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# ATTRAnews

Newsletter of the National Sustainable Agriculture Information Service: A project of the National Center for Appropriate Technology (NCAT)

# Growing Organic Small Grains

The local-food movement has created a demand for locally produced grain. Most American grain is now produced in the Northern Plains states, where the dry climate and cold winters create ideal growing and storage conditions. Would-be organic-grain producers in warmer and more humid areas must overcome serious pest and disease problems. This *ATTRAnews* considers the best methods for growing organic small grains.

Articles in this issue are adapted from a forthcoming series of ATTRA publications about organic small grains.

*An organic crop of beardless hard red spring wheat ripens in a California field. Photo: Rex Dufour, NCAT*

## Opportunities and Challenges

By Susan Tallman, NCAT Agronomist, Certified Crop Adviser

Weed management, soil fertility, soil moisture, tillage, rotation design, and marketing present a unique set of obstacles to organic-grain farmers.

### Reasons to Consider Organic Grain Production

1. Farmers must innovate and experiment on their own farms. This can be a rewarding challenge.
2. Organic production means less pesticide exposure for farmers and their families.
3. Organic production requires increased crop diversity, which adds income sources and helps break pest cycles.
4. When done correctly, organic production can improve the health of the soil. With the increase in organic matter, there is increased nutrient availability, less soil crusting, and better water infiltration.
5. Fewer annual purchases of synthetic fertilizer and herbicide mean greater returns per acre and less need for a large annual operating loan. Per-acre returns can be the same or better than in conventional farming.
6. Cash-crop yields can compare to 90 to 100% of conventional-system yields once the rotation is established.
7. Demand for organic grains is strong. Prices paid to organic producers have historically been greater than those paid to conventional producers.
8. NRCS-EQIP funds may be available to help offset any costs of conversion, such as seed costs for cover crops.
9. Programs may be available to offset costs of certification.
10. Most farmers in the organic community are friendly and willing to share advice. Linking with other farmers in the region is critical for success.

### Reasons Not to Consider Organic Grain Production

1. Farmers must innovate and experiment on their own farms. This can be a significant source of frustration.
2. Nutrient management is not as predictable as it is in conventional grain production. Nitrogen produced by green manure legumes varies widely with weather and precipitation.
3. Most large grain farms do not have easy access to large amounts of animal manure for soil fertility.
4. The first three to five years of transition to organic production are the most difficult. Also, no organic-price premiums are available during the three-year transition phase.
5. If there are no nearby organic farmers to talk to, it can be difficult to know what steps to take.
6. Tillage is generally the most significant method of weed control in an organic system. But tillage can reduce soil organic matter and increase soil erosion.
7. A continuous system of no-till organic grain production has not been perfected. Diverse no-till systems can improve soil structure, increase organic matter, and decrease soil erosion better than the tillage-dependent organic system.
8. Organic record keeping adds to the paperwork required to run the farm business.
9. Cash grain crops cannot be produced every year on each field because diverse rotations are necessary.
10. Finding a buyer may be difficult for farmers who live in areas where grain is not widely produced.

**Inside:**

## Resources for Organic Small-Grain Producers

**ATTRA's Organic Small Grains webinar** is free online: *www.attra.ncat.org/video/#small_grains*

**From Conventional to Organic Cropping**: What to expect during the transition years. From Montana State University Extension. *www.msuextension.org*

**Iowa State University's Long Term Agroecology Research Site** compares conventional and organic grain and bean rotations. *http://extension.agron.iastate.edu/organicag/rr.html*

**Ohio State University's** Organic Food and Farm Educational Research. *http://oardc.osu.edu/offer*

**Organic Field Crop Handbook** is available from the Canadian Organic Association. *www.cog.ca/our-services/publications/organic-field-crop-handbook*

**Montana State University's** Soil Nutrient Management on Organic Grain Farms in Montana. *http://landresources.montana.edu/soilfertility*

**Small-Scale Grain Raising** An organic guide to growing, processing, and using nutritious whole grains for home gardeners and local farmers. By Gene Logsdon, Chelsea Green, 2009 *www.chelseagreen.com*

**University of Manitoba**'s website on various crop rotations in no-till and organic systems. *http://umanitoba.ca/outreach/naturalagriculture*

**University of Minnesota's** Farm Financial Database: 2009 Organic Farm Performance in Minnesota. *www.finbin.umn.edu*

**University of Nebraska's Organic Working Group** conducts organic grain variety trials at various locations. *http://organic.unl.edu*

## Appalachian Staple Foods Collaborative

### New ways to produce, process, market local grains and beans

Michelle Ajamian and Brandon Jaeger started the Appalachian Staple Foods Collaborative in 2008 to build a model field-to-table local-food system based on the production, processing, and marketing of staple beans, grains, and oilseeds. The Athens, Ohio, project involves a diverse group of organizations, farmers, local businesses, and private citizens. The collaborative now runs a prototype processing facility to assess equipment, marketing, and scale for local processing of staple crops.

