
FOREWORD

Cover crops slow erosion, improve soil, smother weeds, enhance nutrient and moisture availability, help control many pests and bring a host of other benefits to your farm. At the same time, they can reduce costs, increase profits and even create new sources of income. You'll reap dividends on your cover crop investments for years, because their benefits accumulate over the long term.

Increasing energy costs will have a profound effect on farm economics in coming years. As we go to press, it is impossible to predict how fast energy costs will increase, but since cover crop economics are rooted in nitrogen dynamics (how much N you save or produce with cover crops), fuel costs (the cost of N and trips across the field) and commodity prices, energy prices will certainly impact the economics of cover crop use.

Economic comparisons in the 2nd edition were based on the old economy of two-dollar corn, twenty-cent nitrogen and cheap gas. Some studies showed that cover crops become more profitable as the price of nitrogen increases. We retained some of these excellent studies because data from new studies is not yet available. What we do know is that cover crops can help you to increase yields, save on nitrogen costs, reduce trips across the field and also reap many additional agronomic benefits.

There is a cover crop to fit just about every farming situation. The purpose of this book is to help you find which ones are right for you.

Farmers around the country are increasingly looking at the long-term contributions of cover crops to their whole farm system. Some of the most successful are those who have seen the benefits and are committed to making cover crops work for them. They are re-tooling their cropping systems to better fit cover crop growth patterns, rather than squeezing cover crops into their existing system, time permitting.

This 3rd edition of *Managing Cover Crops Profitably* aims to capture farmer and other research results from the past ten years. We verified the information from the 2nd edition, added new

results and updated farmer profiles and research data throughout. We also added two new chapters.

Brassicas and Mustards (p. 81) lays out the current theory and management of cover crops in the BRASSICACEAE family. Brassica cover crops are thought to play a role in management of nematodes, weeds and disease by releasing chemical compounds from decomposing residue. Results are promising but inconsistent. Try brassicas on small plots and consult local expertise for additional information.

Managing Cover Crops in Conservation Tillage Systems (p. 44) addresses the management complexities of reduced tillage systems. If you are already using cover crops, the chapter will help you reduce tillage. If you are already using conservation tillage, it shows you how to add or better manage cover crops. Cover crops and conservation tillage team up to reduce energy use on your farm and that means more profits.

We have tried to include enough information for you to select and use cover crops appropriate to your operation. We recommend that you define your reasons for growing a cover crop—the section, *Selecting the Best Cover Crops for Your Farm* (p. 12) can help with this—and take as much care in selecting and managing cover crops as you would a cash crop.

Regional and site-specific factors can complicate cover crop management. No book can adequately address all the variables that make up a crop production system. Before planting a cover crop, learn as much as you can from this book and talk to others who are experienced with that cover crop.

We hope that this updated and expanded edition of *Managing Cover Crops Profitably* will lead to the successful use of cover crops on a wider scale as we continue to increase the sustainability of our farming systems.

