



RESOURCE GUIDE TO ORGANIC & SUSTAINABLE VEGETABLE PRODUCTION

HORTICULTURE RESOURCE LIST

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1.0 About This Resource List

In 1994, ATTRA published a 47-page information package titled *Sustainable Vegetable Production*. At the time it was a leading information source on organic and sustainable vegetable production. However, in 1999 Dr. Vernon Grubinger, vegetable specialist at the University of Vermont, came out with a comprehensive book on this subject, *Sustainable Vegetable Production From Start-Up to Market*. With the advent of Grubinger's book—published by the Natural Resource, Agriculture, and Engineering Service (NRAES) in Ithaca, New York—we've discontinued the ATTRA information package. We think the NRAES book does an excellent job of providing a comprehensive and farmer-friendly overview of sustainable vegetable production.

In keeping with the ATTRA tradition to carve out a niche where no agricultural specialist has gone before, we elected to produce a resource guide of educational materials that supports the needs of organic and sustainable vegetable farmers. Thus, we offer this title—*Resource Guide to Organic and Sustainable Vegetable Production*.



Farmers making a transition to sustainable farming need information on a wide variety of topics—e.g., legumes as a source of nitrogen, cover crops, compost, non-chemical weed control, biointensive IPM, etc. This Guide provides a summary of some of the best *in-print* and *on-line* sources around.

Moreover, ATTRA specialists will continue to address organic and sustainable production of specific vegetable crops—tomatoes, sweet corn, onions, melons, asparagus—as well as complementary production technologies such as compost teas, baking soda as an alternative fungicide, disease-suppressive potting mixes, use of refractometers to measure sugar content, foliar feeding, living mulches, flame weeding, etc.

Here it should be noted that farmers raising herbs or field-grown cut flowers face nearly identical production requirements. Thus, when we talk about cover crops or weed control or soil management for vegetables, the same approach will work for field-grown cut flowers and herbs.

A Partial Listing of ATTRA Publications and Resources Related to Vegetable Production:

- Overview of Organic Crop Production
- Manures for Organic Crop Production
- Companion Planting: Basic Concepts & Resources
- Suppliers of Organic and/or Non-GE Seeds & Plants
- Organic Plug and Transplant Production
- Organic Potting Mixes
- Season Extension Techniques for Market Gardeners
- Organic Allium Production
- Organic Asparagus Production
- Organic Sweet Corn Production
- Organic Sweet Potato Production
- Organic Tomato Production
- Specialty Lettuce and Greens: Organic Production
- Herb Overview
- Sustainable Cut Flower Production
- Organic Certification & The National Organic Program
- Organic Marketing Resources
- Community Supported Agriculture
- Direct Marketing
- Farmers' Markets

1.1 Who Should Use This Guide

Farmers and others who work in commercial agriculture—e.g., Extension specialists, NRCS, crop advisors, teachers, and researchers. The focus is heavily oriented to practical approaches to organic and sustainable farming.

1.2 How to Use This Guide

Printed literature like books and bulletins are listed first; these are followed by a selection of on-line resources. In some instances, a web version corresponds with the book and these have been noted.

Publishers and distributors that sell the books reviewed here are listed in a special section at the end of this resource guide. For details on sales price, shipping expenses, and ordering information, contact the publishers.

1.3 About the Use of Web Resources

The Internet has revolutionized the way information is distributed and obtained.

Whereas it used to take several weeks or months to wait for a publication to arrive in the mail, with a few mouse clicks many of these items now instantly appear on your computer screen. Better yet, all these articles and bulletins are free. In addition, some items—including many Extension Service fact sheets—are available only in electronic form. Thus, some portions of this resource list are more heavily oriented to web resources than others.

If you have received this resource list but you don't have a computer at home, please see your local librarian for assistance. Most rural libraries now have computer access.

How To Read Web Documents:

.HTML Hyper Text Markup Language; click and read online. Most common format.

.PDF Portable Document Format; requires Adobe Acrobat Reader to download.

1.4 What is Sustainable Vegetable Production

For the purpose of an introduction, **sustainable agriculture** can be characterized as follows:

- Sustainable agriculture is a goal rather than a specific set of farming practices. Progress or movement toward the goal may be viewed as a continuum.
- A sustainable farming system strives to be productive and profitable, while at the same time preserving environmental quality and making efficient use of nonrenewable resources.
- Sustainable agriculture is concerned about the well-being of rural communities and the quality of life for families and farmworkers.
- Though biological practices and products are favored over chemical inputs, pesticides and fertilizers may be used within an IPM framework.

One of the quickest ways to grasp *production practices* associated with sustainable vegetable production is to examine the guidelines and standards for integrated farming systems, such as:

- Integrated Pest Management
- Integrated Crop Management
- Integrated Farm Management

In some instances, point systems are employed to certify the adoption of recommended best management practices. For example, a grower can earn points toward “certified IPM” status for sweet corn through the use of cover crops, crop rotations, nitrogen fertilizer applied in split application, etc.

To guide decisions on ways to approach sustainable farming, it is helpful to become knowledgeable about the principles of agroecology and sustainability. Ultimately, each farmer adopts their own approach.

Resource:

Introduction to Sustainable Agriculture & Agroecology

ATTRA's Related Web Links Site
<http://www.attra.org/rel.html>

1.5 What is Organic Vegetable Production

In a nutshell, **organic farming** is based on the following approaches and production inputs:

- Strict avoidance of synthetic fertilizers and synthetic pesticides
- Crop rotations, crop residues, mulches
- Animal manures and composts
- Cover crops and green manures
- Organic fertilizers and soil amendments
- Biostimulants, humates, and seaweeds
- Compost teas and herbal teas
- Marine, animal, and plant by-products
- Biorational, microbial, and botanical pesticides, and other natural pest control products

In 1980, organic farming was defined by the USDA as a system that excludes the use of synthetic fertilizers, pesticides, and growth regulators. Organic certification emerged as a grassroots production and marketing tool during the 1970s and 1980s to ensure that foods labeled “organic” met specified standards of production. The Organic Foods Production Act, a section of the 1990 Farm Bill, enabled the USDA to develop a national program of universal standards, certification accreditation, and food labeling.

In April 2001, the USDA released the Final Rule of the National Organic Program. This federal law stipulates, in considerable detail, exactly what a grower can and cannot do to produce and market a product as organic. Application for certification must be made, paperwork completed, fees paid, and annual inspections undergone. To learn more about the details of the certification process, see ATTRA's *Organic Certification & National Organic Program* information packet.

A companion ATTRA publication—*Overview of Organic Crop Production*—is recommended to gain a better understanding of the history, philosophy, and practices of organic farming.

Resource:

An Overview of Organic Crop Production

By George Kuepper, ATTRA
<http://www.attra.org/attra-pub/organiccrop.html>

2.0 The Farmer's Bookshelf

Here is a selection of some of the best resources for the farmer's bookshelf. For-sale books are available from the sources listed in the **Publishers & Distributors** section. Out-of-print literature and reference titles (mainly in the historical section) are available through Inter-Library Loan.

2.1 Publications on Sustainable Vegetable Production, Market Gardening, and Commercial Vegetable Production

Sustainable Vegetable Production From Start-Up to Market. 1999. By Vernon P. Grubinger. NRAES-104. Natural Resource, Agriculture, and Engineering Service, Ithaca, NY. 268 p.

Vernon Grubinger is an Extension Vegetable Specialist in Vermont. This book resulted from a vegetable production course he taught on sabbatical at the University of Maine in 1996. *Sustainable Vegetable Production From Start-Up to Market* is without a doubt the most comprehensive and modern textbook on sustainable vegetable production. Chapters address concepts and terminology associated with sustainable and organic production philosophies, production practices (soil fertility management, on-farm composting, crop rotations, cover crops and green manures, tillage and field preparation, seeds and transplants, weed control, etc.) as well as business planning and marketing. Special features include farmer profiles and lots and lots of useful tables and sidebars. Farmer-friendly; highly recommended.

Sustainable Practices for Vegetable Production in the South. 1996. By Mary Peet. Focus Publishing, R. Pullins Co., Newburyport, MA. 174 p.

Sustainable Practices for Vegetable Production in the South by Mary Peet is the result of a USDA Sustainable Agriculture Research and Education (SARE) grant to North Carolina State University. This was the first attempt by a land-grant university to collate and synthesize information relevant to *sustainable* vegetable production. Chapters provide overviews on production practices (soil management, cover crops, conservation tillage, and insect, disease, nematode, and weed management) followed by crop profiles on individual vegetable crops. The crop profiles provide a nice summary of standard production practices (botany, plant characteristics, planting, spacing, harvesting).

A full-scale web version is available online at: <http://www2.ncsu.edu/ncsu/cals/sustainable/peet/>

The New Organic Grower: A Master's Manual of Tools and Techniques for the Home and Market Gardener, 2nd Edition. 1995. By Eliot Coleman. Chelsea Green Publishing Co., White River Junction, VT. 340 p.

Eliot Coleman's book *The New Organic Grower* has probably had more impact on the organic market gardening movement in the United States than any other single publication. Coleman advocates the use of walking tractors, wheel hoes, multi-row dibble sticks, soil block transplants, and other tools and techniques that help make market gardening much more efficient. The techniques he describes were honed from years of experience as a farmer, combined with traditional market gardening techniques from Europe. Yet he also injects the insights and wisdom of a pioneer in organics to help the reader acquire new ways of thinking; e.g., *plant positive* production philosophy. This is a complete how-to-get-started manual on conceptualizing and practicing commercial organic vegetable production. Highly recommended.

How to Grow More Vegetables, 5th Edition. 1995. By John Jeavons. Ten Speed Press, Berkeley, CA. 201 p.

John Jeavons's book *How to Grow More Vegetables* is the classic text on the biointensive method of production. This is the production system that emphasizes double digging, intensive spacing, companion planting, organic soil preparation, and high yields in minimal space. Jeavons's book is filled with useful information and charts. The Ecology Action Institute founded by Jeavons publishes numerous booklets and research results on topics relating to biointensive production methods, organic fertilizers, cover crops, composts, small-scale production data, etc. Whereas the *scale* of production advocated by Jeavons is too small for many growers, the *principles* are universally applicable.

For a list of Ecology Action titles, descriptions, and ordering information, see: http://solstice.crest.org/sustainable/ecology_action/index.html

Backyard Market Gardening: The Entrepreneur's Guide to Selling What You Grow. 1993. By Andrew W. Lee. Good Earth Publications, Columbus, NC. 351 p.

Andy Lee has over 20 years of market gardening experience and is executive director of the Good Earth Farm School in Virginia. Lee's book has a nice section on farm equipment with black-and-white photos. Most of the book is geared to the marketing and business side of market gardening.

The Flower Farmer: An Organic Grower's Guide to Raising and Selling Cut Flowers. 1997. By Lynn Byczynski. Chelsea Green Publishing Co., White River Junction, VT. 207 p.

The Flower Farmer is an important contribution to the organic market gardening literature because field-grown flowers are a common part of a crop mix for local sales. As editor of the *Growing for Market* newsletter, Lynn Byczynski has a knack for writing about market gardening ideas and practices. The farm profiles of cut flower growers around the U.S. are a nice feature of her book.

Producing Vegetable Crops, 4th Edition. 1992. By John M. Swiader, George W. Ware, and J.P. McCollum. Interstate Publishers, Inc., Danville, IL. 626 p.

Producing Vegetable Crops is one of the standard textbooks on commercial vegetable production. It draws heavily on data and recommendations published by the Cooperative Extension Service and Agricultural Experiment Stations. These textbooks serve as a good reference for any commercial vegetable grower, whether organic or conventional.

Vegetable Growing Handbook: Organic and Traditional Methods, 4th Edition. 1990. By Walter E. Splittstoesser. An AVI Book, Van Nostrand Reinhold, New York. 362 p.

Vegetable Growing Handbook is a second vegetable textbook worth noting. Though its coverage of organic farming methods is brief, the vegetable production summaries are well done and it contains a section on specialty vegetables.

Knott's Handbook for Vegetable Growers, 4th Edition. 1997. By Donald N. Maynard and George J. Hochmuth. John Wiley, New York, NY. 582 p.

Knott's Handbook for Vegetable Growers is the classic reference text for vegetable growers. It is jam-packed with useful tables, data, calculations, and relevant information on commercial production.

The Organic Gardener's Home Reference: A Plant-by-Plant Guide to Growing Fresh, Healthy Food. 1994. By Tanya Denckla. A Garden Way Publishing Book. Storey Communications, Inc., Pownal, VT. 273 p.

The Organic Gardener's Home Reference by Tanya Denckla is a perfect complement to *Knott's Handbook for Vegetable Growers* as a quick reference source on vegetable production. The Plant Charts summarize production guidelines for 28 vegetable crops in an easy-to-read format, including: growth conditions; harvest; storage requirements; growing tips; selected varieties; common pests and diseases; and plant allies, companions, and incompatibles. Other charts summarize disease and insect control options, and plant allies and companions.

2.2 Specialty, Ethnic, and Minor Vegetable Crops

Specialty vegetables, baby vegetables, heirlooms, colored varieties, ethnic vegetables... market farmers like to raise these minor crops and sell them at farmers markets and other niche markets.

World Vegetables: Principles, Production and Nutritive Values, 2nd Edition. 1997. By Vincent E. Rubatzky and Mas Yamaguchi. International Thompson Science (Chapman & Hall), New York, NY. 853 p.

World Vegetables is a textbook on vegetables produced around the world, with comprehensive coverage of specialty and minor vegetable crops.

Specialty and Minor Crops Handbook, 2nd Edition. 1998. Small Farm Center. University of California, Publication 3346. 184 p.

This is a beautiful publication from University of California that provides brief fact sheets for about 63 minor vegetables. Each crop is summarized with a color photo, market information, cultural information, seed sources, and bibliography.

Manual of Minor Vegetables. 1988. By James M. Stephens. University of Florida. Florida Cooperative Extension, Bulletin SP-40. 123 p.

The *Manual of Minor Vegetables* from University of Florida was one of the first attempts by land-grant universities to offer informational materials on minor vegetable crops. It is mainly listed here as a reference source for southeastern U.S. farmers.

Oriental Vegetables: The Complete Guide for Garden and Kitchen. 1991. By Joy Larkcom. Kodansha International, New York. 232 p.

Oriental vegetables are popular in towns with Asian ethnic markets, and Joy Larkcom's book is one of the best popular-press books on this topic. It contains detailed entries on over 100 varieties of Oriental vegetables categorized into three sections: vegetables that require temperate climates; those requiring subtropical climates; and herbs and water plants.

Let Nature Do The Growing. 1986. By Gajin Tokuno. Japan Publications, Inc./Kodansha International, Ltd., New York, NY. 279 p.

Let Nature Do The Growing is a lesser-known text on organic vegetable production in Japan. It provides

detailed information on 78 Oriental crops (including many greens like mizuna, aburana, komatsura, edible chrysanthemums, yellow mustard); each entry includes steps of production from sowing and germination through thinning, weeding, and harvest.

Cornucopia II: A Source Book of Edible Plants, 2nd Edition. 1998. By Stephen Facciola. Kampong Publications, Vista, CA. 713 p.

Cornucopia is a superb compendium, as well as sourcebook, of edible plants. It contains descriptions and seed or nursery sources for approximately 3,000 species, with detailed cultivar listings for over 110 major crops representing the most popular fruits, vegetables, nuts, herbs, grains, and mushrooms. It also contains a comprehensive bibliography and appendices that organize plants according to 60 different food use categories or edible plant parts. Truly a masterpiece!

New Crops. Proceedings of National Symposia, Vols I-IV. Center for New Crops & Plant Products, Purdue University.

The New Crops symposiums held in 1990, 1993, 1996 and 1999 were published in a series of hard-bound proceedings that contain a wealth of information on new, specialty, and ethnic crops. All volumes are available for sale in print; however, the first three volumes are also on-line.

Advances in New Crops (1990)
<http://www.hort.purdue.edu/newcrop/proceedings1990/v1-toc.html>

New Crops (1993)
http://www.hort.purdue.edu/newcrop/CropInfoSources/NewCropsBook1993_info.html

Progress in New Crops (1996)
http://www.hort.purdue.edu/newcrop/CropInfoSources/NewCropsBook1996_info.html

Vegetables and Fruits: A Guide to Heirloom Varieties and Community-Based Stewardship. AFSIC
http://www.nal.usda.gov/afsic/AFSIC_pubs/heirloom/heirloom.htm

A wealth of resources from the National Agricultural Library containing bibliographical material, resource organizations and seed sources, and historical documentation.

2.3 Literature on Organic Agriculture

Organic agriculture has a rich history of farmers, researchers, and philosophers writing about holistic agriculture practices. As an introduction, five classic titles that provide historical perspective are listed below.

In addition, three resources are provided as access points for further reading: (1) *Tracing the Evolution of Organic-Sustainable Agriculture*, a bibliography from the National Agricultural Library, (2) the *Soil and Health* web library, an on-line collection of classic texts, and (3) *Future Horizons*, a literature review from University of Nebraska.

An Agricultural Testament. 1943. By Sir Albert Howard. Oxford University Press, New York and London. 253 p.

The Living Soil. 1949. By Lady Eve Balfour. Faber and Faber, LTD., London, England. 270 p.

Soils and Men: Yearbook of Agriculture 1938. 1938. USDA. United States Department of Agriculture, Washington, D.C. 1232 p.

Pay Dirt: Farming and Gardening with Composts. 1945. By J.I. Rodale. Devin-Adair Co., New York. 242 p.

Fertility Pastures: Herbal Leys as the Basis of Soil Fertility and Animal Husbandry. 1955. By Newman Turner. Faber and Faber, London. 204 p.

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Tracing the Evolution of Organic/Sustainable Agriculture: A Selected and Annotated Bibliography. 1988. By Jane Potter Gates. National Agricultural Library, Bibliographies and Literature of Agriculture (BLA) No. 72. http://www.nal.usda.gov/afsic/AFSIC_pubs/tracing.htm

The Alternative Farming Systems Information Center at the National Agricultural Library compiled this bibliography in 1988, yet it is still one of the best collections of literature to draw from on the history of organic/sustainable agriculture.

The Holistic Agriculture Library
<http://www.soilandhealth.org/> [Agriculture Library]

The Soil And Health Library, a web library compiled by Steve Solomon in Tasmania, features full-text on-line versions of out-of-print organic agriculture classics.

Plowman's Folly (1943). By Edward Faulkner.

Chemicals, Humus and the Soil (1948). By Donald P. Hopkins.

Farming and Gardening For Health or Disease [later editions titled *Soil and Health*] (1945). By Sir Albert Howard.

An Agricultural Testament (1943). By Sir Albert Howard.

The Waste Products of Agriculture: Their Utilization as Humus (1931). By Sir Albert Howard and Yeshwant D. Wad.

Soil Microorganisms and Higher Plants (1958). By N.A. Krasil'nikov, Academy of Sciences of the USSR, Moscow.

Fertility Farming (1951). By Newman Turner.

Future Horizons: Recent Literature in Sustainable Agriculture. 1997. Extension and Education Materials for Sustainable Agriculture, Volume 6. University of Nebraska-Lincoln, Center for Sustainable Agricultural Systems. 222 p.

The Center for Sustainable Agriculture Systems at the University of Nebraska compiled this resource guide as part of a USDA-SARE grant. It reviews more than 90 books on sustainable agriculture.

On-line and for-sale print versions are available on the Internet at:

Future Horizons: Recent Literature in Sustainable Agriculture
<http://ianrwww.unl.edu/ianr/csas/extvol6.htm>

The Core Historical Literature of Agriculture
<http://chla.library.cornell.edu/>

Electronic collection of full-text agricultural books published between the early nineteenth century and the middle to late twentieth century. Dozens of classic titles!

2.4 Modern Literature on Organic Farming

1980 marked a new era in organic farming literature, since that was the year USDA published its landmark *Report and Recommendations on Organic Farming*. While alternative press books written by farmers and farm advisors are abundant, the advent of scientific, university, and agricultural-society-sponsored conference proceedings and textbooks have enhanced the literature of organic agriculture.

Report and Recommendations on Organic Farming. 1980. USDA Study Team. United States Department of Agriculture, Washington, DC. 94p.

This is the landmark report that helped usher in a new era of scientific and policy support for organic agriculture at the USDA and associated agencies (land-grant universities, Cooperative Extension Service, Agricultural Experiment Stations, and scientific agriculture societies). Five years later, the 1985 Farm Bill enacted legislation that resulted in the Sustainable Agriculture Research and Education program, or SARE.

Organic Farming. 1990. By Nicolas Lampkin. Farming Press, Ipswich, United Kingdom. 701 p.

Nicolas Lampkin is on the faculty at the Welsh Institute of Rural Studies associated with The University of Wales. *Organic Farming* is the most prominent effort by a university professor to address organic agriculture. In addition, the European ecological and organic farming literature—which Lampkin heavily draws upon—is a rich source of information.

An Overview of Organic Crop Production
By George Kuepper, ATTRA
<http://www.attra.org/attra-pub/organiccrop.html>

George Kuepper's ATTRA publication is one of the best factsheet-type primers on organic production, providing principles, practices, and concepts that put it all together.

The Organic Method Primer Update. 1993. By Bargyla and Gylver Rateaver. The Rateavers, San Diego, CA. 596 p.

Organic Farming: Current Technology and Its Role in a Sustainable Agriculture. 1984. By D.F. Bezdicsek (ed.) Agronomy Society of America Special Publication No. 46. ASA, CSSA, SSSA, Madison, WI. 192 p.

Global Perspectives on Agroecology and Sustainable Agricultural Systems. Vol. I and II. 1988. By Patricia Allen and Debra Van Dusen. Proceedings of the Sixth International Scientific Conference of IFOAM. Agroecology Program, University of California, Santa Cruz, CA. 730 p.

