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Organic Small Grain Production

CURRENT TOPIC

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Growing small grains organically means using sustainable methods that exclude the use of standard commercial fertilizers, synthetic pesticides, preservatives, and growth regulators. Organic farmers rely on crop rotations, crop residues, animal manures, legumes, green manures, off-farm wastes, mechanical cultivation, mineral-bearing rocks, and biological pest control to maintain soil health, supply plant nutrients, and minimize insects, weeds, and diseases.

Federal laws regulating the growing, labeling, and marketing of organic products require producers to be certified through a private or state agency. ATTRA has several publications on the topics of organic certification and production. *Organic Farm Certification & the National Organic Program* addresses the new federal requirements. *An Overview of Organic Crop Production* provides a general introduction to organic farming methods and would be considered a prerequisite to starting an organic small grain enterprise. The *An Organic and Sustainable Practices Workbook & Resource Guide for Cropping Systems* is recommended especially for producers new to organic farming. These and other relevant ATTRA publications are available in print and on our Web site http://www.attra.ncat.org.

Details on small-grain production practices—such as planting dates, seeding rates, varieties, and harvesting methods—vary widely among regions, but are largely the same for conventional and organic systems. Such information is generally available from the local Cooperative Extension Service. A brief discussion of some special considerations for organic small grain production follows.

Reducing fertilizer and pesticide inputs requires considerable knowledge and innovation. *Organic Wheat Production Handbook*, published in 1999 by Kernal of Life (1), covers organic certification, principles of organic farming, soil management, crop rotations, planting practices, crop growth and development, nutrient management, grain protein, grain yield, irrigation of winter wheat, disease management, harvest, and storage management. Although the book has a Southwestern slant, it will be useful to anyone who wants to grow small grains organically.

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There are several publications and organizations that will help prospective organic farmers learn more about the subject. Two publications of particular value are Fred Kirschenmann's *Switching To A Sustainable System* (2) and a newer publication, *Transition Notebook* (3), which covers weed control, composting, and a list of information for making the transition to organic farming. Finally, the book *Organic Farming* by Nicholas Lampkin covers all aspects of organic farming, including small grain production. A British book, it is available from a U.S. publisher in New York (4).

Soil Fertility

Organic management seeks to maximize the contributions of on-farm resources such as animal manures, composts, and green manures to soil fertility. However, purchased off-farm nutrients—including mineral fertilizers, fortified composts, and plant and animal meals—may be necessary to ensure adequate nutrient availability during transition to an organic program. Building soil organic matter enhances nutrient availability, as well as soil moisture-holding capacity, and can aid in preventing the buildup of soil-borne plant diseases. A key part of an organic soil-building program is rotation of crops, coupled with the use of cover crops and green manures. For more information on crop rotations, see the enclosure entitled "Planning Crop Rotations."

Animal manures and legumes are two major sources of nitrogen in organic systems. Legume cover crops, plowed down to provide green-manure nitrogen, also contribute to soil tilth and organic matter. During decomposition, legumes can provide 50 to 150 lbs. of nitrogen per acre. Small grains can also receive supplemental nitrogen from crop rotation patterns that include perennial legumes like alfalfa and clover. For more information about cover crops and green manures, request the ATTRA publication *Overview of Cover Crops and Green Manures*.

Native phosphorus and potassium fertility may be enhanced using animal manures and conserved through good management of cover crops and crop residues. Rock phosphate can serve as an alternative or supplementary phosphorus source when necessary. Application rates for rock phosphate usually range from 250 to 1000 pounds per acre. Different sources of rock phosphate have different qualities in terms of their ability to release phosphorus to plants. To fully realize the benefit of rock phosphate, the soil pH should be slightly to moderately acid. Alternative potassium sources include Sul-Po-Mag and untreated potassium sulfate. For more information on soil fertility, request ATTRA's *Sustainable Soil Management* and *Alternative Soil Amendments* publications.