**Andy Clark, Coordinator
Sustainable Agriculture Network (SAN)
June, 2007**

MANAGING COVER CROPS PROFITABLY

THIRD EDITION

Foreword	3	Buckwheat	90
Acknowledgments	5	Oats	93
How to Use this Book	7	• <i>Oats, Rye Feed Soil in</i>	
Benefits of Cover Crops	9	<i>Corn/Bean Rotation.</i>	96
Selecting the Best Cover Crops		Rye	98
for Your Farm.	12	• <i>Cereal Rye: Cover Crop Workhorse</i>	102
Building Soil Fertility and Tilth		• <i>Rye Smothers Weeds Before Soybeans</i>	104
with Cover Crops	16	Sorghum Sudangrass Hybrids	106
• <i>Cover Crops Can Stabilize Your Soil.</i>	19	• <i>Summer Covers Relieve Compaction.</i>	110
• <i>How Much N?</i>	22	Winter Wheat.	111
Managing Pests with Cover Crops	25	• <i>Wheat Boosts Income and</i>	
• <i>Georgia Cotton, Peanut Farmers</i>		<i>Soil Protection.</i>	113
<i>Use Cover Crops to Control Pests.</i>	26	• <i>Wheat Offers High-Volume</i>	
• <i>Select Covers that Balance Pests,</i>		<i>Weed Control Too</i>	114
<i>Problems of Farm</i>	30	Overview of Legume Cover Crops	116
Crop Rotations with Cover Crops.	34	Cover Crop Mixtures Expand	
• <i>Full-Year Covers Tackle Tough Weeds</i>	38	Possibilities	117
• <i>Start Where You Are</i>	41	Berseem Clover	118
Managing Cover Crops in Conservation		• <i>Nodulation: Match Inoculant to</i>	
Tillage Systems.	44	<i>Maximize N.</i>	122
• <i>After 25 Years, Improvements</i>		Cowpeas	125
<i>Keep Coming</i>	52	• <i>Cowpeas Provide Elegant Solution</i>	
Introduction to Charts.	62	<i>to Awkward Niche</i>	128
Chart 1: Top Regional Cover Crop Species	66	Crimson Clover	130
Chart 2: Performance and Roles.	67	Field Peas	135
Chart 3A: Cultural Traits	69	• <i>Peas Do Double Duty for Kansas</i>	
Chart 3B: Planting.	70	<i>Farmer</i>	140
Chart 4A: Potential Advantages.	71	Hairy Vetch.	142
Chart 4B: Potential Disadvantages.	72	• <i>Cover Crop Roller Design Holds</i>	
		<i>Promise for No-Tillers.</i>	146
COVER CROP SPECIES		• <i>Vetch Beats Plastic</i>	150
Overview of Nonlegume Cover Crops	73	Medics	152
Annual Ryegrass.	74	• <i>Jess Counts on GEORGE for N and</i>	
Barley	77	<i>Feed.</i>	153
Brassicac and Mustards	81	• <i>Southern Spotted Bur Medic offers</i>	
• <i>Mustard Mix Manages Nematodes in</i>		<i>Reseeding Persistence.</i>	154
<i>Potato/Wheat System.</i>	86		

Red Clover	159
Subterranean Clovers	164
Sweetclovers	171
• <i>Sweetclover: Good Grazing, Great Green Manure.</i>	174
White Clover	179
• <i>Clovers Build Soil, Blueberry Production.</i>	182
Woollypod Vetch	185

APPENDICES

A. Testing Cover Crops on Your Farm	189
B. Up-and-Coming Cover Crops.	191
C. Seed Suppliers	195
D. Farming Organizations with Cover Crop Expertise	200
E. Regional Experts	202
F. Citations Bibliography	280
G. Resources from the Sustainable Agriculture Network	230
H. Reader Response Form	232

INDEX	233
-----------------	-----

ACKNOWLEDGMENTS

This 3rd edition could not have been written without the help of many cover crop experts. It is based in large part on the content of the 2nd edition, researched and written by Greg Bowman, Craig Cramer and Christopher Shirley. The following people reviewed the 2nd edition, suggested revisions and updates and contributed new content.

Aref Abdul-Baki, retired, USDA-ARS
Wesley Adams, Ladonia, TX
Kenneth A. Albrecht, Univ. of Wisconsin
Jess Alger, Stanford, MT
Robert G. Bailey, USDA Forest Service
Kipling Balkcom, USDA-ARS
Ronnie Barentine, Univ. of Georgia
Phil Bauer, USDA-ARS
R. Louis Baumhardt, USDA-ARS
Rich and Nancy Bennett, Napoleon, OH
Valerie Berton, SARE
Robert Blackshaw, Agriculture and Agri-Food Canada
Greg Bowman, NewFarm
Rick Boydston, USDA-ARS
Lois Braun, Univ. of Minnesota
Eric B. Brennan, USDA-ARS
Pat Carr, North Dakota State Univ.
Max Carter, Douglas, GA