Environmentally Sound Agriculture. 1983. By William Lockeretz (ed.) Selected Proceedings from the Fourth International Conference of IFOAM held in Cambridge, MA. Praeger Publishers, New York. 426 p.

Crop Protection in Organic and Low-Input Agriculture. 1990. By Roger Unwin (ed.) Proceedings of a symposium organized by the British Crop Protection Council held in Cambridge, UK. Monograph No. 45. BCPC, Farnham, Surrey, England. 254 p.

The Economics of Organic Farming: An International Perspective. 1994. By Nicholas Lampkin and S. Padel (eds.) CAB International, Wallingford, Oxon, UK. 468 p.

Organic Agriculture: Economic and Ecological Comparisons with Conventional Methods. 1978. By Robert C. Oelhaf. Allanheld, Osmun, & Co., Montclair, N.J. 271 p.

Biological Husbandry: A Scientific Approach to Organic Farming. 1981. By B. Stonehouse (ed.) Butterworths, London. 352 p.

Towards a Holistic Agriculture: A Scientific Approach. 1987. By R.W. Widdowson. Pergamon Press, Oxford, UK. 187 p.

Agricultural Production and Nutrition. 1997. By William Lockeretz (ed.) Proceedings of a conference held in Boston, Massachusetts. Tufts University, School of Nutrition Science and Policy, Medford, MA. 213 p.

The Importance of Biological Agriculture in a World of Diminishing Resources. 1986. By Vogtmann Hartmut, et al. (eds.) Proceedings of the 5th International Scientific Conference of IFOAM held at the University of Kassel (Germany). Verlagsgruppe Witzenhausen, Witzenhausen. 448 p.

2.5 Literature on Sustainable Agriculture

By the mid-1980s, *sustainable agriculture* was a term gaining wider usage. The 1985 Farm Bill—known as the *conservation farm bill*—spearheaded the creation of the USDA-SARE program and Conservation Reserve Program (CRP). ATTRA, the national sustainable farming information center that created this guide and related titles, was another product of the 1985 Farm Bill.

In 1980, a person could put all of the important books relating to sustainable agriculture on one shelf. Today, there are so many academic books and symposium proceedings on sustainable agriculture that it would be difficult for even a university library to keep current.

Alternative Agriculture. 1989. National Research Council. National Academy Press, Washington, D.C. 448 p.

Sustainable Agriculture in Temperate Zones. 1990. By Charles A. Francis, Cornelia Butler Flora, and Larry D. King. A Wiley-Interscience Publication, Wiley & Sons, New York, NY. 487 p.

Agroecology: The Science of Sustainable Agriculture, 2nd Edition. 1995. By Miguel Altieri. Westview Press, Boulder, CO. 433 p.

Agroecology: Ecological Processes in Sustainable Agriculture. 1998. By Stephen R. Gliessman. Ann Arbor Press, Chelsea, MI. 357 p.

Sustainable Agricultural Systems. 1990. By C.A. Edwards, R. Lal, P. Madden, R.H. Miller and G. House (eds.) Soil and Water Conservation Society, Ankeny, IA. 696 p.

Sustainable Agriculture Systems. 1994. By J. L. Hatfield and D. L. Karlen (eds.) Lewis Publishers, Boca Raton, FL. 316 p.

Ecology and Integrated Farming Systems. 1995. By D. M. Glen, M.P. Greaves, and H.M. Anderson (eds.) John Wiley & Sons, New York. 329 p.

Sustainable Food Systems. 1983. By Dietrich Knorr (ed.) AVI Pub. Co., Westport, Conn. 416 p.

Farming in Nature's Image: An Ecological Approach to Agriculture. 1992. By Judith D. Soule and Jon K. Piper. Island Press, Washington, DC. 286 p.

Biodiversity and Pest Management in Agroecosystems. 1994. By Miguel Altieri. Haworth Press, Binghamton, NY. 185 p.

Toward a More Sustainable Agriculture. 1986. By Raymond P. Poincelot. AVI Pub. Co., Westport, Conn. 241 p.

Sustainable Agriculture & Integrated Farming Systems. 1985. By Thomas C. Edens, Cynthia Fridgen, and Susan L. Battenfield (eds.) Michigan State University Press, East Lansing, MI. 344 p.

The Role of Microorganisms in a Sustainable Agriculture. 1986. By J.M. Lopez-Real and R.D. Hodges (eds.) A.B. Academic, Berkhamsted. 246 p.

Environmentally Sound Agriculture. 1994. By Kenneth L. Campbell, et al. (eds.) Proceedings of the Second Conference held in Orlando, Florida. American Society of Agricultural Engineers, St. Joseph, MI. 578 p.

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Sustainable Agriculture in Print Series

Alternative Farming Systems Information Center,
National Agricultural Library.

<http://www.nal.usda.gov/afsic/sbjusag.htm>
#saip

The Sustainable Agriculture in Print Series, consisting of three bibliographies compiled by the Alternative Farming Systems Information Center, provides bibliographic coverage of sustainable agriculture literature from 1580 to 1999.

2.6 Literature on Alternative Farming Systems

Ecological farming systems—**Organic Farming, Biodynamic Farming, Permaculture, Eco-Farming, Nature Farming**—evolved as an alternative to chemically intensive agriculture. Each offers its own brand of philosophy and practical farming methodologies. Here are some noteworthy titles. See the publishers' catalogs and website listings at the end of this guide for a comprehensive look at what's available.

Organic Farming

The New Organic Manifesto. 1986. By Lee Fryer. Earth Foods Associates, Wheatland, MD. 180 p.

Step by Step Organic Vegetable Gardening. 1992. By Shepherd Ogden. HarperCollins, New York. 299 p.

Profitable Organic Farming. 1995. By John Newton. Blackwell Science Ltd., Osney Mead, Oxford, UK. 142 p.

Organic Farming and Growing. 1994. By Francis Blake. Crowood Press, Gypsy Lane, Swindon, Wiltshire. 221 p.

Eco-Farming

Eco-Farm: An Acres U.S.A. Primer. 1991. By Charles Walters and C.J. Fenzau. Acres USA, Kansas City, MO. 450 p.

Science in Agriculture. 1992. By Arden Andersen. Acres USA, Kansas City, MO. 370 p.

Non-Toxic Farming Handbook. 1998. By Philip Wheeler. Acres, USA, Metairie, LA. 238 p.

The Biological Farmer. 2000. By Gary Zimmer. Acres USA, Austin, TX. 352 p.

Permaculture

Introduction to Permaculture. 1991. By Bill Mollison with Reny Mia Slay. Tagari Publications, Tyalgum Australia. 198 p.

Earth User's Guide to Permaculture. 1994. By Rosemary Morrow and Rob Allsop. Kangaroo Press, Kenthurst, NSW Australia. 152 p.

Introduction to Permaculture: Concepts and Resources
Steve Diver, ATTRA
<http://www.attra.org/attra-pub/perma.html>

Biodynamic Farming

Biodynamic Farming Practice. 1992. By Fritz Sattler and Eckard von Wistinghausen. Bio-Dynamic Agricultural Association, Stourbridge, West Midlands, England. 336 p.

Grasp the Nettle: Making Biodynamic Farming and Gardening Work. 1997. By Peter Proctor. Random House, Auckland, N.Z. 176 p.

Biodynamic Farming & Compost Preparation
By Steve Diver, ATTRA
<http://www.attra.org/attra-pub/biodynamic.html>

Natural Farming

The One-Straw Revolution: An Introduction to Natural Farming. 1978. By Masanobu Fukuoka. Rodale Press, Emmaus, PA. 181 p.

The Natural Way of Farming: The Theory and Practice of Green Philosophy. 1987. By Masanobu Fukuoka. Japan Publications, Kodansha International-USA through Harper & Row, New York. 284 p.

The Road Back to Nature: Regaining the Paradise Lost. 1987. By Masanobu Fukuoka. Japan Publications, Kodansha International-USA through Harper & Row, New York, NY. 377 p.

Nature Farming

Beneficial and Effective Microorganisms for a Sustainable World
Dr. Teruo Higa and Dr. James F. Parr
<http://www.agriton.nl/higa.html>

Nature Farming and Microbial Applications. 2000. Xu, Hui-lian, James F. Parr, and Hiroshi Umemura (eds.) Food Products Press, The Haworth Press, Binghamton, NY. 402 p.

Nature Farming and Effective Microorganisms
By Steve Diver, ATTRA
<http://ncatark.uark.edu/~steved/Nature-Farm-EM.html>

Alternative Farming Systems Primers

Towards a Sustainable Agriculture. 1996. Steve Diver. New Renaissance, Vol. 6, No. 2.
<http://www.ru.org/artagri.html>

Sustainable Agriculture: Definitions and Terms
Mary Gold, AFSIC, National Agricultural Library
http://www.nal.usda.gov/afsic/AFSIC_pubs/srb9902.htm

3.0 Soil Management

Soil management—with its attention to cover crops, crop rotations, composts, soil biology, soil testing, mineral fertilizers—is fundamental to agriculture. Prior to the 1970s and 80s, farmers getting into organics relied primarily on old books and bulletins for information. Now, it would take a donkey cart to haul away the goldmine of useful print and web resources that awaits the beginner.

3.11 Books & Bulletins on Soil Fertility

Building Soils for Better Crops, 2nd Edition. 2000. By Fred Magdoff and Harold van Es. Sustainable Agriculture Network, Handbook Series No. 4. Sustainable Agriculture Publications, University of Vermont. 240 p.

Building Soils for Better Crops, 2nd Edition (2000) by Fred Magdoff and Harold van Es, soil scientists at University of Vermont and Cornell University respectively, is a highly practical 230-page guide to ecological soil management. This is the best all-around manual from the land-grant agricultural colleges on building and maintaining a healthy, productive soil. Topics addressed: organic matter, soil biology, physical properties of soil, animal manures, cover crops, crop rotations, making and using composts, reducing compaction, appropriate tillage systems, nutrient management, soil tests, and fertilizers. It also features profiles of farmers implementing ecological soil management practices, and is accompanied by plenty of helpful illustrations and tables. The SAN series of handbooks are well done and farmer-friendly. Highly recommended.

The Soul of Soil: A Guide to Ecological Soil Management, 3rd Edition. 1995. By Grace Gershuny and Joseph Smillie. agAccess, Davis, CA. 174 p.

The Soul of Soil is the classic primer on ecological soil management, first published in 1983 as Grace Gershuny's Master's Thesis at the University of Vermont. The 1986 edition co-authored with Joseph Smillie is the one that became a primary information source for organic farmers in the 1980s and 90s. It is jam-packed with useful concepts, tables, data, and knowledge about soils, humus, compost, crop rotations, cover crops, green manures, and mineral fertilizers. It belongs on the bookshelf of every organic farm.

Start with the Soil. 1993. By Grace Gershuny. Rodale Press, Emmaus, PA. 274 p.

Gershuny's *Start with the Soil* is a nice complement to the primer noted above, *Soul of the Soil*. Though written for an organic gardening audience (Rodale Press), the information, tables, and data build on her previous book.

Fertile Soil: A Grower's Guide to Organic & Inorganic Fertilizers. 1990. By Robert Parnes. agAccess, Davis, CA. 190 p.

Robert Parnes was an advisor for several years in the well-known Woods End Agricultural Institute laboratory. *Fertile Soil*—first published as *Organic and Inorganic Fertilizers* in 1986—is the other classic soils manual from the 1980s that provides solid information to organic farmers. The tables on nutrient value and estimated fertilizer requirement for organic fertilizers in Parnes's book are the best alternative to standard N-P-K fertilizer guidelines.

Edaphos: Dynamics of a Natural Soil System. 1993. By Paul D. Sachs. The Edaphic Press, Newbury, VT. 197 p.

Paul Sachs is the founder of North Country Organics in Bradford, VT, and *Edaphos* is an outgrowth of Sachs's seminars and consulting work. *Edaphos* does an excellent job of explaining soil science and soil management practices in simple terms, accompanied by useful tables and diagrams.

Organic Soil Amendments and Fertilizers. 1992. By David E. Chaney and Laurie E. Drinkwater. DNAR Publication No. 21505. UC Sustainable Agriculture Research and Education Program, University of California, Division of Agriculture and Natural Resources. 36 p.

UC-SAREP—The University of California's Sustainable Agriculture Research and Education Program—produced this bulletin in 1992, yet it is still the best Extension Service publication on this topic. It uses tables, data, and diagrams to explain soil organic matter and the wide range of organic amendments and fertilizers that are used in organic farming.

Western Fertilizer Handbook—Horticulture Edition. 1990. By Albert E. Ludwick. Interstate Publishers Inc., Danville, IL. 279 p.

Farmers need access to all kinds of information, including standard fertility data. This is one of those handy guides used as an occasional reference source.

The Soil Management Series (PC-7398)

University of Minnesota Cooperative Extension
<http://www.extension.umn.edu/distribution/croppersystems/DC7398.html>

The University of Minnesota recently put out a new series of Extension bulletins:

1. Soil Management (BU-7399)
2. Compaction (BU-7400)
3. Manure Management (BU-7401)
4. Organic Matter Management (BU-7402)
5. Soil Biology and Soil Management (BU-7403)

Each publication is organized according to the following sections:

The Soil Manager - explains management options for improving your soil.

The Soil Scientist - reviews the soil science principles that are important to production agriculture.

Your Farm - helps you apply what you are reading to your own farm.

What's Next? - wraps up the chapter by helping you assess your operation and soil.

Further Resources - lists people and publications to consult for more information.

The Nature and Properties of Soils, 12th Edition. 1999. By Nyle C. Brady and Ray R. Weil. Prentice Hall, Upper Saddle River, NJ. 881 p.

The Nature and Properties of Soils is probably the most authoritative and well-known university textbook on soils. Dr. Ray Weil, a soil scientist at the University of Maryland, updated this classic with modern photographs and illustrations as well as additional notes and information that addresses soil management from a sustainable viewpoint. It is an excellent, comprehensive resource; a good reference book for the farmer's bookshelf.

The Fertile Triangle: The Interrelationship of Air, Water, and Nutrients in Maximizing Soil Productivity. 1991. By Benjamin Wolf. Food Products Press, New York. 463 p.

Fertilizers and Their Use: A Pocket Guide for Extension Officers, 4th edition
Food & Agriculture Organization (FAO)
<ftp://ftp.fao.org/agl/agll/docs/fertuse.pdf>

Dr. Ehrenfried Pfeiffer, Biodynamic Pioneer

Bio-Dynamic Gardening and Farming. [collected articles, ca. 1940 - 1961] Volume 1. 1983. By Ehrenfried Pfeiffer. Mercury Press, Spring Valley, New York. 126 p.

Bio-Dynamic Gardening and Farming. [collected articles, ca. 1940 - 1961] Volume 2. 1983. By Ehrenfried Pfeiffer. Mercury Press, Spring Valley, New York. 142 p.

Bio-Dynamic Gardening and Farming. [collected articles, ca. 1940 - 1961]. Volume 3. 1984. By Ehrenfried Pfeiffer. Mercury Press, Spring Valley, New York. 132 p.

Soil Fertility: Renewal and Preservation. 1983. Ehrenfried Pfeiffer. Lanthorn, East Grinstead, Sussex, England. 200 p.

Eco-Farming Classics

Agriculture in Transition. 2000. By Donald L. Schriefer. Acres USA, Austin, TX. 238 p.

From the Soil Up. 2000. By Donald L. Schriefer. Acres USA, Austin, TX. 274 p.

The Biological Farmer. 2000. By Gary Zimmer. Acres USA, Austin, TX. 352 p.

Crop Roots — The Hidden Half. Circa 1990s. By Harold Willis. Midwestern Bio-Ag, Blue Mound, WI. 106 p.

Non-Toxic Farming Handbook. 1998. By Philip Wheeler and Ronald Ward. Acres USA, Metairie, LA. 238 p.

Nourishment Home Grown. 1992. By A.F. Beddoe. Agro-Bio Systems, Grass Valley, CA. 299 p.

Hands-On Agronomy. 1993. By Neal Kinsey and Charles Walters. Acres USA, Kansas, MO. 352 p.

The Enlivened Rock Powders. 1994. By Harvey Lisle. Acres USA, Kansas, MO. 194 p.

3.12 Soil Fertility Web Links

These first three items are the primary web locations for sources of organic fertilizers and approved materials that can be used in certified organic production.

Sources for Organic Fertilizers and Amendments ATTRA

<http://www.attra.org/attra-pub/orgfert.html>

The ATTRA resource list on organic fertilizers is an extensive listing of dealers and suppliers carrying bulk organic fertilizers. It is organized by category of fertilizer material:

Phosphate rock minerals	Non-phosphate rock minerals
Animal by-products	Plant by-products
Marine products	Worms for vermicompost
Composts & blended fertilizers	Compost inoculants & bioactivators
Cover crop seeds	Bio-dynamic preparations & homeopathic preparations
Humates & humic acids	Hydrogen peroxide
Mycorrhizal inoculants	Microbial inoculants, enzymes, biocatalysts
Soluble organic fertilizers for drip irrigation & greenhouse fertilization	

Note: The ATTRA list was compiled in response to queries from farmers on where to purchase bulk organic fertilizers and amendments. It is *not* an official list of materials that can be used in certified organic production. To verify approved and restricted materials, consult the OMRI lists below.

OMRI's Brand Name Products Lists

Organic Materials Review Institute

http://www.omri.org/brand_list.html

OMRI is the Organic Materials Review Institute. It provides a technical review of organic crop production materials (fertilizers and pest controls) supplied by manufacturers. Products that receive an Allowed or Regulated status can state that the product is "OMRI Listed" and may use the OMRI seal on packaging and literature.

The Brand Name Products List on OMRI's website includes crop production materials organized alphabetically by Generic Material, Supplier, and Product.

CCOF's Organic Practices and List of Materials

<http://www.ccof.org/section8.htm>

California Certified Organic Farmers (CCOF) is one of the premier organic certification organizations in the country, in operation since 1973. The *1998 CCOF Handbook* located on its website contains an informative section on organic farming practices and a listing of approved materials.

Use this site primarily as background reading to become familiar with typical categories of fertilizer products and how they fit into a certified organic program. CCOF transferred the official task of evaluating and listing brand-name products to OMRI in 1997.

The following websites provide valuable information to farmers and Extension specialists who need information and data on soil management, organic fertilizers, and related sustainable fertility topics.

Commercial Organic Nutrient Recommendations

University of Maine Soil Testing Lab

<http://anlab.umesci.maine.edu/handout/organ01.HTM>

In these handy tables from University of Maine you can quickly see how many pounds of organic fertilizer per acre are needed to meet desired pounds of nutrient element per acre; e.g., 670 lbs fish meal equals 60 lbs N per acre, 890 lbs fish meal equals 80 lbs N per acre, and 1100 lbs fish meal equals 100 lbs N per acre. Examples are provided for 10 different organic fertilizers relative to Nitrogen, Phosphorus, and Potassium.

An Introduction to Organic Fertilization in Saskatchewan

Saskatchewan Agriculture and Food FARMFACTS

http://www.agr.gov.sk.ca/farm_man/crop_prod/organicfert.asp

Nutrient Content of Fertilizer and Organic Materials

NC State University Soil Science

[HTML]

<http://ces.soil.ncsu.edu/soilscience/publications/Soilfacts/AG-439-18/>

[PDF]

<http://ces.soil.ncsu.edu/soilscience/publications/Soilfacts/AG-439-18/AG-439-18.pdf>

Convenient tables with nutrient content of standard commercial fertilizers as well as organic fertilizers and manures.

Sustainable Soil Management

By Preston Sullivan, ATTRA

<http://www.attra.org/attra-pub/soilmgt.html>

ATTRA's *Sustainable Soil Management* publication is the most succinct and informative publication of its kind on the web. The concepts and practices embedded in this publication provide the fundamental building blocks for a deeper and more complete understanding of soils from a sustainable farming perspective.

Alternative Soil Testing Laboratories

ATTRA

<http://www.attra.org/attra-pub/soil-lab.html>

ATTRA's *Alternative Soil Testing Laboratories* resource list organizes soil labs into two broad categories: (1) those that focus on biological assays including organic matter, humus content, and microbial analysis, and (2) those that focus on mineral analysis and organic fertilizer recommendations. The resource section provides suppliers, books, and web links that address alternative fertility concepts, soil quality, and on-farm methods of soil and foliar analysis.

Organic Soil Amendments for Sustainable Agriculture

CTAHR, Univ. of Hawaii

<http://agrss.sherman.hawaii.edu/staff/hue/organic.html>

Soil Fertility Management for Organic Crops

University of California, Publication 7249

<http://anrcatalog.ucdavis.edu/pdf/7249.pdf>

Soil Management and Soil Quality for Organic Crops

University of California, Publication 7248

<http://anrcatalog.ucdavis.edu/pdf/7248.pdf>

5-Part Series on Soil Basics

UMass Extension, University of Massachusetts

http://www.umassvegetable.org/soil_crop_pest_mgt/soil_nutrient_mgt.html

- Hairy Vetch as a Cover Crop
- Soil Basics I: Physical Properties of Soil
- Soil Basics II: Chemical Properties of Soil
- Soil Basics III: Organic Matter, Key to Management
- Soil Basics IV: Putting It All Together
- Soil Basics V: Top Dressing and Side Dressing Nitrogen

Soil Fertility Note 12: Fertilizing with Organic Nutrients

North Carolina Department of Agriculture and Consumer Services

<http://www.agr.state.nc.us/agronomi/sfn12.htm>

Guidelines for Organic Fertilization

University Of Vermont Extension System,

Agricultural and Environmental Testing Lab

<http://pss.uvm.edu/pss161/problem/handout.html>

Organic Crop Production

Patrick Moore, The Evergreen State College

Pages 19–32, In: **Organic Resource Manual**

Washington State Department of Agriculture

<http://www.wa.gov/agr/fsah/organic/ofp.htm>

Nitrogen Management in Field Vegetables —A Guide to Efficient Fertilisation

HTML

http://res2.agr.ca/stjean/info/publicat1_e.htm

#Technical

PDF

http://res2.agr.ca/stjean/recherche/azote_e.pdf

Manual on Integrated Soil Management and Conservation Practices

FAO Land and Water Bulletin 8

<ftp://ftp.fao.org/agl/agll/docs/lw8e.pdf> [9506 KB]

Microbial Fertilizers in Japan

Michinori Nishio

Food and Fertilizer Technology Center

Taipei City, Taiwan R.O.C

<http://www.agnet.org/library/abstract/eb430.html>

Use of Microbial Inoculants and Organic Fertilizers in Agricultural Production

Food and Fertilizer Technology Center

Taipei City, Taiwan R.O.C

<http://www.agnet.org/library/article/eb394.html>

Sustainable Nitrogen Management in Intensive Vegetable Production

Food and Fertilizer Technology Center

Taipei City, Taiwan R.O.C

<http://www.agnet.org/library/abstract/eb442.html>

Natural Resources Conservation Service, or NRCS, is the USDA agency formerly known as Soil Conservation Service, or SCS. The **NRCS Soil Quality Institute** gets an A+ for the high-quality, farmer-friendly educational materials they've published in recent years.