Insect and Disease Management

Integrated pest management (IPM) provides a working framework for insect and disease management in organic production systems. In conventional or non-organic systems, IPM utilizes cultural practices and crop scouting to minimize the need for pesticide applications. Pesticides are applied only when insect populations reach economically damaging levels. An organic grower might use the cultural practices and the scouting information but forego the recommended pesticide applications. Information on crop scouting for the major pest problems associated with small grains in a given area can be obtained from the Cooperative Extension Service or private crop consultants. For an overview of IPM principles and practices, request the ATTRA publication *Biointensive Integrated Pest Management*.

Some of the techniques used in intensive small-grain production—such as narrow rows, thicker-than-normal stands, and tram lines (an uplanted strip used to drive on, which allows precision application of inputs)—also provide benefits to farmers who do not use synthetic chemicals and fertilizers. However, these intensive practices may increase disease incidence.

Some disease problems can be minimized with resistant cultivars and variety mixing. Variety mixing involves planting several different small-grain varieties in a mixture, each with a different type of disease resistance. Mixed fields may lose individual varieties to specific pests or diseases, but the chance of total crop failure is greatly reduced. Alternatively, a grower could decide to plant different

fields of separate varieties. Under this system, a specific pest or disease may ruin one field but not affect the others.

Weed Management

Weed control strategies in organic small grains include crop rotation and a limited amount of mechanical cultivation. The narrow-row spacing associated with drilled grains affords significant crop competition with weeds. However, rotation to other crops is still necessary to break weed life cycles. Continuous small-grain cropping creates a haven for weeds with similar ecological niches (e.g., cool-season grasses, buttercup, and others). Including a late-spring-planted crop such as sunflower or proso millet into the winter-wheat fallow system reduced winter-annual grass weeds such as downy brome and jointed goatgrass in a Kansas dryland study (5). Unlike row crops, in which weed control can be obtained through cultivation, drilled crops are less conducive to mechanical weed control. Harrowing or rotary hoeing can help reduce weed problems but it can only be done lightly when the small grain is a few inches high, and weeds have germinated but not emerged. For more details on weed management, request the ATTRA publication *Principles of Sustainable Weed Management for Croplands*.

Marketing

Though organic small grains carry significant price premiums (Table 1), marketing them differs in many ways from conventional marketing. Unlike conventional grain production, where the grower can deposit a whole harvest at the elevator, organic production is often done on contract to a specific buyer. The organic market is typically made up of many buyers who have small individual supply needs. Even the largest buyers usually cannot take a whole year's supply of a particular crop all at once, but may need a lesser amount every month. Consequently, it is often necessary for the organic producer to have grain storage capacity.

Table 1. Organic small grain prices February 2003 (7).

Grain	Low	High
	— $/bushel —	
Durum wheat	5.00	8.00
Hard red spring wheat	5.00	7.65
Hard red winter wheat	4.75	6.05
Soft red wheat	4.35	5.50
Soft white wheat	5.25	6.50
Rye	3.50	4.50

Like all specialty markets, the organic market is small and easily oversupplied, and premiums are not stable. It's generally worthwhile for organic farmers to invest in storage facilities. If you can store it, you can make money by keeping up with the market and selling when shortages occur and the price rises (as long as you don't store until quality deteriorates). Since every day of storage costs money, it's to your advantage to set a date by which the buyer has to accept the grain or begin paying you for storage. An alternative is to contract with a buyer who has storage set aside for specialty grains.

Contracting with a trader is often the only way to sell organic products or alternative crops that lack established market channels. Both producer and buyer need to carefully consider all terms of the contract before signing. Understanding the standards and terms specified is vital. For example, farmers need to understand that grading standards for grains destined for human consumption are higher than standards for feed grains, resulting in higher dockage when cleaned (6). The producer, in particular, should learn about the legal aspects of contract production and know what his or her options for legal recourse are in case a buyer violates the agreement. For more comprehensive details on organic grain marketing, request the ATTRA publication *Marketing Organic Grains*.