"Southeast Ohio has great local markets for fruits, vegetables, dairy, and meats," says Jaeger. "But there is an absence of grains. We started with test plots to see how some beans and grains performed in our area. Before the seeds were even planted, we started to get calls from folks who were interested in buying local grains. Once we saw the demand, we started to identify the issues of harvesting, processing, and storage. We hope that it will be easy to scale up our model so that local grains become an integral part of our food system. This will not only financially benefit the farmers, but also the local businesses and the economy."

To learn more about the Appalachian Staple Foods Collaborative, see their website, *www.asfc.weebly.com* as well as ATTRA's interview with founders Ajamian and Jaeger, *www.attra.ncat.org/interviews/asfc.html*

### We Want to Hear About Your Alternative Farm-Energy Experiences

NCAT Farm-Energy Specialist Leif Kindberg is researching alternative energy for small farms and would like to hear about your alternative-energy systems, technologies, and observations. Your experiences will be considered for use in future ATTRA publications. Let us know what is working for you and, just as important, what is not working.

If you are willing to talk to Leif and to share your alternative-energy experiences with other farmers, please call him at 479-575-1380 or e-mail *leifk@ncat.org*.


The following publications can be downloaded from ATTRA's website. Or call 800-346-9140 for a free print copy.

- Alternative Agronomic Crops IP045
- Amaranth Production CT152
- Biorationals: Ecological Pest Management Database (online only)
- Edible Soybean Production and Marketing CT171
- Energy Efficient Grain Drying Resources (online only)
- Organic Field Corn Production CT113
- Organic Rice Production CT143
- Sustainable Corn and Soybean Production IP100
- Conservation Tillage CT105
- Flame Weeding for Agronomic Crops CT157
- Grain Processing: Adding Value to Farm Products IP140
- Grasshopper Management IP145
- Intercropping Principles and Production Practices IP135
- Manures for Organic Crop Production IP127
- Marketing Organic Grains CT154
- Oilseed Processing for Small-Scale Producers IP134
- Organic Crop Production Overview IP170
- Organic Field Crops Documentation Forms IP230
- Organic Standards for Crop Production: Highlights of the USDA's National Organic Program Regulations IP332
- Principles of Sustainable Weed Management for Croplands IP039
- Pursuing Conservation Tillage Systems for Organic Crop Production IP183
- Seed Production and Variety Development for Organic Systems IP272
- Stored Grain Pest Management CT174
- Suppliers of Seed for Certified Organic Production (online only)
- Transgenic Crops IP189

# Managing Diseases in Organic Grain Fields

By Susan Tallman, NCAT Agronomist, Certified Crop Adviser

Prevention is truly the best strategy for managing diseases and insects in an organic system. Many of the basic practices of organic production, especially crop rotation, help minimize pest pressure and promote the biological diversity that suppresses pests. Farmers must stay ahead of outbreaks by selecting resistant varieties, practicing vigilant monitoring, and implementing a long, diverse rotation.

**Disease Management**—Regions with low rainfall generally have relatively few disease problems. In warmer, humid parts of the country, grain crops are more susceptible to diseases and fungi. Growers in those areas need to consider carefully whether organic small-grain production is right for them.

**Resistant Varieties**—Choose varieties specific to your area, bred to resist local diseases. State Cooperative Extension stations conduct annual variety trials comparing resistance levels of different varieties.

**Seed Quality**—Find the plumpest, highest-germinating seed you can, and plant in high density to offset losses due to damping off. When possible, select **certified seed** from a reputable dealer. In general, certified seed should be purchased every third year. Certified seed will help manage seed-borne diseases such as smut and bunt.

**Delayed Planting**—To help manage soil-borne fungi such as Pythium and Rhizoctonia, plant when soil temperatures are warmer.

**Irrigation Timing**—Do not irrigate your grain crop when it is flowering. Flowering is the susceptible period for Fusarium head blight and ergot.

**Crop Scouting**—Crop scouting is an essential part of disease management. The earlier you detect diseases in the field, the more time you have to respond. Hone your skills in disease diagnosis. If the disease is not a serious problem, you may choose simply to live with the reduced yield. Extreme cases may require terminating the affected portion of the crop before the disease gets out of hand.

**Storage Environment**—Storage mold can be managed by constantly checking grain moisture during harvest. Discontinue harvest when grain moisture exceeds 12%. If there is concern about the grain's moisture content, use aeration in the bin to dry the grain. High moisture levels and high bin temperatures lead to mold, grain deterioration, and insect infestation.