NRCS Agronomy Technical Notes Series

Soil Quality Institute

<http://www.statlab.iastate.edu/survey/SQI/agronomy.shtml>

The Soil Quality Institute website, sponsored by NRCS, features on-line technical notes on soil management topics:

Cover Crops; Conservation Crop Rotation; Effects on Soil Quality; Effects of Residue Management, No-Till on Soil Quality; Effects of Soil Quality on Nutrient Efficiency; Herbicides; Legumes and Soil Quality; Effects of Soil Erosion on Soil Productivity.

NRCS Soil Quality Information Sheets

Soil Quality Institute

<http://www.statlab.iastate.edu/survey/SQI/sqiinfo.html>

The Soil Quality Institute website, sponsored by NRCS, features on-line information sheets on soil quality topics:

Erosion; Sediment Deposition on Cropland; Compaction; Salinization; Soil Biodiversity; Available Water Capacity; Pesticides; Indicators for Soil Quality Evaluation; Organic Matter; Soil Crusts; Aggregate Stability; Infiltration; Soil pH.

Soil Biology Primer

<http://www.statlab.iastate.edu/survey/SQI/primer/index.htm>

The highly regarded *Soil Biology Primer* is reviewed in the section on soil biology.

Soil Quality Test Kit

<http://www.statlab.iastate.edu/survey/SQI/kit2.html>

An 82-page booklet describing procedures for 12 on-farm tests, an interpretive section for each test, data recording sheets, and a section on how to build the kit.



3.21 Print & Video Resources on Cover Crops

Cover crops are like the backbone, the linchpin, the cornerstone... of any **annual cropping system** that seeks to be **sustainable** or **organic**.

Organic farmers rely on cover crops to perform multiple roles and functions on the farm, including soil protection, soil improvement, and insectary habitat. From a fertility angle, the cover crop seed can be viewed as a fertilizer expense.

When **sustainable agriculture** became a priority topic for USDA, land-grant universities, and non-profit institutions in the 1980s, cover crops were one of the first items to receive significant attention. Lots of time and energy have gone into cover crop research, on-farm trials, and information dissemination.

Some of the key players that helped generate this new material on cover crops include the Sustainable Agriculture Network (SAN), the University of California, and the Rodale Institute.

Managing Cover Crops Profitably, 2nd Edition. 1998. By the Sustainable Agriculture Network. Sustainable Agriculture Publications, University of Vermont. 212 p.

Managing Cover Crops Profitably is a comprehensive resource on cover crops— an essential desk reference! The introductory section includes articles on uses and benefits of cover crops, followed by chapters on 18 different cover crop species. Charts rate factors for each species including drought tolerance, nitrogen yield, and seeding rates. The top six high-performing cover crops for each region are discussed. Topics include: selection of the best species for your location, planning profitable crop rotations, crop yield benefits following cover crops, and fertilizer reduction realized from cover crops.

The full-text version can be viewed on the SAN website:

Managing Cover Crops Profitably, 2nd Edition
<http://www.sare.org/handbook/mccp2/index.htm>

Cover Crops for California Agriculture. 1989. By P.R. Miller, et al. University of California, Division of Agriculture and Natural Resources, Leaflet 21471. 24 p.

This University of California leaflet—supported by the Jesse Smith Noyes Foundation, the UC Davis Student Experimental Farm, and the UC

SAREP program—was the first Extension Service bulletin to address the benefits of cover crops in the context of modern sustainable farming systems.

The following two booklets from Pennsylvania and Oregon are a compilation of fact sheets on individual cover crop species. Since the selection and use of cover crops is heavily influenced by growing season, climate, cropping systems, and related geographical peculiarities, these two booklets provide a nice balance for growing conditions in the Northeastern and Northwestern United States.

Northeast Cover Crop Handbook. 1994. By Marianne Sarrantonio. Rodale Institute, Kutztown, PA. 118 p.

The Rodale Institute was a leader in cover crop research and on-farm trials in the 1980s and 90s. The *Northeast Cover Crop Handbook* is the culmination of their extension information delivery from that era. Topics covered are: how to choose a cover crop right for your operation; building a rotation around cover crops; choosing the best species for the whole farm; estimating the nitrogen contribution from a green manure; looking at soil improvements from cover crops; and lowering the cost of cover cropping. The book is well written and easy to read with lots of drawings and charts. The appendix contains detailed management practices for 20 cover crop species, cover crop seed sources, and other information sources.

Cover Crops in Oregon (EM 8704)
Oregon State University

Oregon State University Extension Service published a 50-page booklet on cover crops in 1998 titled *Using Cover Crops in Oregon*. Topics include the pros and cons of cover cropping; how to choose a cover crop; cover crops in annual and perennial systems; how to estimate nitrogen contributions to a subsequent crop; and economic considerations of cover cropping. The booklet provides detailed information on specific cover crops, including annual ryegrass, barley, oats, triticale, wheat, buckwheat, cereal rye, common vetch, crimson clover, fava bean, field pea, hairy vetch, rapeseed, red clover, subterranean clovers, Sudangrass, and sorghum-Sudangrass hybrids. In addition, there is a fact sheet on cover crop weed suppression in annual rotations. (List price, \$5.50 from Oregon State University Publications).

The complete series of 18 individual facts sheets can also be found on the web in HTML and PDF formats:

Cover Crop Fact Sheets, Oregon State University
<http://eesc.orst.edu/tango/pubsearch/0124.qry?function=search>

Cover Crops for Vegetable Production in the Northeast. 1999. By Lee Stivers. Cornell University Extension Service (142IB244). 12 p.

A Cornell University publication on cover crops for vegetables that addresses: addition of organic matter to soils; improvement of soil tilth and remediation of compaction; protection of soil from wind and water erosion; recycling plant nutrients; increasing the biological activity of soil; retention of soil moisture; and suppression of weeds, insects, pathogens, and nematodes.

Overview of Cover Crops and Green Manures. 2000. By Preston Sullivan and Steve Diver. Appropriate Technology Transfer for Rural Areas, Fayetteville, AR. 12 p.
<http://www.attra.org/attra-pub/covercrop.html>

This ATTRA publication provides a summary of the principal uses and benefits of cover crops and green manures, followed by a listing of key resources.

Sustainable Production of Fresh-Market Tomatoes with Organic Mulches. 1997. By Aref Abdul-Baki and John R. Teasdale. USDA Farmers' Bulletin No. 2279. 23 p.
<http://www.ars.usda.gov/is/np/tomatoes.html>

This USDA Farmers' Bulletin features the no-till vegetable cropping system developed by scientists at the USDA-ARS Vegetable Laboratory in Beltsville, Maryland. This system relies on hairy vetch established in the fall, followed by a mow-down treatment the following spring to prepare a no-till bed to transplant tomatoes and other vegetable crops into.

Print copies may be ordered from:
USDA/ARS Vegetable Lab
Rm. 213, B-10A
BARC-West
Beltsville, MD 20705
mcgahan@ars.usda.gov

On-line in PDF format at:
<http://www.ars.usda.gov/is/np/SustainableTomato.pdf>

Feed the Soil. 1982. By Edwin McLeod. Organic Agriculture Research Institute, Graton, CA. 209 p.

The classic tale of Hylas the Hare who goes to work as a seasonal farmer, only to bump into Mr. Earthworm who teaches Hylas all about green manures and soil biology and the importance of "feeding the soil." It is

still one of the best little primers on grasses and legumes in print.

Creative Cover Cropping in Annual Farming Systems—Video. 1993. Produced by the University of California, Division of Agriculture and Natural Resources.

A 24-minute video that shows a selection of cover crops used in various annual cropping systems for the purpose of soil fertility and pest management. (List price, \$20; available through University of California)

No-till Vegetables—Video. 1997. By Steve Groff. Cedar Meadow Farm, Holtwood, PA.

Steve Groff, a no-till vegetable farmer in Pennsylvania, makes extensive use of cover crops in combination with no-till vegetable production to raise high-quality tomatoes, pumpkins, broccoli, snap beans, and sweet corn. He uses specialized equipment like a rolling stalk chopper to knock down and crimp the cover crops, thus allowing him to plant vegetables into a killed cover crop mulch. This cropping system requires post-emergent herbicides, but at greatly reduced rates compared to conventional production systems. After several years of no-till production the soils are very mellow and easy to plant into. (Video price, \$21.95 + \$3.00 shipping from Cedar Meadow Farm).

Using Cover Crops in Conservation Production Systems—Video. 1997. By Seth Dabney, USDA-ARS National Sedimentation Lab in Oxford, MS.

An 11-minute video on cover cropping systems in the Deep South featuring clover species and no-till production methods. (Costs about \$10 through Shepherd Publications in Memphis, TN).

3.22 Cover Crop Web Links

Green Manures

The Basics of Green Manuring

P. Warman

EAP Publication 51, Ecological Agriculture Projects
<http://eap.mcgill.ca/Publications/EAP51.htm>

Green Manures

Greenmount College of Agriculture and Horticulture,
Northern Ireland

<http://www.greenmount.ac.uk/organic/manures.htm>

Catch Crops and Green Manuring in Ecological Agriculture

Proceedings of the Ecological Agriculture NJF-
Seminar 166

http://zeus.bibul.slu.se/documents/slu/ekologiskt_lantbruk/EKL05/EKL05Z.HTM

Cover Crops – General

Managing Cover Crops Profitably, 2nd Edition

Sustainable Agriculture Network

<http://www.sare.org/handbook/mccp2/index.htm>

Cover Crop Fact Sheets

Oregon State University

<http://eesc.orst.edu/tango/pubsearch/0124.qry?function=search>

Michigan Cover Crops

Michigan State University & Kellogg Biological
Station

<http://www.kbs.msu.edu/Extension/Covercrops/home.htm>

An impressive and valuable collection of information sheets and research reports on cover crops used in association with vegetables and row crops.

Cover Crops

Ontario Ministry of Agriculture, Food and
Rural Affairs

http://www.gov.on.ca:80/OMAFRA/english/crops/facts/cover_crops01/covercrops.htm

- Adaptation and Use of Cover Crops
- Choosing a Cover Crop
- Cover Crop Types

Overview of Cover Crops and Green Manures.

ATTRA

<http://www.attra.org/attra-pub/covercrop.html>

<http://www.attra.org/attra-pub/PDF/covercrop.pdf>

Cover Crops – Vegetables

Commercial Vegetable Production: Cover Crops for Vegetable Growers

Kansas State University, MF2343

<http://www.oznet.ksu.edu/library/hort2/Samplers/MF2343.htm>

A 28-page fact sheet from K-State, published in 1998.

One of the better Extension publications on cover crops for vegetables geared to a specific region.

Multiple Impacts Cover Crops

John Luna, Oregon State University

http://ifs.orst.edu/pubs/multiple_impacts_cover_cro.html

In addition to the *Cover Crop Fact Sheets* published by Oregon State University, John Luna and associates have a special topics web page on use of cover crops in sustainable vegetable production; especially note the research results on strip tillage.

Cover Crops for Sustainable Vegetable Production

Debbie Roos

<http://www.geocities.com/RainForest/Canopy/1118/>

Cover Crops & Green Manure Crops for Vegetable Farms

Ohio Vegetable Production Guide 2000

http://www.ag.ohio-state.edu/~ohioline/b672/b672_1.html

Cover Crops For Weed Control In Lettuce

New Alchemy Quarterly, No. 40

Mark Schonbeck, Judy Browne, and Ralph DeGregorio

<http://www.fuzzylu.com/greencenter/q40/weed9009.htm>

Cropping Systems of Intensive Desert Vegetable Production

University of California, Riverside

<http://cnas.ucr.edu/~bps/hcoopextcrop.html>

Cover Crops for Soil Improvement in Horticultural Crops

Alan Ware, Kerr Center for Sustainable Agriculture
<http://www.kerrcenter.com/kerrweb/html/pub4.html>

Summer Cover Crops for Tomato Production in South Florida

<http://www.imok.ufl.edu/veghort/pubs/workshop/Bryan99.htm>

Green Manure Crops in Organic Vegetable Production

Danish Institute of Plant and Soil Science
http://zeus.bibul.slu.se/documents/njf/utredn_rapporter/NUR114/NUR114N.HTM

Cover Cropping in Potato Production

EAP Publication 71, Ecological Agriculture Projects
<http://eap.mcgill.ca/Publications/EAP71.htm>

Interseeding Cover Crops

Observations on Interseeding Cover Crops

Vernon Grubinger, University of Vermont
<http://ctr.uvm.edu/ctr/intseed.htm>

Interseedings in Vegetable Production

Chantal Foulds, REAP Canada
<http://eap.mcgill.ca/MagRack/SF/Summer%2089%20D.htm>

Relay Intercropping Brassicas into Chile and Sweet Corn

New Mexico State University, Guide A-609
http://cahe.nmsu.edu/pubs/_a/A-609.html

Catch Crops – Sucking Up Residual Nitrates

A Farmer's Guide To Reducing Nutrient Loss Using Catch Crops

Janet Wallace, Nova Scotia Organic Growers Association
<http://gks.com/nccrp/Finalr.php3>

Management of Residual Nitrogen with Cover Crops

Technical Notes, Agronomy 38. Pullman Plant Materials Center.
http://www.wsu.edu/pmc_nrcs/technotes/agronomy/tntag38.htm

An Evaluation of Cover Crops to Reduce the Potential for Environmental Damage from Intensively Cultivated Soils

Nova Scotia Department of Agriculture and Fisheries
<http://www.gov.ns.ca/nsaf/rs/greenplan/resource/conservation/035.htm>

Legumes and Crop Rotations

Crop Rotations for Vegetables and Row Crops

Steve Diver, ATTRA
<http://ncatark.uark.edu/~steved/rotation.html>

Soil Improvement with Legumes including Legumes in Crop Rotations

Saskatchewan Agriculture and Food
http://www.agr.gov.sk.ca/land_wat_clim/soil/Scs0395.asp

Organic Rotations Practiced

Ohio State University, Special Circular 174-00
http://www.ag.ohio-state.edu/~ohioline/sc174/sc174_9.html

Legume Green Manuring

Alberta Agriculture, Food and Rural Development
<http://www.agric.gov.ab.ca/agdex/100/2300202.html>

Crop Rotations in Organic Agriculture

Andreas de Neergaard
<http://www.kursus.kvl.dk/shares/ea/02Materials/Crop-rotations.PDF>

An Organic Vegetable Crop Rotation Aimed at Self-Sufficiency in Nitrogen

K. Thorup-Kristensen, Danish Institute of Agricultural Sciences
<http://www.agrsci.dk/pvf/gronsager/ktk/oeko%5Fgronsagssaedskifte/hp%2Dcrop%20rotation.html>

3.23 UC-SAREP Cover Crop Resource

The UC-SAREP program at University of California is a leader in cover crop research and information dissemination. The massive resources UC-SAREP has devoted to the integration of cover crops into annual and perennial cropping systems is astounding. These materials are so extensive and informative, they deserve their own special section.

UC SAREP Cover Crop Resource Page

<http://www.sarep.ucdavis.edu/sarep/ccrop/>

This is the database of all databases when it comes to cover crops. Includes over 5,000 items gleaned from more than 600 separate sources, including journal articles, conference proceedings, standard textbooks, unpublished data, and personal communications from researchers and farmers. The information in the database concerns the management and effects of more than 32 species of plants usable as cover crops. More than 400 different cover crop images are also available for on-line viewing.

One limitation—the database is regionally geared to the Mediterranean climate of California. Ideally, each region of the U.S. should enjoy such site-specific information.

Cover Cropping in Row and Field Crop Systems

UC-SAREP

<http://www.sarep.ucdavis.edu/ccrop/slideshows/rfshow01.htm>

An on-line educational slide series that provides visual images and text describing the benefits and uses of cover cropping in annual crops like vegetables; 52 slides.

Cover Crop Biology: A Mini-Review

Robert L. Bugg, UC-SAREP

<http://www.sarep.ucdavis.edu/ccrop/ccres/35.htm>

A 10-page web article that reviews several aspects of cover crop biology: seeds, seedlings, root zone biology, nutrient uptake, the fate of cover-crop-derived nitrogen, community dynamics, and allelopathy.

Selecting the Right Cover Crop Gives Multiple Benefits

UC-SAREP

<http://www.sarep.ucdavis.edu/ccrop/CCPubs/SelectingCoverCrop.html>

A 4-page web article that discusses: adding and conserving nitrogen, water use by cover crops, pest management, cover crops in annual cropping systems, self-reseeding cover crops, and potential advantages and disadvantages of cover crops.

Survey of Annual Crop Growers Regarding Cover Crops

UC-SAREP

<http://www.sarep.ucdavis.edu/newsltr/v7n3/sa-8.htm>

Samples of UC-SAREP Cover Crop Research and Education Summaries

Release of Nitrogen From a Leguminous Cover Crop and the Subsequent Utilization by Bell Pepper

Richard Smith, Louise Jackson, and Phil Foster
Sustainable Agriculture Research & Education Program, University of California
<http://www.sarep.ucdavis.edu/ccrop/ccres/2.HTM>

Fall Planted Cover Crops May Improve Tomato Yields

Gene Miyao and Paul Robins
Sustainable Agriculture Research & Education Program, University of California
<http://www.sarep.ucdavis.edu/ccrop/ccres/1999/3.htm>

Cover Crop Use in Vegetable Production in the Southern California Deserts

Chad Hutchinson and Milt McGiffen
Sustainable Agriculture Research & Education Program, University of California
<http://www.sarep.ucdavis.edu/ccrop/ccres/1999/4.htm>

Non-Leguminous Cover Crops In Cool-Season Vegetable Crop Systems

Sustainable Agriculture Research & Education Program, University of California
<http://www.sarep.ucdavis.edu/ccrop/ccres/1996/3.HTM>

In-Field Insectaries for Vegetable Crops

Bill Chaney
Sustainable Agriculture Research & Education Program, University of California
<http://www.sarep.ucdavis.edu/ccrop/ccres/1996/7.HTM>

Non-Leguminous Cover Crops To Reduce Nitrate Leaching In Vegetable Cropping Systems

Sustainable Agriculture Research & Education Program, University of California
<http://www.sarep.ucdavis.edu/ccrop/ccres/1996/13.HTM>

Eight Points to Remember

1. For many farms, cover crops offer the only practical means of supplying the organic matter needed to maintain soil physical, chemical, and biological properties. Barnyard manure and other manures cannot meet the requirements of extensive areas.
2. Cultivation decreases the amount of organic matter in the soil and increases soil erosion on sloping land.
3. As organic matter decays, it provides nutrient elements for succeeding crops. Cover crop legumes substantially increase the nitrogen available to the subsequent crop.
4. The value of a cover crop is determined primarily by the amount of organic matter and nitrogen it will add to the soil. Therefore, use the crop that will produce the greatest growth in the particular region and the allotted time.
5. Most winter cover crops should be planted with irrigation, since early seeding is necessary for a good stand and a lack of rain coupled with no irrigation can prevent satisfactory results.
6. Most winter cover crops should be seeded before the first of November. Seedbed preparation is important.
7. The best way to work a cover crop in is with a heavy cover crop disk. Two or three diskings may be necessary. In an orchard, you need not completely incorporate the cover crop.
8. Allow legume cover crops to grow as long as possible before working them into the soil.

Source:

Cover Crops for California Agriculture. 1989. By P.R. Miller, et al. University of California, Division of Agriculture and Natural Resources, Leaflet 21471. 24 p.

3.31 Books & Bulletins on Composts and Manures

Manures For Organic Crop Production. 2000. By George Kuepper. Appropriate Technology Transfer for Rural Areas, Fayetteville, Arkansas. 12 p.
<http://www.attra.org/attra-pub/manures.html>

A Horticulture Technical Note from ATTRA on the use of raw and composted animal manures in vegetable crop production. Topics: produce quality concerns; contamination; fertility imbalances; laboratory analysis; weed problems; pollution; use as fertilizer and soil improver; and field application.

On-Farm Composting Handbook (NRAES-54). 1998. By Robert Rynk (ed.) Natural Resource, Agriculture, and Engineering Service, Ithaca, NY. 186 p.
<http://www.nraes.org/publications/nraes54.html>

This award-winning handbook presents a thorough overview of farm-scale composting and explains how to produce, use, and market compost. Topics: benefits and drawbacks of composting; the composting process; raw materials; composting methods; operations; management; site and environmental considerations; using and marketing compost. Included are 55 figures, 32 tables, calculations, references, and a glossary.