References

1) Boone, Nathan (ed.). 1999. Organic Wheat Production Handbook. Kernal of Life, Santa Fe, NM. 60 p.

Available for $10 ppd from:
Kernel of Life, c/o Tom Seibel
HCR 67, Box 81
Anton Chico, NM 87711
505-427-1132
E-mail: seibel@plateautel.net

2) Kirschenmann, F. 1988. Switching to a Sustainable System: Strategies for Converting from Conventional/Chemical to Sustainable/Organic Farming Systems. The Northern Plains Sustainable Agriculture Society (NPSAS). 18 p.

Available for $7.50 ppd. from:
Northern Plains Sustainable Agriculture Society
9824 79th Street, S.E.
Fullerton, ND 58441-9725
701-883-4304
http://www.npsas.org
E-mail: tpnpsas@drtel.net

3) Kirschenmann, F. 1997. Transition Notebook. The Northern Plains Sustainable Agriculture Society. *Available for $27.95 from reference 1) above.*

4) Lampkin, Nicholas. 1990. Organic Farming. Diamond Farm Books. Alexandria Bay, NY. 701 p.

Available for $49.95 + $4.50 shipping and handling from:
Diamond Farm Books
P.O. Box 537
Alexandria Bay, NY 13607
613-475-3848
800-305-5138
http://www.diamondfarm.com

5) Lyon, D.L., and D.D. Baltensperger. 1995. Cropping systems control winter annual grass weeds in winter wheat. Journal of Production Agriculture. Volume 8, Number 4. p. 535–539.

6) Stearns, Larry, and David L. Watt. 1993. Northern Plains Organic Crops Marketing Analysis: Wheat, Oats, Sunflower. Agricultural Economics Report No. 293. Department of Agricultural Economics-Agricultural Experiment Station. North Dakota State University.

7) Organic Food Business News FAX Bulletin
Hotline Printing and Publishing
P.O. Box 161132
Altamonte Springs, FL 32716

Enclosures

Anon. 1990. Kingmans farm—making a success of organic cereals. New Farmer and Grower. Summer. p. 27–28.

Boone, Nathan. No date. Organic Wheat Production Handbook. Kernal of Life. Santa Fe, NM. 60 p. Title page and table of contents.

Cox, W.J. 1987. Intensive Management of Winter Wheat in New York. Cornell Cooperative Extension Service Fact Sheet 403.11. Cornell University, Ithaca, NY. 6 p.

Dobbs, Thomas, and Lisa Carr. 1997. Price comparisons for organic crop products. Economics Commentator (South Dakota State University). No. 374. April 16. p. 1–3.

Duval, Jean. No date. Mechanical weed control in cereals. McGill University EAP Publication - 72. 10 p.

Gerard, Robert. 2001. Making organic wheat work. ACRES USA. March. p. 1, 9–11.

Meyer, D.W., and M. Badaruddin. 1985. Barley grain yields are increased by a previous legume crop. Crop Production Guide. North Dakota Agricultural Association. p. 177–181.

Reznicek, Ed. 1992. Planning Crop Rotations. Sustainable Farming News. April. 10 p.

Samuel, A.M., and S.J. Guest. 1990. Effect of seed rates and within crop cultivation in organic winter wheat. p. 49–54. In: BCPC Mono No. 45. Crop Protection in Organic and Low Input Agriculture: Proceedings of a Symposium of the British Crop Protection Council. Cambridge, UK.

Sinclair, Ann, and Britt Eustis. 1991. So you want to sell organic grains? The New Farm. September–October. p. 28–30.

Weill, A. 1990. Winter wheat: no-till, no-inputs. Sustainable Farming. Spring. p. 14–15.

Wilheim, H. 1991. Mechanical weed control systems in cereals and row crops. p. 23–24. In: Weed Management in Sustainable Agriculture. Proceedings of the Fifth Annual REAP Conference. McDonald College, Quebec.

Willis, H. 1990. Oats. Acres, U.S.A. March. p. 19–20.

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