*Using a roller-crimper to terminate a cover crop of cereal rye in Dickinson, North Dakota. Learn more about roller-crimpers and no-till grain production by viewing ATTRA's free online webinar, Innovative No-Till: Using Multi-Species Cover Crops to Improve Soil Health,* **www.attra.ncat.org/video/#notill**
*Photo: Susan Tallman, NCAT*

**The articles in this issue** are adapted from a forthcoming series of ATTRA publications on organic small-grain production. NCAT agronomist Susan Tallman is the author of the series, which will cover the following topics:

- Overview — production principles, soil health, organic matter, transition to organic production, rotation design
- Nutrient management
- Weed management
- Disease and insect management
- Profiles of organic small-grain producers

The first of the publications will be published in spring 2011 and will be available to download at ***www.attra.ncat.org/field.html***

# Top 10 Tips for Growing Organic Small Grains

1. **Maintain or increase soil organic matter** by reducing tillage and using cover crops and green manures.
2. **Test soils for nutrient availability** on a regular basis. Harvesting grain removes nutrients from the system. These nutrients must eventually be replaced.
3. **Provide nitrogen by growing green manure legume crops**. Provide all other essential nutrients from organic fertilizer sources.
4. **Provide as many nutrients as possible from biological sources**, such as animal manure, green manure legumes, compost, and cover crops. Mined organic fertilizer sources such as rock phosphate are often expensive and have low nutrient availability.
5. **Consider livestock as part of the crop system.** Manure is a good source of phosphorus and organic matter.
6. **Reduce soil water loss in arid regions** by terminating green manures before they use too much water. Maximize catchment of snow in the winter by cutting straw higher at harvest, leaving taller stubble.
7. **Minimize fallow periods**. When possible, provide ground cover, minimize erosion, and add biomass.
8. **Use multiple techniques for weed suppression**, including tillage, variety selection, increased plant spacing and density, and crop rotation. Farmers with serious perennial weed problems, such as Canada thistle or field bindweed, should not consider organic production until these weeds are under control.
9. **Be aware that pest and disease pressure will increase with increased humidity and temperature**.
10. **Diversify the crop rotation as much as possible**. A diverse rotation is essential to break pest cycles, spread out financial risk and maintain soil health.

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# Managing Insect Pests in Organic Grain Production

The most powerful strategies to minimize in-crop insect damage are cultural practices, rotation, and sanitation. Secondary strategies include predators, traps, and lures. After the first two steps are in place, biological and allowed synthetic substances can be used.

## Cultural Practices

**Resistant varieties** can often help manage problem insects. Farmers need to select a variety based on their primary pest problem.

**Diverse crop rotations** can help to break the pest insects' cycle. Organic farmers tend to have fewer sawfly problems, for example, because of crop rotation practices and the biodiversity in their fields. Rotation to crops that are less attractive to cutworms and wireworms may also help to break the life cycles of these pests.

**Trap crops** should be extremely attractive to pest insects and should stay green longer than the harvested crop. Plant a trap crop on the border of your grain field. When it fills with pests, till it into the ground.

## Dealing with Stored-Grain Insects

The best technique for controlling grain-storage insect pests is to control the storage temperature of the grain. The cooler the temperature, the less active the insects and the less likely they are to reproduce.

In colder states such as Montana and North Dakota, grain can be stored for two to three years with no insect or mold problems if the grain is carefully monitored for changes in temperature and insect numbers.

Farmers in warmer states usually store grain over only one winter to avoid insect and mold problems. This issue of storage time affects a farmer's marketing plan, since some specialty organic grains can take more than a year to sell after harvest.

When placing organic grain in bins, make sure the bins have been thoroughly cleaned and all cracks have been sealed. Never put new grain on top of old grain.

Use smaller bins to reduce the risk of spreading insect or mold problems. The standard 3,000- to 5,000-bushel bins should be small enough, but avoid using 50,000-bushel bins. Air does not circulate well in the bigger bins, and small infestations soon become very large problems. One infestation can ruin an entire crop if it's all in the same bin.

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**Send a message with your e-mail address to Karen Van Epen, *karenv@ncat.org.***
**Thank you for helping us conserve resources!**

## New and Updated Publications from ATTRA

- Illustrated Guide to Growing Safe Produce on Your Farm IP382
- Label Rouge: Pasture-based Poultry Production in France IP202
- Local Foods #1: Seed Spices IP377
- Local Foods #2: Cilantro IP378
- Local Foods #3: Basils IP379
- Local Foods #4: Oregano IP380
- Local Foods #5: Hot Peppers IP381
- Persimmons, Asian and American IP375

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