Field Guide to On-Farm Composting (NRAES-114). 1999. By Mark Dougherty (ed.) Natural Resource, Agriculture, and Engineering Service, Ithaca, NY. 128 p.
<http://www.nraes.org/publications/nraes114.html>

This is a spiral-bound, laminated field guide intended as a companion to the aforementioned *On-Farm Composting Handbook*. Topics covered: operations and equipment; raw materials and recipe making; composting process control and evaluation; site considerations, environmental management, and safety; composting livestock and poultry mortalities; and compost utilization on the farm. Highlights of the guide include an equipment identification table, diagrams showing windrow formation and shapes, examples and equations for recipe making and compost use estimation, a troubleshooting guide, and 24 full-color photos.

Fletcher Sims' Compost. 1993. Acres, USA. Kansas City, MO. 247 p.

Fletcher Sims, a compost pioneer on the High Plains of Texas, shares insights on large-scale composting and the benefits of compost based on several decades

of experience. Of special interest are Sims's notes on composting and the role of humus in eco-farming based on correspondence and publications from William Albrecht, Ehrenfried Pfeiffer, Sir Albert Howard, and Vaclav Petrik.

Composting for Manure Management. 1998. By the staff of *BioCycle*. JG Press, Emmaus, PA. 77 p.
<http://www.jgpress.com/BioCycle/Books.html>

Describes methods for processing and marketing composted manure—and how specialized equipment and composting systems are being used to turn a waste disposal problem into a profit center. Major sections: statistics by region and livestock; composting methods for poultry, hog, dairy, and beef manure; water quality impact; overcoming problems—from odors to leachate; and anaerobic digestion technology for managing manures, as well as vermicomposting methods. The appendix contains a directory of composting equipment.

Farm-Scale Composting Resource List. 1998. By Steve Diver. Appropriate Technology Transfer for Rural Areas, Fayetteville, AR. 11 p.
<http://www.attra.org/attra-pub/farmcompost.html>

This Agronomy Resource List summarizes the key publications; web pages; associations; software; magazines, newsletters, and journals; email lists and web forums; and bibliographies and current research geared to farm-scale composting.

BioCycle magazine
biocycle@jgpress.com
<http://www.jgpress.com>
\$69/12 issues a year

Biocycle magazine is the premier compost trade journal. Making and using farm-produced compost is a regular topic. The associated compost publications from JG Press are, likewise, among the best.

Slide Presentation: The Value of Animal Manure
P.R. Warman and I.Y. Walsh, Nova Scotia
Agricultural College
<http://www.gov.ns.ca/nsaf/rs/greenplan/awareness/presentations/101.htm>

3.32 Web Links on Composts and Manures

Beneficial Uses of Compost in Florida Vegetable Crops

Southwest Florida Research & Education Center,
University of Florida
<http://www.imok.ufl.edu/soils/compost.htm>

Using Composts in Commercial Vegetable and Fruit Operations

Texas A&M University
<http://aggie-horticulture.tamu.edu/vegetable/steph/compost.html>

Reducing Risks from E.coli 0157 on the Organic Farm

David G. Patriquin, Dalhousie University, NS
Eco-Farm & Garden—Summer 2000
<http://www.cog.ca/efgsummer2000.htm>

Composts as a Soil Amendment

CTAHR, University of Hawaii at Manoa
<http://agrss.sherman.hawaii.edu/staff/hue/compost1.html>

Cornell University Composting

<http://www.cals.cornell.edu/dept/compost/>

Basis for Interpretation of Compost Analyses

Woods End Agricultural Institute
<http://www.woodsend.org/compost.pdf>

Sustainability of Modern Composting: Intensification Versus Costs and Quality

Woods End Agricultural Institute
<http://www.woodsend.org/sustain.pdf>

Living Compost - Living Carbon

Woods End Agricultural Institute
<http://www.woodsend.org/live-com.pdf>

Farm-Scale Composting Resource List

Steve Diver, ATTRA
<http://www.attra.org/attra-pub/farmcompost.html>

Worms for Composting (Vermicomposting)

Alice Beetz, ATTRA
<http://www.attra.org/attra-pub/vermicom.html>

Utilization of Organic Wastes: On-Farm Composting

West Virginia University Extension Service
<http://www.wvu.edu/~agexten/wastmang/utioliow.htm>

California Integrated Waste Management Board (CIWMB)

Publications on Compost & Yard Waste
<http://www.ciwmb.ca.gov/Publications/default.asp?cat=2>

Compost: On-Farm Systems, QB 97-12

Mary Gold, AFSIC
http://www.nal.usda.gov/afsic/AFSIC_pubs/qb9712.htm

Carolina Composting Resource Guide: Reference Section

http://www.cra-recycle.org/CCC/resourceguide/resource_guide1.htm

Low-Tech, High-Quality On-Farm Composting

Vern Grubinger, University of Vermont
<http://www.uvm.edu/vtvegandberry/factsheets/compost.html>

Composting in the Southeast – Proceedings of the 1998 Conference

<http://www.p2pays.org/ref/12/11583.htm>

Large-Scale Production of Compost and Mulch

Texas Natural Resource Conservation Commission
<http://www.tnrcc.state.tx.us/exec/oppr/compost/largescale.html>

EPA Office of Solid Waste: Composting Resources

<http://www.epa.gov/epaoswer/non-hw/compost/index.htm>

Field Guide to Compost Use

U.S. Composting Council
<http://CompostingCouncil.org/FGCU.html>

Compost Images

David Granatstein, Washington State University
<http://organic.tfrec.wsu.edu/compost/imagesweb/compimages.html>

BioCycle, the Journal of Composting & Organics Recycling, offers a website with table of contents and selected on-line articles (text-only) from back issues. The photos and charts that accompany these articles are very helpful, and certainly worthy of a subscription for anybody getting into on-farm composting.

BioCycle Contents:
<http://www.jgpress.com/BCContent.html>

Lessons Learned from On-Farm Composting
BioCycle, January 2000, Page 42

Exploring the Economics of On-Farm Composting, Part I
BioCycle, February 2001, Page 61

Certified Organic Farm Relies on Compost
BioCycle, December 1999, Page 60

Composters Build Strong Links to California Farms
BioCycle, February 1999, Page 55

Composting Reduces Fuel and Labor Costs on Family Farms
BioCycle, May 2000, Page 72

Compost Research On Wisconsin Organic Farm
BioCycle, September 2000, Page 54

The Applied Thoughts Of A Compost Theorist
BioCycle, February 2001, Page 56

Troubleshooting the Compost Pile, Part I
BioCycle, November 1999, Page 53

Monitoring Moisture in Composting Systems
BioCycle, October 2000, Page 53

Getting Moisture into the Compost Pile
BioCycle, June 2001, Page 51

Advances in Windrow Turning
BioCycle, July 2001, Page 63

Building a Safe Pesticides Industry with Bioproducts and Biomethods
BioCycle, October 1999, Page 56

Evaluating Microbiology of Compost
BioCycle, May 1999, Page 62

Using Compost To Control Plant Diseases
BioCycle, June 1999, Page 61

New Trends in Sustainable Farming Build Compost Use
BioCycle, July 2000, Page 30

Understanding Compost Tea
BioCycle, October 2000, Page 71

Time for (Compost) Tea in the Northwest
BioCycle, October 2000, Page 74

Brewing Up Solutions To Pest Problems
BioCycle, March 2001, Page 64

Latest Developments in Mid-to-Large Scale Vermicomposting
BioCycle, November 2000, Page 51

Worming the Way to Finished Compost
BioCycle, October 1999, Page 34

Achieving Pathogen Stabilization Using Vermicomposting
BioCycle, November 1999, Page 62

Manures and Food Residuals Compost are in the Bag
BioCycle, June 2001, Page 49

Dutch Farmers Find It Pays To Manage Poultry Manure
BioCycle, April 1999, Page 72

Poultry Farm Pioneers Low-Rate Composting
BioCycle, August 1999, Page 59

The High Route to Managing Hog Manure
BioCycle, October 1999, Page 36

BioCycle Equipment and Systems Directory, 2001
<http://www.jgpress.com/BCArticles/2001/040182intro.html>

- Products And Services
- Company Index

3.41 Books & Bulletins on Soil Organic Matter

Soil organic matter and soil humus are critical components of any soil system. Humus is like the glue that binds the soil together. And together, humus and clay are known as the Seat of Soil Fertility.

Humus management is especially important in organic farming systems, since farmers rely so heavily on recycled plant and animal wastes to:

- feed the soil
- improve soil tilth
- increase water holding capacity
- support a complex soil food web
- induce disease suppression

Building Soils for Better Crops, 2nd Edition. 2000. By Fred Magdoff and Harold van Es. Sustainable Agriculture Network, Handbook Series No. 4. Sustainable Agriculture Publications, University of Vermont. 240 p.

Building Soils for Better Crops, 2nd Edition (2000) by Fred Magdoff and Harold van Es, soil scientists at University of Vermont and Cornell University, focuses on building and maintaining soil organic matter through ecological soil management practices like composting, cover crops, crop rotations, mulches, and animal manures.

Humic, Fulvic, and Microbial Balance: Organic Soil Conditioning. 1993. By William R. Jackson. Jackson Research Center, Evergreen, CO. 958 p.

Organic Soil Conditioning is the award-winning book on humic substances by William Jackson. Jackson's book supports the current renaissance of ecological soil management whereby greater attention is being paid to the *soil foodweb* and *deep humus*. Available through Acres USA.

The Carbon Catcher Program: Using the Earth to Take Carbon from the Sky. 1993. By Gerry Wass. The Water Foundation, Brainerd, MN. 31 p.

This little-known booklet does a fine job of summarizing the importance of humus, outlines the basic principles of ecological agriculture, lists publications and resources, and contains a directory of alternative agricultural consultants and soil fertility labs.

The following titles are key reference books on humus and organic matter, available through Inter-Library Loan.

Soil Organic Matter, 2nd English Edition. 1966. By M.M. Kononova. Pergamon Press, New York, NY. 544 p.

Humus Chemistry: Genesis, Composition, Reactions, 2nd Edition. 1994. By F.J. Stevenson. Wiley & Sons, New York, NY. 496 p.

Soil Organic Matter: Biological and Ecological Effects. 1987. By Robert L. Tate. John Wiley & Sons, New York. 291p.

Humus: Origin, Chemical Composition, and Importance in Nature. 1936. By Selman A. Waksman. The Williams & Wilkins Co., Baltimore, MD. 494 p.

Soil Organic Matter in Temperate Agroecosystems: Long-Term Experiments in North America. 1997. By E.A. Paul, E.T. Elliott, K. Paustian, and C.V. Cole (eds.) CRC Press, Boca Raton, FL. 414 p.

Sustainable Management of Soil Organic Matter. 2001. Edited by R.M. Rees, et al. CABI Publishing Co., New York. 440 p.

The following **Soil Science Society** publications are noteworthy mainly as reference titles that provide background research and schematic illustrations on agricultural practices that influence soil organic matter.

Humic Substances in Soil Science and Crop Sciences: Selected Readings. 1990. By P. MacCarthy, et al. Soil Science Society of America, American Society of Agronomy, Madison, WI. 281 p.

Soil Fertility and Organic Matter as Critical Components of Production Systems. 1987. By R.R. Follet, J.W.B. Stewart, and C.V. Cole. SSSA Special Publication No. 19. Soil Science Society of America, American Society of Agronomy, Madison, WI. 166 p.

Interactions of Soil Minerals with Natural Organics and Microbes. 1986. By P.M. Haug and M. Schnitzer. SSSA Special Publication No. 17. Soil Science Society of America, Madison, WI. 606 p.

3.42 Soil Organic Matter Web Links

Soil Quality Indicators: Organic Matter

NRCS Soil Quality Institute

<http://www.statlab.iastate.edu/survey/SQI/sqiinfo.html>

Changes in Soil Organic Matter, Chapter 5

In: The Health of Our Soils: Toward Sustainable Agriculture in Canada (1995)

Agriculture and Agri-Food Canada

<http://res.agr.ca/CANSIS/PUBLICATIONS/HEALTH/chapter05.html>

Lectures on Soil Organic Matter

University of Wales, Bangor

<http://safsdj3.bangor.ac.uk/dj/lectures/om/om.html>

Slide Show on Soil Organic Matter

College of Biology and Agriculture, Brigham Young University

<http://ucs.byu.edu/bioag/ghort/514pres/humus/>

Add Organic Matter for 'Better' Garden Soils

University of Wisconsin-Extension

<http://ipcm.wisc.edu/wcm/99-3soils1.html>

Organic Matter Management (BU-7402)

In: The Soil Management Series

University of Minnesota Cooperative Extension

<http://www.extension.umn.edu/distribution/cropsystems/DC7402.html>

Stabilizing Effect of Organic Matter

University of Putra Malaysia

http://www.agri.upm.edu.my/jst/resources/as/om_stable.html

The Role of Humic Substances

University of Putra Malaysia

http://www.agri.upm.edu.my/jst/resources/as/om_humicsubs.html

Soil Humic Substances

Agricultural University of Wroclaw, Poland

<http://www.ar.wroc.pl/~weber/humic.htm>

Humic Products For Agriculture and the Environment

<http://www.humic.com>

Utilization of Composted Organic Wastes in Vegetable Production Systems

Food and Fertilizer Technology Center

<http://www.agnet.org/library/abstract/tb147.html>

Soil Organic Matter

North Ortago Sustainable Land Management Group, New Zealand

http://noslam.co.nz/info_sheets/organicmatter.shtml

Soil Organic Matter

Alberta Agriculture, Food and Rural Development

<http://www.agric.gov.ab.ca/agdex/500/536-1.html>

Soil Humic Substances

Virtual Classroom, Prince of Songkla University

<http://classroom.psu.ac.th/users/msomsak/ChemNutrient/humic.htm>

Soil Organic Matter Agronomy Notes

Montana State University

http://scarab.msu.montana.edu/Agnotes/category_230.htm#A229

Soil Basics III: Organic Matter, Key to Management

In: 5-Part Series on Soil Basics

UMass Extension, University of Massachusetts

http://www.umassvegetable.org/soil_crop_pest_mgt/soil_nutrient_mgt.html

Experts Talk Soil at MOFGA Meetings

Maine Organic Farmer & Gardener,

June - August 2000 issue

<http://www.mofga.org/mofgj00j.html>

Featuring:

- Jerry Brunetti, Agri-Dynamics
- Fred Magdoff, University of Vermont
- Marianne Sarrantonio, University of Maine
- Rick Kersbergen, Maine Cooperative Extension
- Elaine Ingham, Soil Foodweb, Inc.
- Mark Fulford, Agricultural Alternatives

3.51 Books & Bulletins on Soil Biology, Worms and Microbes

Farmers enlist the aid of legions of earthworms, bacteria, fungi and other soil-dwelling creatures to decompose crop residues and cycle nutrients to crop plants. Not unlike a crew of carpenters, electricians, plumbers, painters, and brick layers who combine forces to build a house, each member of the microbial herd has an important task to perform in the soil.

In the past few years, it has become apparent to farmers and scientists alike that a greater understanding of and ability to work *with* soil creatures and soil food webs can help us achieve a healthy, sustainable agriculture.

These first two bulletins from USDA-NRCS and Michigan State University are wonderful educational resources. They are worthy additions to the farmer's bookshelf.

Soil Biology Primer. 1999. By E.R. Ingham, A.R. Moldenke, and C. Edwards. USDA-Natural Resource Conservation Service, Soil Quality Institute. 52 p.

The *Soil Biology Primer* is a much-heralded USDA-NRCS publication that went out of print faster than crap runs through a goose! This is a highly educational and graphically interesting and colorful booklet that sums up our collective knowledge about soil creatures, soil foodwebs, and soil biological functions. It is a landmark publication in the history of USDA. Chapters: The Soil Food Web; The Food Web & Soil Health; Soil Bacteria; Soil Fungi; Soil Protozoa; Soil Nematodes; Soil Arthropods; Earthworms.

To order a print copy (now back in print, 2nd Edition) or to see the online web version, go to:

<http://www.statlab.iastate.edu/survey/SQI/primer/index.htm>

Michigan Field Crop Ecology: Managing Biological Processes for Productivity and Environmental Quality. 1998. By M.A. Cavigelli, S.R. Deming, L.K. Probyn, and R.R. Harwood (eds.) Michigan State University Extension, Bulletin E-2646. 87 p.

Michigan Field Crop Ecology is another landmark bulletin from the Extension Service. Its stated intent is to address the *biological basis of sustainability*. Chapters address field crop ecosystems; soil ecology; carbon; nitrogen; cover

crops; pest ecology and management; the insect community; and nematodes. Practical examples and colorful graphics enhance the educational quality of this farmer-friendly manual.

Soil Microorganisms and Higher Plants. 1961. By N.A. Krasil'nikov. National Technical Information Service, Springfield, VA. 474 p. Publication No. TT-60-21126.

Soil Microorganisms and Higher Plants is the classic Russian text on soil microbiology. As part of the Soil and Health Library, it can be viewed online at:

The Holistic Agriculture Library
<http://www.soilandhealth.org/01aglibrary/01aglibwelcome.html>

Textbooks and Library References

Principles and Applications of Soil Microbiology. 1998. By D.M. Sylvia, J.J. Fuhrman, P.G. Hartel, and D. Zuberer. Prentice Hall, NJ. 550 p.

Fundamentals of Soil Ecology. 1995. By David C. Coleman and D.A. Crossley, Jr. Academic Press, New York. 205 p.

Soil Biology Guide. 1990. By Daniel L. Dindal. A Wiley-Interscience Publication, John Wiley & Sons, New York. 1349 p.

The Biodiversity of Microorganisms and Invertebrates: Its Role in Sustainable Agriculture. 1991. By D.L. Hawksworth (ed.) CASAFA Report Series No. 4, CAB International, Wallingford, Oxford, UK. 302 p.

Soil Biota, Nutrient Cycling, and Farming Systems. 1993. By M.G. Paoletti, W. Foissner, and D. Coleman (eds.) Lewis Publishers, Boca Raton, FL. 314 p.

3.52 Soil Biology Web Links

Soil Biology

Soil Biological Communities

Bureau of Land Management
<http://www.id.blm.gov/soils/index.html>

Life in the Soil

CRC for Soil & Land Management, Adelaide, South Australia
<http://www-crcslm.waite.adelaide.edu.au/soillife.html>

Microbe Zoo

Center for Microbial Ecology, Michigan State Univ.
<http://commtechlab.msu.edu/sites/dlc-me/zoo/index.html>

The Soil Makers

The Wonderful World of Insects
<http://www.insect-world.com/insects/soileco.html>

Lecture Notes on Soil Microorganisms, The Rhizosphere, Mycorrhiza, and Microbial Ecology

By Davey Jones at University of Wales, Bangor
<http://safsdj3.bangor.ac.uk/dj/lectures/s-lect.html>

Soil Biology and Soil Management (BU-7403)

In: The Soil Management Series
University of Minnesota Cooperative Extension
<http://www.extension.umn.edu/distribution/cropland/DC7402.html>

Nutrient Cycling and Conservation in a Self-Contained Production System

By Lawrence Andres, Sharing the Lessons of Organic Farming conference
<http://gks.com/library/OrgConf/andres.html>

Using Soil Fauna to Improve Soil Health

By Bonnie Witt
<http://www.hort.agri.umn.edu/h5015/97papers/witt.html>

The Soil Foodweb: Its Importance in Ecosystem Health

By Dr. Elaine Ingham
<http://www.rain.org/~sals/ingham.html>

Soil Ecology, The Pedosphere and Its Dynamics

University of Alberta
<http://www.pedosphere.com/toc10.html>

Soil Biodiversity

NRCS Soil Quality Information Sheet
<http://www.statlab.iastate.edu/survey/SQI/pdf/biodivers.pdf>

Mycorrhiza = Plant + Fungus Symbiosis

Mycorrhiza Information Exchange

<http://mycorrhiza.ag.utk.edu/>

Overview of Mycorrhizal Symbiosis

David Sylvia, University of Florida
<http://dmsylvia.ifas.ufl.edu/mycorrhiza.htm>

Glomalin—Soil's Superglue

USDA ARS News
<http://www.ars.usda.gov/is/AR/archive/oct97/glomalin1097.htm>

Mycorrhiza.com

<http://www.mycorrhiza.com/index.htm>

Earthworms

Earthworms and Crop Management

Purdue University. Agronomy Guide AY-279
<http://www.agcom.purdue.edu/AgCom/Pubs/AY/AY-279.html>

Building Your Soil: The Role of Earthworms in Healthy Soils

<http://maine.maine.edu/~thomascb/earthworm.html>

Frequently Asked Questions About Earthworms

Southern Crop Protection and Food Research Centre, Agriculture and Agri-Food Canada
<http://res2.agr.ca/london/pmrc/english/faq/earthwor.html>

The Worm Digest

<http://www.worndigest.org/>

Earthworm Information at UC-SAREP

<http://www.sarep.ucdavis.edu/worms/>

4.0 IPM for Vegetables:

Pests of vegetables – insects, diseases, and weeds – are part of every vegetable field in the world. It is part of their nature to eat, inhabit, and reproduce, using the vegetables as hosts to complete their life cycle. Pest management strategies such as IPM, or Integrated Pest Management, are therefore critical.

Integrated pest management is the basic framework used in vegetable production to decide when and how pests are controlled. The primary goal of IPM is to provide clear pest management guidelines to growers in order to optimize pest control in an economically and ecologically sound manner.

IPM integrates habitat modification and cultural, physical, biological, and chemical practices to minimize crop losses. Monitoring, recordkeeping, and life-cycle information on pests and their natural enemies are used to determine when control options are needed to keep pests below an economically damaging threshold.

As they move towards greater sustainability, vegetable IPM programs tend to go through three phases†, with each stage using and building on previous knowledge and techniques:

1. The **pesticide management** phase, characterized by establishing economic thresholds, sampling, and spraying as needed.
2. The **cultural management** phase, based on a thorough understanding of the pest's biology and its relationship to the cropping system. Tactics employed to control pests include delayed planting dates, crop rotation, altering harvest dates, etc.
3. The **biological control** phase, or "bio-intensive IPM," requires thorough understanding of the biology of natural enemies (in addition to that of the pest) and an ability to measure how effective these agents are in controlling pests. When natural agents do not meet expected goals, "soft" pesticides (non-toxic to non-target organisms) are used, and applications are timed to minimize pesticide exposure of beneficials.