Guihua Chen, Univ. of Maryland
Aneeqa Chowdhury, SARE
Hal Collins, USDA-ARS
Craig Cramer, Cornell Univ.
Nancy Creamer, North Carolina State Univ.
William S. Curran, The Pennsylvania State Univ.
Seth Dabney, USDA-ARS
Bryan Davis, Grinnell, IA
Jorge Delgado, USDA-ARS
Juan Carlos Diaz-Perez, Univ. of Georgia
Richard Dick, Ohio State Univ.
Sjoerd W. Duiker, The Pennsylvania State Univ.
Gerald W. Evers, Texas A&M Univ.
Rick Exner, Iowa State Univ. Extension
Richard Fasching, NRCS
Jim French, Partridge, KS
Eric Gallandt, Univ. of Maine
Helen Garst, SARE

Dale Gies, Moses Lake, WA
Bill Granzow, Herington, KS
Stephen Green, Arkansas State Univ.
Tim Griffin, USDA-ARS
Steve Groff, Holtwood, PA
Gary Guthrie, Nevada, IA
Matthew Harbur, Univ. of Minnesota
Timothy M. Harrigan, Michigan State Univ.
Andy Hart, Elgin, MN
Zane Helsel, Rutgers Univ.
Paul Hepperly, The Rodale Institute
Michelle Infante-Casella, Rutgers Univ.
Chuck Ingels, Univ. of California
Louise E. Jackson, Univ. of California
Peter Jeranyama, South Dakota State Univ.
Nan Johnson, Univ. of Mississippi
Hans Kandel, Univ. of Minnesota Extension
Tom Kaspar, USDA-ARS
Alina Kelman, SARE
Rose Koenig, Gainesville, FL
James Krall, Univ. of Wyoming
Amy Kremen, Univ. of Maryland
Roger Lansink, Odebolt, IA
Yvonne Lawley, Univ. of Maryland
Frank Lessiter, No-Till Farmer
John Luna, Oregon State Univ.
Barry Martin, Hawkinsville, GA
Todd Martin, MSU Kellogg Biological Station
Milt McGiffen, Univ. of California
Andy McGuire, Washington State Univ.
George McManus, Benton Harbor, MI
John J. Meisinger, USDA/ARS
Henry Miller, Constantin, MI
Jeffrey Mitchell, Univ. of California
Hassan Mojtahedi, USDA-ARS
Gaylon Morgan, Texas A&M Univ.
Matthew J. Morra, Univ. of Idaho

Vicki Morrone, Michigan State Univ.
Jeff Moyer, The Rodale Institute
Paul Mugge, Sutherland, IA
Dale Mutch, MSU Kellogg Biological Station
Rob Myers, Jefferson Institute
Lloyd Nelson, Texas Agric. Experiment Station
Mathieu Ngouajio, Michigan State Univ.
Eric and Anne Nordell, Trout Run, PA
Sharad Phatak, Univ. of Georgia
David Podoll, Fullerton, ND
Paul Porter, Univ. of Minnesota
Andrew Price, USDA-ARS
Ed Quigley, Spruce Creek, PA
RJ Rant, Grand Haven, MI
Bob Rawlins, Rebecca, GA
Wayne Reeves, USDA-ARS
Ekaterini Riga, Washington State Univ.
Lee Rinehart, ATTRA
Amanda Rodrigues, SARE
Ron Ross, No-Till Farmer
Marianne Sarrantonio, Univ. of Maine
Harry H. Schomberg, USDA-ARS
Pat Sheridan, Fairgrove, Mich.
Jeremy Singer, USDA-ARS
Richard Smith, Univ. of California
Sieglinde Snapp, Kellogg Biological Station
Lisa Stocking, Univ. of Maryland
James Stute, Univ. of Wisconsin Extension
Alan Sundermeier, Ohio State Univ. Extension
John Teasdale, USDA-ARS
Lee and Noreen Thomas, Moorhead, MN
Dick and Sharon Thompson, Boone, IA
Edzard van Santen, Auburn Univ.
Ray Weil, Univ. of Maryland
Charlie White, Univ. of Maryland
Dave Wilson, The Rodale Institute
David Wolfe, Cornell Univ.