an excellent chance that the custom combine driving into your organic field just left a Roundup Ready field. Wherever you are located, it is critical that you take the time to thoroughly clean out any combines that may be also used on conventional soybeans. An "empty" combine can still hold as much as two to three bushels of the previous crop. After cleaning, run some organic soybeans at maximum capacity through the system as a purge to clean out any remaining GM soybeans (and write down your cleaning procedures in your field notebook). If a custom combine operator is not willing to take the time for a thorough cleanout, you would do well to hire someone else.

Setting the combine. Peter Shuster says that there is absolutely no substitute for a well-adjusted combine in good repair, with knives, guards, raspbars and concave replaced before they are worn out, and with all parts straight and in good condition so the beans will feed in evenly. Adjust the machine to keep bean damage to an absolute minimum. It is important to have experience with your machine and to spend the time needed to observe whether it is doing the job right. The combine should be set to feed material into and through the system quickly. In order to minimize physical damage to the beans, get the pods out of the cylinder/rotor and get the soybeans and plant material into the separator as quickly as possible. In a rotary combine, it is important to get the stems and pods out of the rotor as quickly as possible. But most people tend to run the cylinder too fast with the concave too far open. It is best to keep the combine running full to keep grain rubbing against grain rather than grain rubbing against iron. Most combines will lose a lot more grain when they are being run too slowly.

Field conditions change. Remember that crop conditions can change not only by the field but also by the hour as weather conditions and moisture content change. Peter Shuster cautions that dew early in the morning can cause dust to stick to the beans and stain them. It is critical to wait until after the plants dry completely to begin combining, maybe until after lunch. After you combine a few hundred feet into a field (the combine needs to be running at full capacity), stop and look critically at the thrashed beans. If they do not look clean and bright, *stop* and wait until conditions are better. If you are not sure, it might be best to show a sample to your buyer before harvesting for a whole day. Many buyers will be able to suggest changes in combine settings to improve harvest quality.

Quality custom harvest. Custom operators often push to get started too early in the day, and do not like to take the time to insure top quality. That's fine for farmers producing cheap, feed-grade, conventional soybeans, but if you are producing organic food-grade beans, this can ruin your crop. You have to be assertive with a custom combine operator and insist that your beans are handled with utmost

care. After the quality of the beans have been compromised by sloppy or poorly timed combining, it is too late to do anything about it.

Don't mix the good with the bad. If you have sections of a field where the beans are wetter, weedy or of lower quality, harvest and store them separately. Don't risk spoiling a bin of good beans with a few loads of bad beans. Some buyers will be interested in buying the "bad" beans separately to try to clean them enough to make them sellable, but they will not want to buy lots of mixed good and bad beans if they can help it.

Clean out equipment. Any hauling vehicle that includes augers should be cleaned thoroughly. Grain-receiving pits, augers or conveyors, elevator legs, dryers and bins are all possible sources of mixing. If you are loading into a truck, be sure that the truck is clean, including the "sump" (if it has one), and that the tarp is completely opened and empty of old beans before starting to fill the truck. There have been cases of organic soybeans being rejected for GM contamination because they were co-mingled with GM beans caught in the truck tarp.

Clean out bins. Clean storage bins completely, vacuum grain dust, remove spilled moldy grain, and keep weeds around the bins mowed. The need to clean bins before storage was thoroughly covered in the October installment on small grains, but the importance of this should be emphasized again here. Don't put clean beans into dirty bins and don't mix new clean soybeans with old, possibly infested soybeans.

Handle with care. With food grade whole organic soybeans running $14-$16/bu and soybean splits running $8-$10, it makes sense to maximize your quantity of good, undamaged beans. Avoid dropping beans a long way down into bins, minimize the use of stirrers and spreaders, and move the beans as little as possible. Bean ladders can be installed in bins to lower them more slowly. Brush augers on the bin unloaders can really cut down on damage. When handling beans, augers should be run full, but not fast. You might also wish to purchase a beltveyor, especially if you are also growing edible dry beans.

Ventilation. Soybeans should go into bins that have aeration, preferably with a full perforated floor. Keep the beans in the bin cool by running the fans when needed — day and night (unless it is raining) until they reach 13 percent moisture. Some buyers may actually require the use of aeration. Put higher-moisture beans in the bottom of bins so that moisture will more easily move up through dry beans when aerated. However, it is important to keep track of the equilibrium moisture level. Beans will come to a certain percent moisture based on temperature and humidity. If the equilibrium moisture level is above the percent moisture of the beans, then aeration may actually make the beans wetter.

Use caution with heat. Be very cautious when using supplemental heat with stored soybeans. At our farm in New York, supplemental heat is not needed if soybeans are harvested near the proper moisture level in the field. Raising the air temperature by 10 degrees with heat will reduce the humidity by half, thereby reducing the equilibrium moisture level of the air going through the beans drastically. Drying beans too quickly will cause them to split and be susceptible to further damage. If you are using supplemental heat, it is relatively easy to overdry the bottom before the top is adequately dry. The average of the bin may be fine, but a large percentage of the beans may be damaged by excess drying. Monitor closely.

Don't split now. Right out of the combine, the cleanout percentage for good Vinton soybeans should be 6 percent or lower. After some time in storage, the percent of cleanout will be higher, often around 10-12 percent. The amount of cleanout depends on many things, including quality and cleanliness of beans at harvest, harvesting and handling equipment damage, conditions during storage, and how stringently your buyer cleans the beans. The dirtier your beans start out, the higher the percent cleanout will be!

In most cases, soybean splits are sold to the animal-feed market and will need to be roasted prior to feeding. On average, there is about 10 percent weight loss in roasting, though this can be much higher if the splits contain a lot of pod and stem material.

DO THE PAPERWORK

You're an organic farmer, so you're not done until the paperwork is done. Make a careful record of all your harvest, handling and storage — this is a critical part of your required audit trail.

Whenever you ship any product off your farm, it should be accompanied by:

1. A Bill of Lading, listing your name and address; your buyer's name and address; the date; the product, identified as "certified organic," with your certification; a lot number; and an estimated or actual weight.

2. A Clean Truck Affidavit or Truck Cleaning Document. This can be as simple as a statement written on the Bill of Lading, but the point is to document that you, as the organic producer, have taken responsibility for the sufficient cleanliness of all equipment and transport vehicles.

3. Weigh Slip.

4. A copy of your organic certificate under which the product is certified.

5. A Certificate of Compliance (FVO), Transaction Certificate (OCIA), or Organic Transfer Monitor (NOFA) sent to your buyer as soon as possible to document the transfer of the organic product.

Remember: keep copies of everything for your records!

Mary-Howell & Klaas Martens raise mixed grains on more than 900 acres in the Finger Lakes region of western New York, with every acre certified organic. Mary-Howell is a former genetics researcher and a frequent writer for Acres U.S.A. *They can be contacted by email at <kandmhfarm@sprintmail .com>.*