†**Source:** Ferro, D.N. 1993. Integrated pest management in vegetables in Massachusetts. p. 95-105. In: Anne R. Leslie, and Gerrit W. Cuperus (eds.) Successful Implementation of Integrated Pest Management for Agricultural Crops. Lewis, Boca Raton, FL.

Rincon-Vitova 5-Point Integrated Pest Control†

1. Colonizing Beneficial Organisms

Use insectary-raised beneficials selectively to help restore the natural enemy complex damaged by pesticide use.

2. Cover Crop Refuges

Plant strips of pesticide-free trap cover crops as a field insectary and winter refuge for beneficials.

3. Monitoring

Sample (with nets or vacuums) and observe the relative number of pests and beneficials.

4. Spraying

Do not spray if there is no pest problem! Use "soft" pesticides that are less disruptive to natural biological controls.

5. Cultural Practices

Slight changes in farming methods can alter the behavior of pests and their natural enemies to favor the crop. Crop rotation, hedgerows, strip cutting, and other refuge management techniques do make a difference.

Source:

†Rincon-Vitova Insectaries
P.O. Box 1555
Oak View, CA 93022
800-248-2847
805-643-6267 Fax
bugnet@rinconvitova.com
<http://www.rinconvitova.com>

* * * * *

IPM is a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools in a way that minimizes economic, health, and environmental risks.

National Coalition on IPM, January 1994

* * * * *

When we kill off the natural enemies of a pest we inherit their work.

Carl Huffaker
University of California at Berkeley

Natural Enemies and Biological Control

Enlisting the aid of beneficial insects is one of the first steps toward bio-intensive pest management. Farmscaping, or habitat manipulation, is the use of hedgerows, insectary plants, and cover crops to attract and support populations of parasites and predators. Flowering plants offer shelter, water, nectar, pollen, and herbivorous insects and mites as food to sustain these natural enemies of crop pests. Natural biological control makes more sense when you are familiar with these beneficial insects and how they live. Here are the key IPM reference materials that can help you learn about:

- predators and parasites
- life cycles of beneficial insects
- which beneficial insects attack crop pests
- how to provide insectary habitat
- how to attract beneficials to the farm

Natural Enemies of Vegetable Insect Pests. 1993. By Michael P. Hoffman and Anne A. Frodsham. Cornell Cooperative Extension Service, Ithaca, New York. 63 p.

The complete manual can also be found on the web at:

Biological Control: A Guide to Natural Enemies in North America

<http://www.nysaes.cornell.edu/ent/biocontrol/>

Natural Enemies Handbook: The Illustrated Guide to Biological Pest Control. Publication 3386B4. University of California, Statewide Integrated Pest Management Project. 164 p.

To review contents and place an order, see:
<http://www.ipm.ucdavis.edu/GENERAL/naturalenemiesflyer.html>

Biological Control of Insects and Mites: An Introduction to Beneficial Natural Enemies and Their Use in Pest Management. 1993. By Daniel L. Mahr and Nino M. Ridgeway. North Central Region Publication No. 481. Cooperative Extension Service, University of Wisconsin 91 p.

To review contents and place an order, see:
<http://muextension.missouri.edu/xplor/regpubs/ncr481.htm>

Biological Control of Insect Pests of Cabbage and Other Crucifers. 1993. By Susan E. Rice Mahr, Daniel L. Rice, and Jeffrey A. Wyman. North Central Region Publication No. 471. Cooperative Extension Service, University of Wisconsin. 55 p.

To place an order, see:
<http://www1.uwex.edu/ces/pubs/>

Predatory Insects in Fruit Orchards

Publication 208, Ontario Ministry of Food and Agriculture. 32 pages.

Predatory Insects in Fruit Orchards identifies over 100 beneficial insects that work in the orchard. It features detailed color pictures and life cycle descriptions for each insect. Though this particular bulletin is geared to fruit orchards, much of the information is universally applicable to horticulture crops.

To review contents and place an order, see:
<http://www.gov.on.ca/OMAFRA/english/products/newpubs.html#insects>

Farmscaping to Enhance Biological Control

By Rex Dufour, ATTRA
<http://www.attra.org/attra-pub/farmscape.html>

This publication summarizes habitat manipulation as a means to create insect refugia and attract beneficial insects to the farm, thus enhancing natural biological control. It provides an introduction to farmscaping, practical examples of habitat manipulation employed by farmers, and pointers to useful print and web resources.

Identification and Management of Major Pests & Beneficial Insects in Potato

Oregon State University
<http://ipcc2.orst.edu/potato/>

Naturalize Your Farming System: A Whole-Farm Approach to Managing Pests

Sustainable Agriculture Network, USDA-SARE
<http://www.sare.org/farmpest/index.htm>
<http://www.sare.org/farmpest/farmpest.pdf>

4.1 Print & Video Resources on IPM

General IPM Reference Materials

Vegetable Insect Management: With Emphasis on the Midwest. 1995. By Rick Foster and Brian Flood (eds.) Meister Publishing Co., Willoughby, OH. 206 p.

A comprehensive 206-page manual produced by the Purdue Research Foundation, published by Meister Publishing Company. Very practical. One of the best pest management guides on vegetables compiled by the Extension Service.

Pests of the Garden and Small Farm: A Grower's Guide to Using Less Pesticide. 1991. By Mary Louise Flint. University of California, Statewide Integrated Pest Management Project, Division of Agriculture and Natural Resources, Publication 3339. 257 p.

Complete Guide to Pest Control With and Without Chemicals, 3rd Edition. 1996. By George Ware. Thompson Publishing Co., California. 350 p.

Insect Pests of Farm, Garden and Orchard, 8th Edition. 1987. By R. Davidson & W. Lyon. John Wiley & Sons, New York. 640 p.

Vegetable Diseases and their Control, 2nd Edition. 1986. By Arden F. Sherf and Alan A. MacNab. John Wiley & Sons, New York. 728 p.

Diseases and Pests of Vegetable Crops in Canada. 1994. By Ronald J. Howard, J. Allan Garland, and W. Lloyd Seaman (editors). The Canadian Phytopathological Society and the Entomological Society of Canada
\$65, with \$15 shipping & handling to U.S.:

The Entomological Society of Canada
393 Winston Ave.
Ottawa, Ontario
Canada K2A 1Y8
613-725-2619
613-725-9349Fax

IPM Guidebooks

There are numerous books and manuals that address insect and disease pests of vegetable crops. Four sources, in particular, have amassed a noteworthy collection of educational resources on IPM: University of California Statewide IPM Project, Entomological Society of America, American Phytopathological Society, and BIRC.

UC Statewide IPM Project

University of California
One Shields Avenue
Davis, CA 95616-8620
530-752-7691
<http://www.ipm.ucdavis.edu/>

For-sale Publications:

- IPM for Tomatoes
- IPM for Cole Crops and Lettuce
- IPM for Potatoes
- Managing Insects and Mites with Spray Oils
- Natural Enemies Are Your Allies! (poster)
- Natural Enemies Handbook: The Illustrated Guide to Biological Pest Control
- Pests of the Garden and Small Farm: A Grower's Guide to Using Less Pesticide, 2nd edition
- UC IPM Pest Management Guidelines

On-line Publications:

- UC IPM Pest Management Guidelines

Entomological Society of America

9301 Annapolis Road
Lanham, MD 20706-3115
301-731-4535
301-731-4538 Fax
esa@entsoc.org
<http://www.entsoc.org/catalog/>

- Complete Guide to Pest Control With and Without Chemicals, 3rd Edition
- Insect Pests of Farm, Garden and Orchard, 8th Edition
- Integrated Pest Management for Onions (Cornell)
- Manual on Natural Enemies of Vegetable Insect Pests (Cornell)
- Pests of the West, Revised
- Numerous standard reference books: IPM, biological control, ecology, and behavior

APS Press

American Phytopathological Society
3340 Pilot Knob Road
St. Paul, MN 55121-2097
651-454-7250
651-454-0766 Fax
aps@scisoc.org
<http://www.scisoc.org/>

- Diseases of Vegetables CD-ROM
- Advances in Potato Pest Biology and Management
- Compendium of Bean Diseases
- Compendium of Beet Diseases
- Compendium of Corn Diseases, 3rd Edition
- Compendium of Cucurbit Diseases
- Compendium of Lettuce Diseases
- Compendium of Pea Diseases
- Compendium of Tomato Diseases

Bio-Integral Resource Center (BIRC)

BIRC is a leader in the field of integrated pest management. BIRC publishes *The IPM Practitioner* and *Common Sense Pest Control Quarterly* as well as an annual *Directory of IPM Products and Beneficial Insects*. BIRC also produces booklets and reprints on least-toxic controls for selected pests.

Bio-Integral Resource Center (BIRC)
P.O. Box 7414
Berkeley, CA 94707
510-524-2567
510-524-1758 Fax
birc@igc.org
<http://www.birc.org/>

What are Biorational Pesticides

Biorational pesticides, also known as **least-toxic pesticides**, are those that are pest-specific and cause the least amount of harm to beneficial organisms or the environment. Examples include microbial insecticides, insecticidal soaps, horticultural oils, insect growth regulators, sorptive dusts like diatomaceous earth, pheromones, and botanical plant extracts.

Resources:

Alternatives in Insect Pest Management: Biological & Biorational Approaches

North Central Regional Extension Publication 401.
<http://spectre.ag.uiuc.edu/%7Evista/abstracts/aaltinsec.html>

Organic Pesticide Guide for Insect and Disease Control

University of Georgia Entomology
http://www.bugwood.org/ent/pest2001/Horticultural_Crops/Horticultural_Crops.htm

What are Biopesticides

The EPA, which sponsors a **biopesticides** web page, classifies biopesticides into three major categories:

(1) **Microbial pesticides** contain a microorganism (e.g., a bacterium, fungus, virus or protozoan) as the active ingredient. For example, there are fungi that control weeds, and bacteria that control plant diseases.

(2) **Plant-pesticides** are pesticidal substances that plants produce from genetic material that has been added to the plant. For example, the gene for the Bt pesticidal protein has been introduced into corn.

(3) **Biochemical pesticides** are naturally occurring substances that control pests by non-toxic mechanisms. Conventional pesticides, by contrast, are synthetic materials that usually kill or inactivate the pest. Biochemical pesticides include substances, such as pheromones, that interfere with growth or mating of the pest.

Resources:

What are Biopesticides

EPA Office of Pesticide Programs: Biopesticides
http://www.epa.gov/pesticides/biopesticides/what_are_biopesticides.htm

4.2 IPM Web Links

Biointensive IPM in a Nutshell

A Total System Approach to Sustainable Pest Management —The Image

Biological Control as a Component of Sustainable Agriculture, USDA-ARS
<http://sacs.cpes.peachnet.edu/lewis/ecolsyst.gif>

A Total System Approach to Sustainable Pest Management —The Story

Biological Control as a Component of Sustainable Agriculture, USDA-ARS
<http://sacs.cpes.peachnet.edu/lewis/lewis1.pdf>

This is the classic biointensive IPM article from the November 1997 issue of *Proceedings of the National Academy of Science*. It is accompanied by the diagrammatic illustration that shows an unstable pyramid on the left (Pesticide Treadmill) transitioning through boxes in the middle (Therapeutics) + (Ecosystem Manipulation) to get to a stable pyramid on the right (Total System Management)

Host Distribution, Life Cycle, Management

Featured Creatures: The Good, The Bad, and The Pretty

University of Florida Department of Entomology and Nematology
<http://www.ifas.ufl.edu/~insect/index.htm>

Featured Creatures, a University of Florida website, is a great first-step IPM site to find quick, essential knowledge about pest insects: Introduction - Hosts - Distribution - Description - Life Cycle - Damage - Economic Injury Level - Management - Selected References.

Biological Control

Biological Control of Insect and Mite Pests

University of Nebraska Cooperative Extension
<http://www.ianr.unl.edu/pubs/insects/g1251.htm>

Biological Control: Predators and Parasitoids

University of Minnesota, Center for Urban Ecology and Sustainability
<http://www.ent.agri.umn.edu/cues/dx/pred-par.htm>

Beneficial Insects and Mites

University of Florida
<http://edis.ifas.ufl.edu/IN078>

Beneficial Insects Sheet 1

University of Florida
<http://edis.ifas.ufl.edu/in002>

Beneficial Insects Sheet 2

University of Florida
<http://edis.ifas.ufl.edu/in003>

Beneficial Insects Sheet 3

University of Florida
<http://edis.ifas.ufl.edu/in012>

Beneficial Insects Sheet 4

University of Florida
<http://edis.ifas.ufl.edu/in013>

Biological Control: A Guide to Natural Enemies in North America

Cornell University
<http://www.nysaes.cornell.edu/ent/biocontrol/>

Natural Enemies Handbook: The Illustrated Guide to Biological Pest Control

University of California
<http://www.ipm.ucdavis.edu/GENERAL/naturalenemiesflyer.html>

Assoc. of Natural Bio-Control Producers — Natural Enemy Fact Sheets

<http://ipmwww.ncsu.edu/biocontrol/anbp/Factsheets.html>

Insect Parasitic Nematodes

Ohio State University
<http://www2.oardc.ohio-state.edu/nematodes/>

Beneficial Nematodes: Suppliers and Pesticide Compatibility, Nematology Pointer No. 45

University of Florida
<http://edis.ifas.ufl.edu/in096>

Suppliers of Beneficial Organisms in North America

California Environmental Protection Agency
<http://www.cdpr.ca.gov/docs/ipminov/bensuppl.htm>

Approaches to Biological Control of Insect Pests
Department of Entomology, Connecticut Agricultural
Experiment Station
<http://www.state.ct.us/caes/fsen0004f.htm>

Farmscaping and Phenology: Designing the Landscape for Beneficial Insect Habitat

Farmscaping to Enhance Biological Control
ATTRA
<http://www.attra.org/attra-pub/farmscape.html>

**Phenology Web Links: Sequence of Bloom, Floral
Calendars, What's in Bloom**
ATTRA
<http://www.attra.org/attra-pub/phenology.html>

Biorational Pesticides

**Alternatives in Insect Pest Management:
Biological & Biorational Approaches**
North Central Region Extension Publication 401
<http://spectre.ag.uiuc.edu/%7Evista/abstracts/aaltinsec.html>

What are Biorational Pesticides?
University of Minnesota, Center for Urban Ecology
and Sustainability
<http://www.ent.agri.umn.edu/cues/dx/bugs/bio1.htm>

Insect Management: Botanicals
Sustainable Practices for Vegetable Production in the
South, Dr. Mary Peet, NCSU
<http://www.cals.ncsu.edu/sustainable/peet/IPM/insects/botan.html>

Biointensive Integrated Pest Management
ATTRA
<http://www.attra.org/attra-pub/ipm.html>

Appendix B: Microbial Pesticides
Appendix C: Microbial Pesticide Manufacturers
and Suppliers

**Integrated Pest Management for Greenhouse
Crops**
ATTRA
<http://www.attra.org/attra-pub/gh-ipm.html>

Appendix II: Beneficial Organisms
Appendix III: Biorational Pesticides

Least Toxic Materials for Managing Insect Pests
IPM Access - An Integrated Pest Management
Online Service
<http://www.efn.org/~ipmpa/leastox.html>

Hydrated Lime as an Insect Repellent
University of Connecticut Integrated Pest
Management Program
<http://www.hort.uconn.edu/ipm/veg/htms/hydlime.htm>

Use of Baking Soda as a Fungicide
ATTRA
<http://www.attra.org/attra-pub/bakingsoda.html>

Cultural Controls & Crop Rotations

**Cultural Control for Management of Vegetable
Pests in Florida**
University of Florida
<http://www.imok.ufl.edu/LIV/groups/cultural/pests/insects.htm>

**Having Problems Controlling Vegetable Crop
Diseases - Try Rotation**
University of Connecticut, IPM Program
<http://www.hort.uconn.edu/ipm/veg/htms/rotate.htm>

**Conservation Crop Rotation: Effects on Soil
Quality**
NRCS Soil Quality Institute, Agronomy Technical
Note No. 2.
<http://www.statlab.iastate.edu/survey/SQI/pdf/agronomy2.pdf>

Crop Rotations in Direct Seeding
Alberta Agriculture, Food and Rural Development
<http://www.agric.gov.ab.ca/agdex/500/519-28.html>

**Crop Rotation: The Future of the Potato
Industry in Atlantic Canada**
Eastern Canada Soil and Water Conservation Centre
<http://www.cuslm.ca/ccse-swcc/publications/english/rotation.pdf>

Cultural Control
Radcliffe's IPM World Textbook
<http://ipmworld.umn.edu/chapters/ferro.htm>

Entomology

Entomology on World-Wide Web

Colorado State University
http://www.colostate.edu/Depts/Entomology/www_sites.html

Insects on WWW

Virginia Tech
<http://www.isis.vt.edu/~fanjun/text/Links.html>

Entomology Index of Internet Resources: A Directory and Search Engine of Insect-Related Resources on the Internet

Iowa State University
<http://www.ent.iastate.edu/list/>

Land Grant University Entomological Resources

University of Florida jump site
http://www.ifas.ufl.edu/~pest/vector/link_sub.htm#Land

Diseases

Plant Pathology Internet Guide Book

<http://www.ifgb.uni-hannover.de/extern/ppigb/ppigb.htm>

Texas Plant Disease Handbook

<http://cygnus.tamu.edu/Texlab/tpdh.html>

An Online Guide to Plant Disease Control

Oregon State University
<http://plant-disease.orst.edu/index.htm>

Disease Management for Vegetables and Herbs in Greenhouses Using Low Input Sustainable Methods

North Carolina State University
<http://www.ces.ncsu.edu/depts/pp/notes/oldnotes/vg2.htm>

Minimizing Vegetable Disease

Cornell University
<http://plantclinic.cornell.edu/vegetable/minimizevege/minimizevege.htm>

Vegetable MD Online

Cornell University Vegetable Disease Web Page
<http://ppathw3.cals.cornell.edu/Extension/VegetableDiseases/Home.htm>

Traditional Practices for Plant Disease Management in Traditional Farming Systems

H. David Thurston, Cornell University
http://www.tropag-fieldtrip.cornell.edu/Thurston_TA/default.html

Commercial Biocontrol Products For Use Against Soilborne Crop Diseases

USDA-ARS
<http://www.barc.usda.gov/psi/bpdl/bpdlprod/bioproduct.html>

Nematodes

Alternative Nematode Control

ATTRA
<http://www.attra.org/attra-pub/nematode.html>

Soil Organic Matter, Green Manures and Cover Crops For Nematode Management

Entomology and Nematology Department, University of Florida
<http://hammock.ifas.ufl.edu/txt/fairs/vh/17728.html>

Nematode Suppressive Crops

Auburn University
<http://www.aces.edu/department/extcomm/publications/anr/anr-856/anr-856.htm>

Alternatives to Methyl Bromide

Methyl Bromide Alternatives Newsletter

USDA
<http://www.ars.usda.gov/is/np/mba/mebrhp.htm>

Methyl Bromide Phase Out Web Site

EPA
<http://www.epa.gov/ozone/mbr/>

Organic Pest Management

Organic Vegetable IPM Guide

Mississippi State University
<http://ext.msstate.edu/pubs/pub2036.htm>

Insect Management for Organic Crops

University of California, Publication 7251
<http://anrcatalog.ucdavis.edu/pdf/7251.pdf>

Plant Disease Management for Organic Crops

University of California, Publication 7252
<http://anrcatalog.ucdavis.edu/pdf/7252.pdf>

Organic Pest Control Guide for Insect and Disease Control

University of Georgia
<http://www.ces.uga.edu/Agriculture/entomology/pest99/hort/organic/organic.htm>

Organic Vegetable Production: Managing Nutrients and Pests

Ontario Ministry of Food and Agriculture
http://www.gov.on.ca:80/OMAFRA/english/crops/organic/Organic_Vegetable_Production.htm

Pest Management Guidelines & Vegetable IPM

UC Pest Management Guidelines

<http://www.ipm.ucdavis.edu/PMG/crops-agriculture.html>

University of California Statewide Integrated Pest Management Project

<http://www.ipm.ucdavis.edu/>

Integrated Crop and Pest Management Guidelines for Commercial Vegetable Production

Cornell Cooperative Extension
<http://www.nysaes.cornell.edu/recommends/>

IPM in New York State Vegetables

<http://www.nysaes.cornell.edu/ipmnet/ny/vegetables/>

Vegetable Production and Pest Control Guides from Land-Grant Universities

Oregon State University
<http://www.orst.edu/Dept/NWREC/veglink.html>

IPM — Fruits & Vegetables at University of Illinois

<http://www.aces.uiuc.edu/~ipm/fruits/fruits.html>

VegEdge — Vegetable IPM for the Midwest

<http://www3.extension.umn.edu/vegipm/>

VegNet

Ohio State University
<http://www.ag.ohio-state.edu/~vegnet/index.html>

Vegetable Insect Fact Sheets

University of Kentucky — Department of Entomology
<http://www.uky.edu/Agriculture/Entomology/entfacts/efveg.htm>

Vegetable IPM Insect Notes

North Carolina State University
http://www.ces.ncsu.edu/depts/ent/notes/Vegetables/vegetable_contents.html

Crop Knowledge Master: Vegetables

University of Hawaii at Manoa
<http://www.extento.hawaii.edu/kbase/crop/crops/vegetabl.htm>

Pesticide Use Crop Profiles

USDA/OPMP Crop Profiles Database

USDA Office of Pesticide Management Programs, (OPMP) & Pesticide Impact Assessment Program (PIAP)
<http://cipm.ncsu.edu/CropProfiles/>

A great place to find out what the standard pest controls are for vegetable crops.

