

Cover Crops Key to Successful Organic Grain Farm

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“I feed the soil, not the plant.”

I had heard that line before! I might have been with a group of farmers who were passionate about direct seeding (no-till); but I wasn't. I was standing in a farm shop in the heart of Montana listening to Bob Quinn describe his philosophy of organic farming.

Let go of any preconceived ideas you may have of organic farming. The fields here spread across 3,600 acres; certified organic since 1991. Few weeds dared raise their heads on this farm, and king amongst the



Cover crops such as peas are key to soil health and weed management on the Quinn farm.

large equipment lined up by the shop was a Concorde air drill. Quinn maintained that the perfect farming system would be organic no-till, but to get there he needs more research.

The Bob Quinn Family Farm

The farm is in a 12 to 14 inch precipitation area and Zone 3 for temperature (going down to -40 °F). About 40% of the rainfall

occurs in May and June. Quinn has 600 acres in native pasture and 3,000 in crop, of which 50% is in green manure at any time.

The primary cash crops are: winter wheat, spring wheat, barley, Kamut®, alfalfa, safflower, and sunflower. The oilseeds are sold to make organic soaps and the meal goes to animal feed. Bob Quinn's basic farming principles are 1) soil building - he grows his own fertility inputs and 2) diversification – he tries to mimic nature by using crop rotations to break pest cycles. Both these principles are common to both direct seeding systems and organic farming, and Quinn takes the positive perspective that by growing diverse crops, “something will do well every year.”

Bob Quinn alternates crops from several perspectives; fall with spring crops, broad- with narrow- leafed plants, late with early maturing crops, heavy with light feeders, and cash crops with green manures. Some crops, such as buckwheat, solubilize phosphate and make it available to other crops.

Green Manures

The cover crops/green manures are crucial to soil fertility and weed management on the farm. Sweet clover (seeded at 5 lb/A) is a common green manure. Quinn seeds it in the spring, using small grains as a nurse crop. He direct-harvests the grain that season, but leaves the sweet clover until discing it down the following June (14 month life cycle). He seeds cash crops following the green manure.

Another cover crop is a bushy, leafy, Austrian winter pea seeded in the fall –

which provides at least a 2-week advantage over spring-seeded peas. Quinn discs down the peas just as they begin to flower, at which time the nitrogen-fixing nodules are beginning to slough off and the crop is not fixing any more atmospheric nitrogen. The ground isn't worked again until weeds start appearing. Peas provide 50 to 70 lb/A nitrogen. They are an investment, not a cash crop, though it's always tempting to harvest them – which he does only to maintain his own seed supply.



Quinn discs down sweet clover after 14 months growth.

Crop Management

Bob Quinn said the organic matter levels on his farm are around 2.5 to 3% - but the important factor is that the ground feels springier, water holding capacity has improved, and soil erosion is less than when he farmed conventionally.

The green manures also provide weed management. Fanweed is a predominant weed on Quinn's farm. Dog fennel and prickly lettuce, which are common weeds in Washington state, are not a problem in the Big Sandy area. Canada thistle and wild oats can be troublesome, and Quinn uses alfalfa crops to manage them.

Sometimes he broadcasts the alfalfa seed (at a higher rate than if drilled) and seeds a companion grain crop (spring wheat or barley) through it.



Hay barley grown as a nurse crop for alfalfa (marked by the arrow) grown to control Canada thistle.

He harvests the grain the first year, then the second season he swathes the alfalfa and sells it for hay. By this time the Canada thistle is weakened severely from the competition. Then the third year he plows down the alfalfa as it comes into bloom – by which time N-fixation has ceased. He uses alfalfa varieties bred for irrigated situations because they are easier to kill in the plow-down year (it takes 2 field operations versus four). He also uses alfalfa along field edges that have isolated Canada thistle patches, in which case it is important to seed the alfalfa well beyond the borders of the Canada thistle patch.

Believing that crop competition is the best weed management, Quinn seldom does any in-crop cultivation. He does cultivate in corn and sunflower, which are grown in 3-ft rows. But only once in 20 years has he harrowed within an emerged grain crop, which he plants with 7-inch row spacing.

Marketing Matters

A scientist by training and an entrepreneur at heart, Bob Quinn obviously has made his organic farm at Big Sandy into a successful venture that reflects his creative, orderly



The Quinn farm house at Big Sandy, MT.

mind. He emphasized that he is growing high quality food, not commodity crops. From 1983 to 1999 he owned Montana Flour and Grains that markets both organic and conventionally produced crops. He introduced into the market Kamut® grain that is an ancient relative of durum wheat and is tolerated by many people who are sensitive to wheat. You may read more at about Kamut® at www.kamut.com. Montana Flour and Grains (<http://www.montanafLOUR.com/index.html>) is the local contractor and source for Kamut®.