Pesticide Registration Databases

Some states provide free access to pesticide registration databases. As a quick research tool, they can be used to identify pest control products for target pests— including biorational pesticides, botanical and microbial pesticides, and other natural pest control products.

Kelly Pesticide Registration Systems

<http://www.kellysolutions.com/>

Hawaii Pesticide Information Retrieval System

<http://pestworld.stjohn.hawaii.edu/cfdocs/test/hpirs.htm>

Pesticides: Education, Databases, Manufacturers, and Suppliers

Pesticide Education Resources

University of Nebraska-Lincoln
<http://pested.unl.edu/pestbkmk.htm>

Newsletters: Vegetable Production & IPM

IPMnet NEWS Archives

http://www.IPMnet.org/IPMnet_NEWS/archives.html

IPM Solutions

Gempler's IPM Almanac
<http://www.ipmalmanac.com/solutions/archive.asp>

Vegetable IPM Insect Notes

North Carolina State University
http://www.ces.ncsu.edu/depts/ent/notes/Vegetables/vegetable_contents.html

Pest Management & Crop Development Bulletin

University of Illinois Extension
<http://www.ag.uiuc.edu/cespubs/pest/>

Integrated Crop Management Newsletter

Iowa State University
<http://www.ipm.iastate.edu/ipm/icm/>

Vegetable IPM Message

University of Massachusetts
<http://www.umass.edu/umext/programs/agro/vegsmfr/Articles/Newsletters/Newsletters.htm>

Vegetable Crops Hotline

Purdue University
<http://www.entm.purdue.edu/entomology/ext/targets/newslett.htm>

Pest & Crop Newsletter

Purdue University
<http://www.entm.purdue.edu/entomology/ext/targets/newslett.htm>

Biological Control News

University of Wisconsin
<http://www.entomology.wisc.edu/mbcn/mbcn.html>

VegNet Newsletter

Ohio State University
<http://www.ag.ohio-state.edu/~vegnet/news/newslst.htm>

Vegetable Crop Advisory Team (CAT) Alert

Michigan State University
<http://www.msue.msu.edu/ipm/vegCAT.htm>

The Georgia Pest Management Newsletter

<http://www.ces.uga.edu/Agriculture/entomology/pestnewsletter/newsarchive.html>

Pest Alert

Colorado State University
<http://www.colostate.edu/programs/pestalet/index.html>

The Vegetable Gazette

The Pennsylvania State University
<http://www.ento.psu.edu/vegetable/veggaz/veggazette.htm>

Plant & Pest Advisory, Vegetable Edition

Rutgers University, New Jersey
<http://www.rce.rutgers.edu/pubs/plantandpestadvisory/index.html>

VegNews

University of Arizona
<http://ag.arizona.edu/hypermail/vegnews/index.html>

Vegetarian Newsletter

University of Florida
http://www.hos.ufl.edu/gjhweb/vegetarian_index_page.htm

Pay Dirt—Newsletter for Vegetable Growers

North Carolina State University
<http://henderson.ces.state.nc.us/newsletters/veg/>

Vegetable Newsletter

Nova Scotia Department of Agriculture
<http://www.gov.ns.ca/nsaf/elibrary/archive/hort/newslets/vegetable/>

South Carolina Pumpkin News

<http://virtual.clemson.edu/groups/hort/vegprog.htm>

The Illinois Fruit and Vegetable News

<http://www.aces.uiuc.edu/ipm/news/fvnews.html>

4.3 Print & Video Resources on Weed Control in Vegetables and Row Crops

Steel in the Field: A Farmer's Guide to Weed Management Tools. 1997. By Greg Bowman (ed.) Sustainable Agriculture Network, Handbook Series No. 2. Sustainable Agriculture Publications, University of Vermont. 128 p.

Cultivation techniques and the tools used in association with mechanical weed control are less familiar to farmers after several decades of widespread chemical weed control. *Steel in the Field*, a handbook in the Sustainable Agriculture Network series, provides illustrations, descriptions, and practical examples of 37 specialized tools used to control weeds. It features profiles of farmers using reduced- or non-chemical weed control strategies, and contains a listing of suppliers of these specialized tools.

Excerpts can be viewed on the SAN website:

Steel in the Field: A Farmer's Guide to Weed Management Tools
<http://www.sare.org/steel/index.htm>

Cultivation Basics for Weed Control in Corn. 1997. By Jane Mt. Pleasant. Cornell University. Publication 125IB241. 10 p.

Cultivation is discussed as an alternative to herbicides, as well as in combination with herbicides through a mixed weed control approach. A description of six inter-row and in-row tools is provided, accompanied by color photos. Research on mechanical weed control field trials at Cornell is summarized.

New York State Integrated Pest Management Program, catalog:
<http://www.nysipm.cornell.edu/catalog/catalog01/lfc.html>

New Tools for Mechanical Weed Control
11.5-minute video by Robin Bellinder et al., \$7.00.
<http://www.hort.cornell.edu/department/faculty/bellinder/pubs.html>

Department of Horticulture
Cornell University
164 Plant Science Building
607-255-7890
rrb3@cornell.edu

Vegetable Farmers and Their Weed-Control Machines

A 75-minute educational video on cultivation and flaming equipment produced in 1996 by Vern Grubinger, UVM Extension System and Mary Jane Else, UMass Extension with funding from USDA-SARE. Cost is \$12.00 from:

The Center for Sustainable Agriculture
University of Vermont & State Agricultural College
590 Main Street
Burlington, Vermont 05405-0059
802-656-0233
802-656-8874 Fax
<http://moose.uvm.edu/~susagctr/index.html>

A Whole-Farm Approach to Weed Control: A Strategy for Weed-Free Onions

Anne and Eric Nordell, Sharing the Lessons of Organic Farming Conference, January 30–31, 1998, University of Guelph
<http://gks.com/library/OrgConf/1998d.html>

An on-line conference paper that summarizes the weed control methods Anne and Eric Nordell use to control weeds in onion fields.

The Nordells work with horses to raise a 6 acre market garden in Pennsylvania, growing dried flowers, herbs, lettuce, potatoes, onions, and other vegetables. They use a combination of cover crops, fallowing, tillage, and hand weeding for weed control.

To provide a visual image of how they integrate different components of their farm into a whole, the Nordells videotaped a slide presentation they use at organic farming workshops. The 52-minute tape is available for \$10 postpaid from:

Anne and Eric Nordell
RDI Box 205
Trout Run, PA 17771

Cultural Weed Control in Vegetable Crops

Video V93-E, 18 minutes, 1993.

Non-chemical weed control practices used by California organic row crop growers, produced by Dr. Tom Lanini; \$15.00:

University of California
DANR Communication Services
6701 San Pablo Avenue
Oakland, CA 94608-1239
510-642-2431
510-643-5470 Fax
danrcs@ucdavis.edu

4.4 Weed Control Web Links

Principles of Agroecology & Weed Biology

Weeds in Agroecosystems

Dalhousie University, Canada
<http://is.dal.ca/~dp/reports/mcpheest.htm>

Principles of Sustainable Weed Management for Croplands

Preston Sullivan, ATTRA
<http://www.attra.org/attra-pub/weed.html>

Sustainable & Organic Weed Management

Weed Management for Organic Crops

University of California, Publication 7250
<http://anrcatalog.ucdavis.edu/pdf/7250.pdf>

Sustainable Weed Management in Organic Herb & Vegetable Production

University of New England, NSW (Australia)
<http://www.une.edu.au/agronomy/weeds/organic/organic.html>

Organic Field Crop Handbook — Weed Management

Canadian Organic Growers, COG
http://eap.mcgill.ca/MagRack/COG/COGHandbook/COGHandbook_1_7.htm

A Review of Non-Chemical Weed Control Techniques

S. Parish, Biol. Agriculture and Horticulture, Vol. 7
<http://eap.mcgill.ca/MagRack/BAH/BAH%205.htm>

Weed Control in Ecological Vegetable Farming

Swedish University of Agricultural Sciences
http://zeus.bibul.slu.se/documents/slu/ekologiskt_lantbruk/EKL05/EKL05AD.HTM

1988 REAP: Guide to Economical Weed Control

Roger Samson, Canada-REAP
<http://eap.mcgill.ca/MagRack/SF/Spring%2089%20D.htm>

Weed Management Strategies in Organic Farming Systems

David Oien, 1997 Direct Seeding Conference, Saskatchewan Soil Conservation Association
<http://ssca.usask.ca/97-Proceed/Oien.htm>

Nonchemical Weed Management Strategies

University of Illinois Extension Service
<http://www.aces.uiuc.edu/ipm/fruits/nonchem.html>

Cover Crops, Intercropping, & Crop Rotations

Intercropping Principles and Production Practices

Preston Sullivan, ATTRA
<http://www.attra.org/attra-pub/intercrop.html>

Cover Crops For Weed Control In Lettuce

New Alchemy Quarterly, No. 40
Mark Schonbeck, Judy Browne and Ralph DeGregorio
<http://www.fuzzylu.com/greencenter/q40/weed9009.htm>

Mechanisms of Weed Suppression By Squash Intercropped in Corn

Phillip Thomas Fujiyoshi, UC Santa Cruz
<http://www.agroecology.org/people/phillip/dissertation.htm>

Cover-Cropping with Rye and Bellbeans in California Vegetable Production

Center for Agroecology and Sustainable Food Systems, UC Santa Cruz
<http://www.agroecology.org/cases/rbcovercrop.htm>

Watermelon Cover Cropping with Wheat and Barley in Niigata, Japan

Center for Agroecology and Sustainable Food Systems, UC Santa Cruz
<http://www.agroecology.org/cases/watermeloncover.htm>

Contribution of Cover Crop Mulches to Weed Management

University of Connecticut, IPM Program
<http://www.hort.uconn.edu/ipm/weeds/htms/cvrcrps.htm>

Thoughts on Crops

Ted Zettel, Ecological Farmers Association of Ontario News
http://eap.mcgill.ca/MagRack/EFA/EF_95_E_6.htm

Notes on crop rotation, and a summary of weed control in corn from two Ontario farmers.

Integrated Weed Management

Integrated Weed Management in Vegetable Crops

University of Illinois Extension Service
<http://www.aces.uiuc.edu/ipm/fruits/iwm/iwm.html>

Weed Prevention

Alberta Practical Crop Protection
<http://www.agric.gov.ab.ca/agdex/000/pp6063s1.html>

Integrated Pest Management Plan for Lower Klamath and Tule Lake NWRs — Weeds

National Center for Appropriate Technology
<http://refuges.fws.gov/NWRSFiles/HabitatMgmt/KBasin/Weeds.html>

Principles of Integrated Weed Management

Ontario Ministry of Agriculture, Publication 75
<http://www.gov.on.ca/OMAFRA/english/crops/facts/IWM.htm>

Integrating Non-Chemical Methods to Enhance Weed Management

Horticultural Sciences Department
University of Florida
http://www.imok.ufl.edu/LIV/groups/cultural/pests/weed_man.htm

Weed & Vegetable Exchange

Oregon State University
<http://www.orst.edu/dept/hort/weeds/vegetable.htm>

Weed Identification & Photo Gallery Websites

New Jersey Weed Gallery

Rutgers, The State University of New Jersey
<http://www.rce.rutgers.edu/weeds/index.html>

UC IPM Weed Photo Gallery

University of California Statewide IPM Project
http://www.ipm.ucdavis.edu/PMG/weeds_common.html

Mechanical Weed Control & Equipment

New Cultivation Tools for Mechanical Weed Control in Vegetables

Cornell University, IPM Fact Sheet 102FSNCT
<http://www.hort.cornell.edu/department/faculty/bellinder/publications/weeders.pdf>

Cornell University has made a special effort to evaluate mechanical cultivators for non-chemical weed control in vegetable production. In addition to this fact sheet, see the Cornell video in the previous section.

New Cultivation Tools for Mechanical Weed Control in Vegetables

University of Connecticut, IPM Program
<http://www.hort.uconn.edu/ipm/weeds/htms/weeders.htm>

An HTML version of the Cornell University publication above, with additional links to equipment images.

Use of Mechanical Cultivators for Market Vegetable Crops

Horticultural Research and Development Centre, Agriculture and Agri-Food Canada
http://res2.agr.ca/stjean/recherche/weeder_e.htm

Especially see the accompanying chart that illustrates appropriate time of operations for seven different mechanical cultivators, according to stage of growth for carrots, lettuce, and beans: spring-tine harrow; rigid-tine harrow; rotary hoe; basket weeder; torsion weeder; Danish tines weeder; and rototiller.

Mechanical Weed Control: A Slide Show of Equipment

Vern Grubinger, University of Vermont
<http://www.uvm.edu/vtvegandberry/mechweedcontrol/sld001.htm>

Innovative Cultivating Tools

University of Connecticut, IPM Program
<http://www.hort.uconn.edu/ipm/weeds/htms/culttools.htm>

Photo Gallery & Glossary of Cultivators and Implements Used in Physical Weed Control

European Weed Research Society
<http://www.ewrs.org/physical-control/glossary.htm>

Rotary hoe, flexible chain harrow, spring tine harrow, Lilliston rolling cultivator, horizontal-axis brush hoe, vertical-axis brush hoe, finger weeder, torsion weeder

Consider a Wheel Hoe

Gord Chiddicks, Ecological Farmers Association of Ontario News
http://eap.mcgill.ca/MagRack/EFA/EF_95_P_06.htm

Management Weeds out High Labor Costs

Chantal Foulds, Sustainable Farming-REAP Canada
<http://eap.mcgill.ca/magrack/sf/spring%2091%20c.htm>

Mulching, Paper Mulch, High-Residue No-Till Mulch

Mulching for Weed Control in Annual Vegetable Crops

Mark Schonbeck, VABF Information Sheet No. 9
<http://www.vvac.org/vabf/infosht/info1.html>

Mulches for the Garden

Vern Grubinger, University of Vermont
<http://ctr.uvm.edu/ctr/gl/gl6.htm>

Paper Mulch Coated with Vegetable Oil Offers Biodegradable Alternative to Plastic

USDA-ARS
<http://www.ars.usda.gov/is/pr/2001/010312.htm>

Paper Mulch: Can it Replace Plastic?

2000 New York Vegetable Variety and Cultural Practices Results, Cornell University
<http://www.hort.cornell.edu/commercialvegetables/online/2000veg/freeville/papermulch%20.pdf>

Paper Mulch Trial Photo Gallery

Cornell University
<http://www.hort.cornell.edu/commercialvegetables/online/2000veg/freeville/papermul.html>

Newspaper Mulch Study, 1996

North Dakota State University
<http://www.ag.ndsu.nodak.edu/oakes/1996Report/npms96.htm>

No-Till, Mulch-Based Market Gardening

Mark Cain
<http://www.seedballs.com/mcain.html>

No-Till Broccoli Production without Herbicides

Ronald Morse, Virginia Cooperative Extension
<http://www.ext.vt.edu/departments/commhort/1997-04/1997-04-03.html>

Affordable Small-Scale Equipment for Production of Transplanted Vegetables in High-Residue, No-Till Farming Systems

Ronald Morse, Virginia Tech

HTML Conference Source:

<http://vric.ucdavis.edu/issues/bulletinboard/soiloptions.html>

PDF Article:

<http://vric.ucdavis.edu/issues/bulletinboard/soilconf/afford.pdf>

No-Till and Strip-Till Vegetable Production: Focus on Non-Chemical Methods of Cover Crop Suppression and Weed Control

Steve Diver, ATTRA
<http://ncatark.uark.edu/~steved/no-till-veggie.html>

4.5 Weather, Agriculture and IPM

Weather — especially temperature and humidity — plays a crucial role in insect and disease development. A modern feature of IPM is the use of weather monitoring to predict periods of heavy infestation. The following weather sites on the Internet specialize in agricultural data; in most instances these sites focus on IPM at the regional level.

Here, you can find data on degree days to predict insect emergence, frost prediction, and pest-specific data such as blight forecasts (onions, tomatoes, potatoes); maggot emergence (onions); European corn borer forecasts and trap catches (sweet corn); phenology; etc.

Agricultural Weather Information Service (AWIS)

<http://www.awis.com>

SkyBit, Agricultural Weather Information Service

<http://www.skybit.com>

Agricultural Weather.com

<http://www.agriculturalweather.com>

DTN Kavouras Weather Services

<http://www.dtn.com/weather/>

Texas A&M Meteorology

<http://www.met.tamu.edu/personnel/students/weather/current.html>

Oklahoma Mesonet

<http://okmesonet.ocs.ou.edu/body.html>

PAWS Weather Data (Pennsylvania)

<http://frost.prosser.wsu.edu>

The Arizona Meteorological Network (AZMET)

<http://Ag.Arizona.Edu/azmet/>

WI-MN Cooperative Extension Agricultural Weather

<http://bob.soils.wisc.edu/wimnext/>

NEWA, The Northeast Weather Association

http://www.nysaes.cornell.edu/ipmnet/ny/program_news/newa/newa99.html

Leaf Wetness Observations

University of Florida

<http://www.imok.ufl.edu/weather/archives/2000/Leaf%20Wetness/leafwetness2000.htm>

Weather Data / Precipitation Totals

Connecticut Agricultural Experiment Station

<http://www.state.ct.us/caes/Weather/wxdata.htm>

WeatherSites: Jump Site from University of Michigan

<http://cirrus.sprl.umich.edu/wxnet/servers.html>

UK Agricultural Weather Center

University of Kentucky

<http://www.wagwx.ca.uky.edu/>

<http://www.wagwx.ca.uky.edu/Agwx.html>

The Vegetable Crops Planner—Weather

Ohio State University

<http://www.ag.ohio-state.edu/~vegnet/planner.htm>

IPM Weather Data and Degree-Days: For Pest Management Decision Making in the Pacific Northwest

<http://www.orst.edu/Dept/IPPC/wea/>

Cucurbit Downy Mildew Forecasts

North Carolina State University

<http://www.ces.ncsu.edu/depts/pp/cucurbit/>

MELCAST

<http://www.hort.purdue.edu/hort/ext/veg/melcast.html>

California PestCast: Disease Model Database

<http://www.ipm.ucdavis.edu/DISEASE/DATABASE/diseasemodeldatabase.html>

TOMCAST

<http://www.ag.ohio-state.edu/%7Evegnet/tomcats/tomfrm.htm>

4.6 IPM Certification and Labeling

IPM guidelines, or best management practices, have been established by several state and private organizations for the purpose of verification and labeling. IPM guidelines are being used: (1) As a checklist for farmers to evaluate their on-farm pest management programs and identify areas where management can be improved; (2) To verify and document that IPM is practiced on the farm; and (3) As an educational tool that describes the scope and complexity of IPM to farmers, government officials, community groups, and the general public.

In addition to pest management education, IPM labeling has emerged as a green marketing strategy parallel to organic food channels.

Some food processing companies—for example Wegman's in the Northeastern U.S.—now display an IPM logo on canned or frozen vegetable labels, with accompanying text that touts the environmental benefits of IPM.

Massachusetts IPM Guidelines: Commodity Specific Definitions

http://www.umass.edu/umext/programs/agro/ipm/ipm_guidelines/

The Massachusetts IPM Guidelines have been used to verify IPM use by the USDA Farm Service Agency in Massachusetts since 1990, and by the *Partners with Nature* IPM certification program since 1993. For certification in the *Partners with Nature* program, a crop must be grown using a minimum of 70% of the Adjusted Total Practice Points. Qualified growers are licensed to use the *Partners with Nature* logo and are provided with marketing assistance including posters, leaflets, brochures, and documentation of their certification.

Elements of New York State IPM

Cornell University

<http://www.nysipm.cornell.edu/elements/index.html>

New York state growers can market vegetables under an IPM logo if they follow these IPM guidelines and meet at least 80% of the recommended practices.

An IPM Label on Supermarket Vegetables: A First for the Nation

<http://www.nysipm.cornell.edu/labeling/labels.html>

A partnership among growers, Wegmans Food Markets, Comstock Michigan Fruit, and Cornell has spawned the first IPM-labeled canned and frozen vegetables in the nation.

The Food Alliance

<http://www.thefoodalliance.org>

The Food Alliance is a non-profit organization in the Pacific Northwest that offers a brand label to farms transitioning to sustainable agriculture. Farms that bear the Food Alliance label meet or exceed standards in three areas: (1) Conserving soil and water; (2) Pest and disease management; and (3) Human resources.

CORE Values Northeast

<http://www.corevalues.org/cvn/consumers/olabel.html>

CORE Values is a northeastern apple label based on bio-intensive growing methods.

An eco-label is a label or logo on a product that gives consumers information about the environmental, agricultural, or social impacts of what they buy, which in turn can help people make better informed choices in the marketplace.

Bibliography of IPM Certification, Labeling and Marketing

http://www.ipminstitute.org/ipm_bibliography.htm

An online bibliography listing over 70 *in-print* and *on-line* articles associated with the topic of IPM certification, labeling and marketing.

Eco-Spuds: Prince Edward Island Farmers Work with WWF to Reduce Pesticide Use

Spudman Magazine

http://www.spudman.com/pages/issue00vol6_eco_spuds.html

4.7 IPM Databases & Search Engines

IPM is knowledge intensive, so easy access to IPM materials and information is a big help. The Internet has turned into a premier source of information on IPM. Here, dozens of university programs and IPM specialists make their materials available on-line, for free.

A few websites are designed to organize all this information and make it available through databases and directories. Powerful *search engines* allow visitors to find information by typing in *keywords*.

Database of IPM Resources (DIR)

<http://www.ipmnet.org/DIR/>
<http://www.ippc.orst.edu/cicp/Index.htm>

Database of IPM Resources (DIR) is an information retrieval system that searches through a compendium of directories containing IPM information resources on the Internet.

Database of IPM Resources (DIR): Internet Resources on Vegetable Pest Management

<http://www.ippc.orst.edu/cicp/Vegetable/veg.htm>

Internet Resources on Vegetable Pest Management is a sub-category of DIR that provides links to materials on insect and disease problems associated with vegetable production. A great starting point!

Database of IPM Resources (DIR): Internet Resources on Potato IPM

<http://www.ippc.orst.edu/cicp/crops/potato.htm>

Database of IPM Resources (DIR): Internet IPM Resources on Tomato

<http://www.ippc.orst.edu/cicp/crops/tomato.htm>

IPMlit —The Database of Current IPM Literature

<http://ippc.orst.edu/IPMlit/index.html>

An on-line searchable database that focuses on current research and technical papers on Integrated Pest Management (IPM) and related topics. Titles are selected from a wide array of technical and professional journals. IPMlit broadly groups listed papers by pest or tactic categories, e.g., Biocontrol, Entomology, Nematology, Plant Pathology, Vertebrate Management, and General.

National IPM Network Search Engine (North Central Region)

<http://www.ipm.iastate.edu/ipm/ncrsearch/>

A search engine for IPM materials published by land grant institutions of the North Central Region.

IPM Directories & Resource Sites

Integrated Pest Management (IPM): Concepts and Definitions

<http://www.ippc.orst.edu/cicp/IPM.htm>

Radcliffe's IPM World Textbook

<http://ipmworld.umn.edu/>

Pest Management Resource Center

<http://www.pestmanagement.co.uk>

IPM Access: Integrated Pest Management Information Service

<http://www.efn.org/~ipmpa/index.shtml>

StudyWeb | Science| Integrated Pest Management

<http://www.studyweb.com/links/2509.html>

StudyWeb | Science| Pest Management

<http://www.studyweb.com/links/2510.html>

State IPM Coordinators & Web Sites

<http://www.reeusda.gov/agsys/ipm/coordinators.htm>

4.8 Appropriate Technology Transfer for Rural Areas (ATTRA) Publications on Pest Management

Biointensive Integrated Pest Management

<http://www.attra.org/attra-pub/ipm.html>

Farmscaping to Enhance Biological Control

<http://www.attra.org/attra-pub/farmscape.html>

Sustainable Management of Soil-borne Plant Diseases

<http://www.attra.org/attra-pub/PDF/soildiseases.pdf>

Alternative Nematode Control

<http://www.attra.org/attra-pub/nematode.html>

Compost Teas for Plant Disease Control

<http://www.attra.org/attra-pub/comptea.html>

Disease Suppressive Potting Mixes

<http://www.attra.org/attra-pub/dspotmix.html>

Use of Baking Soda as a Fungicide

<http://www.attra.org/attra-pub/baksoda.html>

Alternative Controls for Late Blight in Potatoes

<http://www.attra.org/attra-pub/lateblight.html>

Management Alternatives for Thrips on Vegetable and Flower Crops in the Field

<http://www.attra.org/attra-pub/thrips.html>

Phenology Web Links: Sequence of Bloom, Floral Calendars, What's in Bloom

<http://www.attra.org/attra-pub/phenology.html>

Grasshopper Management

<http://www.attra.org/attra-pub/grasshopper.html>

Sustainable Fire Ant Management

<http://www.attra.org/attra-pub/fireant.html>

Integrated Pest Management for Greenhouse Crops

<http://www.attra.org/attra-pub/gh-ipm.html>

Greenhouse IPM: Sustainable Thrips Control

<http://www.attra.org/attra-pub/gh-thrips.html>

Greenhouse IPM: Sustainable Aphid Control

<http://www.attra.org/attra-pub/gh-aphids.html>

Greenhouse IPM: Sustainable Whitefly Control

<http://www.attra.org/attra-pub/gh-whitefly.html>

In Print Only

- **Colorado Potato Beetle: Organic Control Options**
- **Downy Mildew Control in Cucurbits**
- **Powdery Mildew Control in Cucurbits**
- **Flea Beetle: Organic Control Options**
- **Organic Control of Squash Bug**
- **Organic Control of Squash Vine Borer**

5.0 Vegetable Industry Resources

The Source Book, American Vegetable Grower's Annual Buyer's Guide

Published every year in the July issue of *American Vegetable Grower*. Comprehensive listing of: state horticultural associations; government agencies; university contacts; web site directory; crop protection; application equipment; seed suppliers; greenhouse equipment and supplies; irrigation; planting equipment; postharvest equipment; management software; and calendar of growers' meetings.

Meister Publishing Co.
37733 Euclid Avenue
Willoughby, OH 44094
216-942-2000
216-942-0662 Fax
avg_circ@meisterpubl.com
\$15.95/12 issues per year subscription to *American Vegetable Grower*

The Packer

The Packer is the national weekly business newspaper of the produce industry. \$65/year, weekly issues.
Contact:

The Packer
P.O. Box 2939
Shawnee Mission, KS 66201-1339
913-438-8700, Ext. 327
800-255-5113, Ext. 327
the.packer@compuserve.com
<http://www.thepacker.com>

Produce Availability & Merchandising Guide

The Produce Availability & Merchandising Guide is compiled and published by *The Packer*. The Guide provides a summary of handy data (e.g., months available, nutrition facts, U.S. Grades, postharvest handling) on hundreds of fruits and vegetables, including specialty items. Single copies \$35.00 from *The Packer*.

Produce Services Sourcebook

The Produce Services Sourcebook is compiled and published by *The Packer*. The Sourcebook provides a summary of handy data (e.g., common shipping containers, environmental conditions for shipping and postharvest handling, chilling sensitivity, load compatibility, pallet configuration, key shipping regions and destinations) for common and specialty items, with extensive listings for suppliers of

containers, packaging, transportation and other items. Single copies \$20.00 from *The Packer*.

United Fresh Fruit and Vegetable Association

United Fresh Fruit and Vegetable Association
727 North Washington St.
Alexandria, VA 22314
703-836-3410
800-836-7745
703-836-7745 Fax
united@uffva.org

The United Fresh Fruit and Vegetable Association is the national trade organization that represents all sectors of the fresh fruit and vegetable industry. One of its services, the United Information Center, provides data on all aspects of the fresh produce industry. This includes consumption trends, industry practices, and marketing statistics. The service is available free to members and on a fee basis for nonmembers. Pamphlets, fact sheets, videotapes, posters and charts, and a newsletter are available. Of interest to vegetable growers is the *Facts and Pointers on Fruits and Vegetables* series.

Produce Marketing Association

Produce Marketing Association
1500 Casho Mill Road
P.O. Box 6036
Newark, DE 19714-6036
302-738-7100
302-731-2409 Fax
pma@mail.pma.com
<http://www.pma.com>

The Produce Marketing Association provides a Fresh Facts Education Kit. This informative kit contains pamphlets and brochures about a variety of vegetables (Belgian endive, broccoli, iceberg lettuce, onions, peppers, potatoes) as well as fruits and nuts.

6.0 Selected Vegetable Production Materials on the Web

General Vegetable Production Resources

Vegetable Production Guide for Commercial Growers 2000-2001

University of Kentucky
<http://www.ca.uky.edu/agc/pubs/id/id36/id36.htm>

2000 Ohio Vegetable Production Guide

Ohio State University
<http://www.ag.ohio-state.edu/~ohioline/b672/index.html>

Commercial Vegetable Production Handbook

Louisiana Cooperative Extension Service
<http://www.agctr.lsu.edu/wwwac/pub2433.pdf>

Midwest Vegetable Production Guide '98

<http://www.entm.purdue.edu/entomology/ext/targets/ID/index2000.htm>

Vegetable Bytes Online Crop Production Information

University of California-Davis
<http://pubweb.ucdavis.edu/documents/coopext/cesutter.htm>

UC-Davis Vegetable Research and Information Center

<http://vric.ucdavis.edu>

Horticulture Publications on Vegetable Production—Oklahoma State University

http://www.okstate.edu/OSU_Ag/agedcm4h/pearl/hort/vegetble/vegetble.htm

Commercial Vegetable Production in Wisconsin

University of Wisconsin
<http://cf.uwex.edu/ces/pubs/pdf/A3422.PDF>

Farmer's Bookshelf: Vegetables

University of Hawaii
<http://Agrss.sherman.Hawaii.Edu/bookshelf/vege.htm>

Crop Knowledge Master: Vegetable Crops

University of Hawaii
<http://www.extento.hawaii.edu/kbase/crop/crops/vegetabl.htm>

Vegetable Viewpoint

Ontario Ministry of Agriculture, Food, and Rural Affairs
<http://www.gov.on.ca/OMAFRA/english/crops/hort/news/vegnews/viewpoint.html>

Penn State Online Vegetable Resources

<http://www.ento.psu.edu/vegetable/default.htm>

Postharvest Handling of Fruits and Vegetables

Postharvest Handling of Fruits and Vegetables

ATTRA
<http://www.attra.org/attra-pub/postharv.html>

Postharvest Technology Research and Information Center

University of California
<http://postharvest.ucdavis.edu/>

Microbial Risk Reduction in Vegetable Production & Handling: Special Attention to Safe Use of Animal Manures

Reducing Risks from E.coli 0157 on the Organic Farm

David G. Patriquin, Dalhousie University, Halifax, Nova Scotia, Canada
Eco-Farm & Garden - Summer 2000
<http://www.cog.ca/efgsummer2000.htm>

Progress in Defining Microbial Risk Reduction Practices for Animal Manure and Manure-based Composts

Dr. Trevor Suslow, UC Vegetable Research and Information Center
<http://postharvest.ucdavis.edu/Pubs/index.html>

Manure and Food Safety

Vegetable Crops Hotline, Purdue University
No. 371, March 23, 2000
<http://www.entm.purdue.edu/entomology/ext/targets/vegcrop/index2000.htm>

Microbial Food Safety IS Your Responsibility!

University of California
<http://vric.ucdavis.edu/veginfo/foodsafety/foodsafety.htm>

Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables

U. S. Food and Drug Administration
<http://www.foodsafety.gov/~dms/prodguid.html>

On-Farm Food Safety Program

Ontario Vegetable Growers' Marketing Board
<http://www.plant.uoguelph.ca/safefood/on-farm/ovgmb/report.htm>

Season Extending Techniques & Plasticulture

Season Extension Techniques for Market Gardeners

ATTRA
<http://www.attra.org/attra-pub/seasext.html>

Use of Plastic Mulch and Rowcovers in Vegetable Production

Oklahoma State University
http://www.okstate.edu/OSU_Ag/agedcm4h/pearl/hort/vegetble/f-6034.pdf

Sustainable Vegetable Production

Sustainable Practices for Vegetable Production in the South

<http://www.cals.ncsu.edu/sustainable/peet/>

Practical Equipment and Harvesting Tips for Vegetable Farmers

Healthy Farmers, Healthy Profits

University of Wisconsin-Madison
Biological Systems Engineering Department
<http://bse.wisc.edu/hfhfp/>

- Mesh Produce Bags: Easy Batch Processing
- Packing Shed Layout
- Standard Containers
- Narrow Pallet System
- A Rolling Dibble Marker for Easy Transplant Spacing
- A Specialized Harvest Cart for Greens
- Plans for a Specialized Harvest Cart

Organic Vegetable Production

Organic Farming Information

Greenmount College of Agriculture and Horticulture,
Northern Ireland
<http://www.greenmount.ac.uk/organic/index.htm>

Information Leaflets:

- General information about organic production
- Principles of organic production
- Protected cropping for organic vegetables
- Organic potato production
- Marketing organic produce
- Converting to Organic Production
- Green Manures

Technical Booklets:

- Beginners' Guide to Organic Vegetable Production
- Organic Ware Potato Production

Organic Sweet Corn Production

North Carolina State University
<http://www.ces.ncsu.edu/depts/hort/hil/hil-50.html>

Organic Fruit and Vegetable Production

Information Sources

Mississippi State University
<http://www.msstate.edu/dept/cmrec/organic/organicresources.html>

ATTRA's Organic Vegetable Production Series

<http://www.attra.org/attra-pub/horticulture.html>

Case Studies & Surveys on Organic Farming

A Case-Study Report: Farming Without Chemicals in Ohio

<http://www.ohiocitizen.org/campaigns/pesticides/farming/farming.html>

Ohio Organic Producers: Final Survey Results

Ohio State University, Special Circular 174-00
<http://www.ag.ohio-state.edu/~ohioline/sc174/index.html>

7.0 Magazines & Newsletters on Vegetable Production and Market Gardening

American Vegetable Grower

Meister Publishing Co.
37733 Euclid Avenue
Willoughby, OH 44094
216-942-2000
216-942-0662 Fax
avg_circ@meisterpubl.com
\$15.95/12 issues per year

California Grower

<http://www.rinconpublishing.com>

Citrus and Vegetable

<http://www.citrusandvegetable.com>

The Grower

<http://www.growermagazine.com>

Growing for Market

P.O. Box 3747
Lawrence, KS 66046
785-748-0609
\$27/12 issues per year
<http://www.growingformarket.com>

New York State Vegetable Growers News

P.O. Box 4256
Ithaca, NY 14852-4256
607-539-7648
607-539-3150 Fax
\$40/8 issues per year (annual membership)

Vegetable Gazette

Pennsylvania State University
<http://hortweb.cas.psu.edu/veg crops/newsletterlist.html>
<http://www.ento.psu.edu/vegetable/veggaz/veggazette.htm>

The Vegetable Growers News

Great American Publishing
P.O. Box 128
Sparta, MI 49345
616-887-9008
616-887-2666 Fax
gap@i2k.net
<http://www.vegetablegrowersnews.com>
\$11/12 issues per year, or \$28/3 years

Veg-I-News

North Carolina State University
<http://ipmwww.ncsu.edu/vegetables/veginews/>

The Illinois Fruit and Vegetable News

<http://www.aces.uiuc.edu/~ipm/news/fvnews.html>

Vegetable Crops Hotline

Purdue University
<http://www.entm.purdue.edu/entomology/ext/targets/newslett.htm>

Vegetable Viewpoint

Ontario Ministry Agriculture, Food and Rural Affairs
<http://www.gov.on.ca/OMAFRA/english/crops/hort/news/>

The Vegetarian

University of Florida
http://www.hos.ufl.edu/gjhweb/vegetarian_index_page.htm

Organic Production and Marketing Newsletter

University of Florida
http://www.hos.ufl.edu/jjfnweb/organic_index.htm

VegNet News

Ohio State University
<http://www.ag.ohio-state.edu/vegnet/news/newslist.htm>

California Grower

<http://www.rinconpublishing.com>

California Vegetable Journal

<http://www.rinconpublishing.com>

California Agriculture

<http://danr.ucop.edu/calag/>

8.0 Database & Directory Links to Vegetable Crops and Associated Production Practices on the Web

MAC Link List—Missouri Alternatives Center

<http://agebb.missouri.edu/mac/links/index.htm>

MAC Link List is the Missouri Alternatives Center list of hot links to fact sheets and web pages on dozens of topics relating to alternative crop and livestock production, small farming, and sustainable agriculture. Especially see: vegetable crops, alternative crops, specialty crops, herbs, flowers, etc.

The Ohio State University Factsheet Database

<http://www.hcs.ohio-state.edu/Factsheet.html>

Plant Facts is a keyword-searchable factsheet database on plant-related topics (cultivation, pest control, soils, vegetables) compiled by Ohio State University. It contains 20,000 pages of Extension Service factsheets and bulletins related to horticulture and crop science from 46 different colleges, universities, and institutions across the United States and Canada.

E-answers

<http://www.e-answers.org>

E-answers is a keyword-searchable database for Extension Service and Agricultural Experiment Station publications, factsheets, and bulletins published by land grant universities throughout the United States.

PENpages - Pennsylvania State University

<http://www.penpages.psu.edu>

PENpages provides full-text information relating to the agricultural sciences, human nutrition, aging, family, community development, forest resources, and consumer issues. It features over 13,000 reports, newsletters, bibliographies, and fact sheets from the Cooperative Extension Service with a special focus on materials from land-grant universities in the Mid-Atlantic and Northeastern regions, including Penn State.

NewCROP

<http://www.hort.purdue.edu/newcrop/default.html>

The NewCROP website is sponsored by the Center for New Crops & Plant Products at Purdue University. It provides access to the CropSEARCH; CropINDEX; Indiana CropMAP; CropREFERENCE; search engines, databases, and directories with search results leading to full-text documentation on a very extensive list of traditional and alternative crops.

AgWeb: The Ultimate Agriculture Research Directory

ATTRA

<http://www.attra.org/search.html>

The ATTRA Research Directory with links to prominent agriculture bibliographical and full-text databases, agricultural directories, library catalogs, library resource guides, electronic journals, and search engines on the Internet.

PLANT—Purdue Landscape and Nursery Thesaurus

<http://bluestem.hort.purdue.edu/plant/index.html>

A horticultural meta-list with over 3,300 links: insects, diseases, soils and media, etc.

Vegetables on the Internet

North Carolina Cooperative Extension Service

<http://www.ces.ncsu.edu/depts/hort/mg/>

Vegetable.html

Commercial Vegetable Production Guides & Resources

Oregon State University

<http://www.orst.edu/Dept/NWREC/vegindex.html>

9.0 Organic Farming Primer

The Aims and Principles of Organic Agriculture:

- nearly closed cycles of nutrients and organic matter within the farm;
- predominantly farm-produced manure and compost;
- if needed, slowly soluble minerals for fertilizing only (P/K);
- if possible, self-produced seeds;
- weed control by crop rotation, cultivation, thermal methods and competition effects;
- pest control based on homeostasis and inoffensive substances, and use of predators promoted by structures like hedges, flowering plants, etc.;
- lasting fertility due to efficient "reproduction of soil organic matter";
- encouraging and enhancing biological processes (N fixation);
- for animal welfare, appropriate housing systems and suitable feeding with farm-grown crops (10–15% of daily ration in dry matter can be imported).

Source:

FAO/IFOAM Meeting on Organic Agriculture, Rome, March 19–20, 1998.

The Principal Aims of Organic Agriculture and Processing:

- To produce food of high nutritional quality in sufficient quantity.
- To interact in a constructive and life-enhancing way with natural systems and cycles.
- To encourage and enhance biological cycles within the farming system, involving micro-organisms, soil flora and fauna, plants, and animals.
- To maintain and increase long-term fertility of soils.
- To promote the healthy use and proper care of water, water resources and all life therein.
- To help in the conservation of soil and water.
- To use, as far as possible, renewable resources in locally organized agricultural systems.
- To work, as far as possible, with materials and substances that can be reused or recycled, either on the farm or elsewhere.

- To give all livestock conditions of life which allow them to perform basic aspects of their innate behavior.
- To minimize all forms of pollution that may result from agricultural practice.
- To maintain the genetic diversity of the agricultural system and its surroundings, including the protection of plant and wildlife habitats.
- To allow everyone involved in organic production and processing a quality of life conforming to the UN Human Rights Charter, to cover their basic needs and obtain an adequate return and satisfaction from their work, including a safe working environment.
- To consider the wider social and ecological impact of the farming system.
- To produce non-food products out of renewable resources, which are fully biodegradable.
- To encourage organic farming associations to function along democratic lines and the principle of division of power.
- To progress towards an entire organic production chain, which is both socially and ecologically responsible.

Source:

IFOAM Basic Standards

International Federation for Organic Agricultural Movements

Definitions and Objectives of Organic Farming:

What is Organic Farming?

Elm Farm Research Centre
http://www.efrc.com/efrc/what_is_organic_farming.htm

What is Organic Farming?

Welsh Institute of Rural Studies
<http://www.irs.aber.ac.uk/research/Organics/define.html>

Organic Farm Management Handbook

Elm Farm Research Centre
http://www.efrc.com/efrc/organic_farm_management_handbook.htm

Organic Farming Worldwide – A 100% Pesticide Risk Reduction

Bernward Geier, International Federation of Organic Agricultural Movements (IFOAM)
<http://www.pan-uk.org/articles/pn40p10.htm>

10.0 Organic Certification and Marketing

In the 1970s and '80s *organic certification* emerged as a marketing tool to assure consumers that foods labeled organic were grown to specified standards of production, including strict avoidance of synthetic fertilizers and pesticides. To get an organic label, farms must be *inspected* and approved by an accredited organic certification program. Private (Oregon Tilth, California Certified Organic Farmers) and government (Texas Department of Agriculture, Washington State Department of Agriculture) organic certification programs exist.

The Organic Foods Production Act, included in the 1990 Farm Bill, enabled USDA to develop a national program of universal standards, certification accreditation, and food labeling. After a long delay, a National Organic Program is now scheduled to go into effect in October 2002.

Organic certification standards not only provide documentation on what constitutes a certified organic label, but they also provide an excellent summary of the organic agriculture concepts, production methods, and fertility and pest management inputs that can be used in organic farming.

USDA National Organic Program

<http://www.ams.usda.gov/nop/>

This is the official USDA website regarding the National Organic Program (NOP), with links to the Final Rule and other regulations.

National Organic Program (NOP) Final Rule ATTRA

<http://www.attra.org/attrapub/nop.html>

ATTRA's guide to the National Organic Program and Final Rule, with timelines and highlights on key issues and topics of special importance to farmers and organic certification organizations.

Organic Certification Organizations and Programs

ATTRA

<http://www.attra.org/attrapub/orgcert.html>

A comprehensive listing of organic certification organizations in the United States.

Organic Certification, Farm Production Planning, and Marketing

University of California, Publication 7247
<http://anrcatalog.ucdavis.edu/pdf/7247.pdf>

CCOF Certification Handbook.

California Certified Organic Farmers (CCOF) is one of the premier organic certification organizations in the United States. The CCOF Certification Handbook is a good reference guide to accepted, regulated, and restricted inputs to organic production. Cost is \$10, from:

California Certified Organic Farmers.
1115 Mission Street
Santa Cruz, CA 95060
831-423-2263
831-423-4528 Fax
ccof@ccof.org
<http://www.ccof.org>

CCOF Certification Standards are available on the web at: http://www.ccof.org/certification_standards.htm

OCIA Certification Standards

<http://www.ocia.org/PDF%20Files/OCIAStds.pdf>

OCIA, the Organic Crop Improvement Association, was one of the first major certification programs. An 83-page PDF download.