Fuel Research Crops

All around the farm were innovative projects. Bob Quinn wanted a better oilseed crop; he believes there should be an oil crushing and filtration plant in every community – to reduce both oil imports and greenhouse gases. He emphasized, “Locally produced, organic fuel and fertilizer is homeland security,” adding wryly, “My food has more frequent flier miles than I do.” To support his belief, in 2008 he

experimented with crushing camelina grown on the farm, planning to use it for fuel in the



Bob Quinn (left) demonstrates his experimental oilseed crusher.

raw oil form as it was utilized in the original diesel engines. As of 2009, he plans instead to use high-oleic acid safflower, which is more suitable for use as a straight vegetable oil without prior conversion to biodiesel. Quinn emphasized that grain for crushing must be cleaned to the same level as that for seeding. Safflower on his farm yields about



Bob Quinn stands in a field of camelina, being grown as an experimental biofuel crop.

1200 lb/A, which produces 400 lb (50 gal) of oil. At that rate he estimates he will need

to dedicate 7% of his acreage to fuel production to be self sufficient in fuel. This applies only to the growing season when it is warm enough to burn straight vegetable oil in his equipment.

Vegetable Research

The last several years, Bob Quinn has set aside 20 acres of ground for research projects on dryland vegetables (potatoes, sweet corn, and summer squash) that are managed by his assistant, Jacob Cowgill. The most pressing question is management of a saline seep area. Around the edge of the seep, where there was a Canada thistle patch, Jacob seeded alfalfa with a spring hay barley variety as a nurse crop. In the center of the seep he had found onions and tomatoes to be most tolerant to the salts, and



Radiating rows of crops (onions and tomatoes) grown in a saline seep demonstrate which ones are most salt-tolerant.

he was growing heirloom tomatoes that he would select for saline tolerance. Jacob was also alternating potatoes with bush beans to discourage the Colorado potato beetle.

In another test plot they were growing purple-seeded corn as a nutraceutical high in anthocyanins. Around the corn they had

broadcast safflower – to keep out deer and raccoons as the crop reached maturation.

Integrating Home and Farm

“We need to think of our (water) resources differently, as they do in Australia,” said Quinn, commenting on the large rainwater barrels he installed at the corners of his house and machine sheds. He estimated all his farm roofs together could collect 85,000 gallons per year, providing 75% of his household needs. But to implement that he would need to install a large, underground cistern for storage.

At lunch we sat on a lush, weed-free lawn that was also maintained without chemicals.



Visitors to the Quinn farm gather on the lush front lawn.

Beyond were a formal flower garden and a root cellar containing multiple varieties of potatoes. Further away were the chicken houses and an orchard. A metal tree sculpture with leaves awaiting grandchildren’s names was a testament to Quinn family pride; and a hammock swung gently in the shade of a tree. “That’s probably a decoration,” remarked Reardan farmer Fred Fleming, with his characteristic chuckle. “I doubt anyone in this family has much time to use it.”



Potato varieties stored in bins in a modern root cellar on the Quinn farm.



“My whole farm is my garden,” says Bob Quinn – which includes a formal vegetable and flower garden overlooking the Bear’s Paw Mountains.

Future for Organic

Bob Quinn concluded that he believes organic agriculture is one of the answers to the US energy and health crisis. He added that organic farming 1) reduces petroleum inputs, 2) increases labor needs, and thereby 3) supports local communities.

2009 Quinn Farm Tour

The next tour of Bob Quinn’s farm will be Wednesday July 22, 2009. The tour will be organized by AERO (Alternative Energy Resources Organization) out of Helena, MT. Phone: (406) 443-7272 or Internet: <http://www.aeromt.org/index.php>

Participation in the 2008 farm tour was made possible by a grant from the USDA Western SARE (Sustainable Agriculture Research and Education) Washington State Professional Development Program, administered by WSU CSANR.

One Tour Outcome

Fred Fleming, a long-time direct seed farmer, was sufficiently impressed by Bob Quinn’s farm that he planted an experimental 8 acres of Austrian winter peas last fall on his farm at Reardan, WA. He commented, “After taking this tour and seeing Bob's farm it confirmed my belief that a cover crop for soil health needs to be incorporated into my own direct seed farming system.” Consistent with his no-till philosophy, Fred will try using a roller-crimper to kill the green manure crop, and then direct seed a fall grain through the residue.