The Standards for Organic Agricultural Production

National Association for Sustainable Agriculture
Australia Ltd (NASAA)

<http://nasaa.com.au/standards.html#organic>

Organic production standards from Australia and Europe are another good place to look for organic agriculture concepts and production methods. A 75-page PDF download from Australia.

Organic Certification of Crop Production in Minnesota.

A 40-page handbook written by Lisa Gulbranson and published by Minnesota Institute for Sustainable Agriculture (MISA) and the University of Minnesota Extension Service. Available in print and on the web at:

<http://www.extension.umn.edu/distribution/cropsystems/DC7202.html#01>

Idaho's Organic Certification Program.

<http://www.agri.state.id.us/AgInspectWeb/organic/>

Texas Organic Standards and Certification

Texas Department of Agriculture
<http://www.sos.state.tx.us/tac/4/I/18/index.html>

Maine Organic Farmers & Gardeners Association, Organic Certification Standards

<http://www.mofga.org/cstandards.html>

NOFA-Vermont Organic Standards

<http://www.nofavt.org/Documents/vofstds.pdf>

Washington State Department of Agriculture Organic Food Program

<http://www.wa.gov/agr/fsah/organic/ofp.htm>

Organic Certification in Nebraska

University of Nebraska
<http://www.ianr.unl.edu/pubs/nebfacts/nf259.htm>

NOFA Massachusetts Organic Certification Standards

<http://ma.nofa.org/Standards.html>

Getting Started in Organic Farming

Environment Canada and Manitoba Agriculture
<http://www.mb.ec.gc.ca/pollution/pesticides/ec00s12.en.html>
<http://www.gks.com/library/transition.html>

Canadian resources on organic farming and certification are another good place to look. *Getting Started in Organic Farming* features profiles of eight organic farmers; farm management techniques such as crop rotation and soil management; certification and marketing of organic products; and other resources.

Marketing & Statistics

Organic Marketing Resources

ATTRA
<http://www.attra.org/attra-pub/markres.html>

Provides a summary and contact list for a broad range of publications and web links. Many of the key organic industry publications are listed here.

A Guide to Marketing Organic Produce

Texas A&M University
<http://sustainable.tamu.edu/publications/organicproduce/organic.html>

Organic Produce Information Sheet

Dr. Roberta Cook, Department of Agricultural and Resource Economics, UC Davis
<http://www.agecon.ucdavis.edu/faculty/Roberta.C/links/Organic.pdf>

Fresh Fruit and Vegetable Marketing and Trade Information

Useful links by Dr. Roberta Cook, Department of Agricultural and Resource Economics, UC Davis
<http://www.agecon.ucdavis.edu/faculty/roberta.c/cookpg2.htm>

Fresh Vegetable Market Gardening Industry

Fact Sheet from Ag Canada
<http://www.agric.gov.ab.ca/agdex/200/5083001.html>

Quality Standards: Fresh Fruits & Processing Vegetables

USDA-Agricultural Marketing Service
<http://www.ams.usda.gov/standards/stanfrfv.htm>

USDA-AMS Fruit & Vegetable Market Reports

<http://www.ams.usda.gov/fv/mnocs/fvwires.htm>

USDA Economics and Statistics

<http://usda.mannlib.cornell.edu/usda/usda.html>

- Specialty Agriculture - Vegetables and Melons
- Fresh Vegetable Prices and Spreads
- Vegetables and Specialties
- Vegetable Statistics
- Agricultural Chemical Use, Vegetables Summary
- Food Consumption
- Pest Management Practices

Briefing Room: Organic Farming & Marketing

USDA Economic Research Service
<http://www.ers.usda.gov/briefing/Organic/>

- U.S. Organic Farming Emerges in the 1990s: Adoption of Certified Systems
- U.S. Organic Agriculture—Statistical Tables, 1992-97

Also see:

Organic Vegetable Growers Surveyed in 1994

USDA Economic Research Service
<http://www.econ.ag.gov/epubs/pdf/arei/96upd/ upd96-4.pdf>

11.1 Economics of Organic Vegetable Production: Crop Production Budgets

Organic Vegetable Crop Budgets & Economic Studies

Cultural Practices and Sample Costs for Organic Vegetable Production on the Central Coast of California — Background Report

<http://vric.ucdavis.edu/veginfo/topics/prodcosts/organiccosts.html>

This California report is the best effort to date toward estimating costs and returns on organic vegetable production. Start here to read some background information on production practices and economic data.

Cultural Practices and Sample Costs for Organic Vegetable Production on the Central Coast of California — Cost of Production Tables

<http://vric.ucdavis.edu/veginfo/topics/prodcosts/organicprodcosts.html>

This second link provides access to the costs-of-production tables for 20 different vegetable enterprises, cover crops, and equipment costs. Here you can download the full 89-page report, or access individual tables, as PDF downloads.

Print copies are available through:

Dept. of Agriculture and Resource Economics
UC Davis
One Shields Ave.
Davis, CA 95616
530-752-1515
530-752-5614 Fax
budgets@primal.ucdavis.edu
<http://www.agecon.ucdavis.edu/outreach/crop/cost.htm>

Ask For:

Organic Mixed Vegetable Study, VM-CC-94-01

K. Klonsky, L. Tourte, D. Chaney, P. Livingston and R. Smith, 1994.

1994, University of California Cooperative Extension Sample Costs to Produce Organic Processing Tomatoes in the Sacramento Valley

<http://vric.ucdavis.edu/veginfo/topics/prodcosts/organictom.html>

Per Acre Costs of Production for Fresh Vegetables, Organic Production Practices, Northeastern United States, 1996

Rutgers University

<http://aesop.rutgers.edu/~farmmgmt/ne-budgets/organic.html>

Bell Pepper	Cabbage
Cauliflower	Cucumber
Leaf Lettuce	Yellow Onions
Pumpkins	Sweet Corn
Fresh Market Tomatoes	Processing Tomatoes

Planning for Profit Enterprise — Vegetables

FBMInet-British Columbia

<http://FBMInet.ca/bc/pfp/veg.htm>

Organic Carrots	Organic Celery
Organic Processing Peas	Organic Processing Beans
Organic Processing Corn	Other Vegetable Budgets

Planning for Profit Enterprise — Special Crops

FBMInet-British Columbia

<http://FBMInet.ca/bc/pfp/special.htm>

Organic Echinacea	Organic Garlic
Other Specialty Crops	

A Profile of Florida's Commercial Organic Vegetable Farmers

University of Florida

<http://hammock.ifas.ufl.edu/txt/fairs/48041>

Standard Crop Production Budgets

Vegetable Crop Budgets on the Web

Southwest Florida Research & Education Center, UF/IFAS

<http://www.imok.ufl.edu/LIV/groups//economic/budglnks.htm>

Production Practices and Sample Costs to Produce: Chili Pepper, Eggplant, Loose Leaf Lettuce, Okra

University of California, Small Farm Center

<http://www.sfc.ucdavis.edu/research/coststudies.html>

11.2 Economics of Organic Vegetable Production: Record Keeping

Market Farm Forms: Spreadsheet Templates for Planning and Organization Information on Diversified Farms

Full Circle Farm
3377 Early Times Lane
Auburn, CA 95603
530-885-9201
Marcie Rosenzweig
fullcircle@jps.net
(\$45 plus \$5 shipping and handling)

While a number of farm management spreadsheets exist, *Market Farm Forms* is the best one I've seen to help organize and calculate a mix of vegetables and related crops raised by market gardeners, truck farmers, and CSAs. On top of that, it supports the needs of certified organic growers with special features.

Market Farm Forms is a 95-page book and diskette containing Excel spreadsheet templates that sells for \$45, plus \$5 shipping and handling. The diskette is available in PC or Macintosh formats.

Seeds and purchased plants needed, farm-grown transplants, soil amendments and fertilizers, cropping and succession timelines, weekly task lists.

Crop yield and income projections, actual harvest and income data, produce availability sheets, invoices and pick sheets, Community Supported Agriculture share and yield sheets, budget worksheets.

Row calculations and input sheets, CSA share bed calculations and input sheets, certified organic producer certificate sheets, fax sheets, labels, order forms, point of sales labels, recipes, and flyers—it's all there.

Crop Planning & Record Keeping Spreadsheets for Diversified Vegetable Farms

Brookfield Farm
Amherst, MA
Dan Kaplan
413-253-7991
bfcsa@aol.com

Crop plan, field plan, planting schedule, seed order, greenhouse schedule, harvest record, field record, Planet Jr. plate size. \$25; available in Excel and Works

12.0 Magazines & Newsletters on Organic Farming and Sustainable Agriculture

Acres Australia

P.O. Box 27, Eumundi
Qld 4562 Australia.
Phone +61 7 5449 1884
Fax +61 7 5449 1889
<http://www.acresaustralia.com.au>
\$90 AUS/12 issues per year

Acres USA

P.O. Box 91299
Austin, Texas 78709-1299
512-892-4400
512-892-4448 Fax
info@acresusa.com
<http://www.acresusa.com>
\$24/12 issues per year

Biodynamics

Biodynamic Farming and Gardening Association, Inc
Building 1002B, Thoreau Center, The Presidio
P.O. Box 29135
San Francisco, CA 94129-0135
415-561-7797
415-561-7796 Fax
biodynamic@aol.com
<http://www.biodynamics.com>
\$35/6 issues per year

Eco Farm & Garden

\$24/4 issues per year

A combined publication of Canadian Organic Growers (formerly published *Cognition*) and Resource Efficient Agricultural Production (REAP)-Canada (formerly published *Sustainable Farming-REAP*).

Canadian Organic Growers
Box 6408, Station J
Ottawa, Ontario K2A 3Y6
<http://www.cog.ca>

Resource Efficient Agricultural Production (REAP)-
Canada
Box 125
Maison Glenaladale
Ste-Anne-de-Bellevue, Quebec
Canada H9X 3V9
514-398-7743
514-398-7972 Fax
reap@interlink.net
<http://www.reap.ca>

See online articles from past issues at:
<http://www.reap.ca/publications.htm>

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Tholey-Theley, Germany
Phone: (+49) 6853-919890
Fax: (+49) 6853-919899
E-mail: HeadOffice@ifoam.org
<http://www.ifoam.org>
\$30/3 issues per year

The Maine Organic Farmer and Gardener

Common Ground Country Fair
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Unity, ME 04988
207-568-4142
207-568-4141 Fax
mofga@mofga.org
<http://www.mofga.org>
\$12/6 issues per year

The Natural Farmer

411 Sheldon
Barre, MA 01005
978-355-2853
978-355-4046 Fax
jackkitt@aol.com
\$10/4 issues per year

New Farmer & Grower

The Soil Association
Bristol House
40-56 Victoria Street
Bristol BS1 6BY
United Kingdom
Tel: 0117 914 2400
Fax: 0117 925 2504
soilassoc@gn.apc.org
\$26 surface; \$32 air/4 issues per year

New Hope Natural Media

<http://www.newhope.com/>

Natural Foods Merchandiser Archives

http://www.healthwellexchange.com/nsn_nfm_archives_by_date.cfm?mag=nfm

Ohio Ecological Food and Farming News

P.O. Box 82234
Columbus, OH 43202
614-294-3663
614-291-3276 Fax
oeffa@iwaynet.net
<http://www.greenlink.org/oeffa>

Organic Farms, Folks & Foods

P.O. Box 880
Cobleskill, NY 12043
518-827-8495
518-827-8496 Fax
nofany@midtel.net
<http://ny.nofa.org>
\$10/4 issues per year

Organic Food Business News

Hotline Printing and Publishing Co.
P.O. Box 161132
Alamonte, FL 32716-1132
407-628-1377
407-628-9935 Fax
74562.744@compuserve.com
\$99/12 issues per year

Organic Matters

Irish Organic Farmers and Growers Association
<http://www.organicmattersmag.com/>

Synergy

Box 8803
Saskatoon, Saskatchewan
Canada S7K 6S6
306-652-9572
306-664-6074
synergy@link.ca
\$22/4 issues per year

The Virginia Biological Farmer

c/o Shana Kresmer-Harris
1663 Jack Jouett Road
Louisa, VA 23093
540-967-9212
<http://www.vvac.org/vabf/>
\$25/6 issues per year

Scientific Journals

Many journals offer on-line table of contents, abstracts, and search options. University library users can often access full-text articles through on-line services.

Agriculture, Ecosystems & Environment

<http://www.elsevier.nl/locate/agee/>

Agricultural Systems

<http://www.elsevier.nl/locate/jnlmr/02002>

Agriculture and Human Values

<http://www.wkap.nl/jrnltoctoc.htm/0889-048X>

Agroforestry Systems

<http://www.wkap.nl/journalhome.htm/0167-4366>

American Journal of Alternative Agriculture

<http://www.winrock.org/wallacecenter/ajaa.htm>

Annual Reviews Entomology

<http://ento.AnnualReviews.org/>

Annual Reviews PhytoPathology

<http://phyto.AnnualReviews.org/>

Applied Soil Ecology

<http://www.elsevier.nl/locate/jnlmr/05091>

Biological Agriculture and Horticulture

<http://www.nes.coventry.ac.uk/bah//index.htm>

Bioresource Technology

<http://www.elsevier.nl/locate/jnlmr/02009>

Electronic Green Journal

<http://egj.lib.uidaho.edu/index.html>

Experimental Agriculture

<http://uk.cambridge.org/journals/eag/>

European Journal of Plant Pathology

<http://www.wkap.nl/journalhome.htm/0929-1873>

HortTechnology

<http://ashs.frymulti.com/horttech.asp>

Integrated Pest Management Reviews

<http://www.wkap.nl/journalhome.htm/1353-5226>

Journal of Agricultural and Environmental Ethics

<http://www.wkap.nl/journalhome.htm/1187-7863>

Journal of Sustainable Agriculture

c/o BUBL Table of Contents

<http://bubl.ac.uk/journals/agr/jsusagr/>

Journal of Vegetable Crop Production

c/o BUBL Table of Contents

<http://bubl.ac.uk/journals/agr/jvcp/>

The Journal of Agricultural Science

<http://uk.cambridge.org/journals/ags/>

Nutrient Cycling in Agroecosystems

http://www.wkap.nl/journals/nutrient_cycling

Plant Disease

<http://www.apsnet.org/pd/current/top.asp>

Plant and Soil

<http://www.wkap.nl/journalhome.htm/0032-079X>

Soil Biology & Biochemistry

<http://www.elsevier.nl/locate/soilbio/>

Soil Science

<http://www.soilsci.com>

Weed Technology

[http://apt.allenpress.com/aptonline/
/?request=get-archive](http://apt.allenpress.com/aptonline/?request=get-archive)

Organic Farming Database

organic-research.com

<http://www.organic-research.com/>

CABI compiled a comprehensive Organic Farming CD-ROM containing over 100,000 literature citations; available through a subscription to organic-research.com, a CABI website.

Directory of Online Journals

AgWeb, The Ultimate Agriculture Research Directory

ATTRA

<http://www.attra.org/searchAgWeb.html>

13.0 Publishers & Book Distributors

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<http://www.acresusa.com>

Wide selection of titles on organic and sustainable production.

agAccess

See: Fertile Ground

APS Press

American Phytopathological Society
3340 Pilot Knob Road
St. Paul, MN 55121-2097
651-454-7250
651-454-0766 Fax
aps@scisoc.org
<http://www.scisoc.org/>

Manuals on plant disease identification and control.

Back40Books

26328 Locust Grove Road
Creola, OH 45622
740-596-4379
Contact: Herman Beck-Chenoweth
locustgrove@ohiohills.com
<http://www.free-rangepoultry.com>

BioCycle/JG Press, Inc.

419 State Ave.
Emmaus, PA 18049
610-967-4135
610-967-1345
biocycle@jgpress.com
<http://www.jgpress.com/>

Publisher of *BioCycle* magazine and related publications on composting and organic waste management.

Biodynamic Farming and Gardening Association

Building 1002B, Thoreau Center, The Presidio
P.O. Box 29135
San Francisco, CA 94129-0135
415-561-7797
415-561-7796 Fax
biodynamic@aol.com
<http://www.biodynamics.com>

Wide selection of titles on biodynamic and organic farming.

Bio-Integral Resource Center (BIRC)

P.O. Box 7414
Berkeley, CA 94707
510-524-2567
510-524-1758 Fax
birc@igc.apc.org
<http://www.igc.org/birc/>
Resources on IPM, biological control, and least-toxic pest control.

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717-284-5152
<http://www.cedarmeadowfarm.com>
Supplier for Steve Groff's video.

Chelsea Green Publishing Co.

P.O. Box 428
White River Junction, VT -5001
800-639-4099
Books by Eliot Coleman: *The New Organic Grower*, *Four-Season Harvest*; and others titles like *The Flower Farmer*.

Conservation Gardening and Farming

Contact: Bargyla Rateaver
9049 Covina Street
San Diego, CA 92656
619-566-8994
619-586-1104 Fax
Bargyla Rateaver <brateaver@earthlink.net>
<http://home.earthlink.net/~brateaver/>
Distributor for organic agriculture classics; and publisher of *The Organic Methods Primer UPDATE*.

Cornell Cooperative Extension and IPM Catalogs

Resource Center-GP
7 Cornell Business and Technology Park
Ithaca, NY 14850
607-255-2080
Resources on IPM for vegetables.

Ecology Action/Bountiful Gardens

18001 Shafer Ranch Road
Willits, CA 95490
Phone/Fax: 707-459-6410
<http://www.growbiointensive.org/>
http://solstice.crest.org/sustainable/ecology_action/

Publications by John Jeavons and Ecology Action Institute: biointensive food production, organic fertilizers, composts, green manures.

Entomological Society of America

9301 Annapolis Road
Lanham, MD 20706-3115
301-731-4535
301-731-4538 Fax
esa@entsoc.org

<http://www.entsoc.org/pubs/>

Extensive selection of books and IPM resources on insect pest management.

Fertile Ground

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Fertile Ground offers a wide selection of new, used, and out-of-print agricultural books with a special emphasis on small farming and sustainable agriculture. Previously known as agAccess.

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<http://www.haworthpressinc.com>

Focus Publishing

c/o PBS
P.O. Box 390
Jaffrey, NH 03452
Phone/Fax: 800-848-7236
orders@pullins.com
<http://www.pullins.com/txt/science.htm>
Publisher of *Sustainable Practices for Vegetable Production in the South*, \$32.95

Good Earth Publications

1702 Mt. View Road
Buena Vista, Virginia 24416
540-261-8775
goodearth@rockbridge.net

A wide selection of titles on small-scale farming, market gardening, and alternative enterprises, including *Backyard Market Gardening*.

The Green Center

237 Hatchville Rd.
East Falmouth, MA 02536
508-564-6301
<http://www.fuzzyly.com/greencenter/home.htm>

Supplier of out-of-print New Alchemy publications.

Interstate Publishers, Inc.

P.O. Box 50
Danville, IL 61834-0050
217-446-0500

Publisher of *Producing Vegetable Crops* and related agriculture textbooks.

Kodansha International

Distributed by Kodansha America, Inc.
575 Lexington Ave, 23rd Floor
New York, NY 10022-6102
917-322-6200
800-451-7556
<http://www.our-use.org>

Distributor for *Oriental Vegetables* by Joy Larkcom and *Let Nature Do the Growing* by Gajin Tokuno.

Meister Publishing Co.

37733 Euclid Avenue
Willoughby, OH 44094-5992
440-942-2000
440-942-0662 Fax
fchb_circ@meisternet.com
<http://www.meisterpro.com>

Publisher of *Vegetable Insect Management: With Emphasis on the Midwest*.

NRAES

152 Riley-Robb Hall
Ithaca, NY 14853-5701
607-255-7645
607-254-8770
nraes@cornell.edu
<http://www.nraes.org>

Distributor of NRAES publications: *Sustainable Vegetable Production From Start-Up to Market; On-Farm Composting*.

The Permaculture Activist

P.O. Box 1209
Black Mountain, NC 28711
828-298-2812
828-298-6441 Fax
pactiv@sunsite.unc.edu
<http://metalab.unc.edu/pc-activist/>
Books on permaculture, small farming, and organic production.

Pike Agri-Lab Supplies

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Carries hard-to-find eco-farming titles, including *Nourishment Home Grown*.

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The Rodale Institute Bookstore carries a nice selection of farmer-audience titles, including classic titles in organic agriculture, farmer-friendly books from *The New Farm* era, and popular press books on permaculture and market gardening.

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- Controlling Weeds with Fewer Chemicals
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<http://www.organicgardening.com>
The Rodale Press Bookstore carries an extensive collection of gardener-audience books on organic gardening, soils, pest control, vegetables, & herbs.

Shepherd Publications

2256 Washington Avenue
Memphis, TN 38104
901-272-0350

Video distributor for *Using Cover Crops in Conservation Production Systems*.

Storey/Garden Way Publishing

Pownal, VT 05261
800-242-7737
Books on small farming and organic production; *The Organic Gardener's Home Reference*.

Sustainable Agriculture Publications

Hills Building
University of Vermont
Burlington, VT 05405-0082
802-656-0484
802-656-4656 Fax
sanpubs@uvm.edu
<http://www.sare.org/htdocs/docs/order.html>
Distributor of SAN books and publications, *Managing Cover Crops Profitably*, *Steel in the Field*, *Building Soils for Better Crops*.

The Water Foundation

P.O. Box H20
Brainerd, MN 56401
218-829-3616
<http://www.bogfrog.com/PRODUCTS.HTM>
Publisher of *The Carbon Catcher* booklet, \$4.95.

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The electronic version of **Resource Guide to Organic and Sustainable Vegetable Production** is located at:

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<http://www.attra.ncat.org/attra-pub/vegetable-guide.html>

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