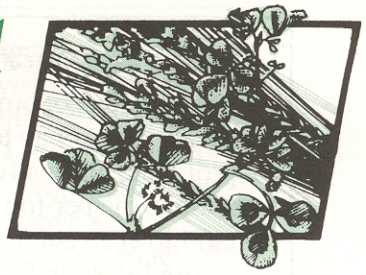
SUSTAINABLE FARMING Quarterly



VOL. 6 NO. 1 AUGUST 1994

Harvest the wheat and chaff, but then use BOTH

— By David Granatstein, coordinator of the Washington State University Center for Sustaining Agriculture and Natural Resources in Wenatchee, Wash. —

In separating wheat from the chaff, farmers hope to reap the maximum value from their grain crops. But Saskatchewan growers who are harvesting both grain and chaff are finding it worth the effort, especially if they have livestock on the farm.

To evaluate this practice, Canadian researcher M. Olfert and colleagues conducted a survey of 50 farmers who used a chaff collection system during grain harvest. From the survey information, they were able to estimate the cost of chaff collection and the potential benefits, both as a feed substitute and the agronomic value to succeeding crops. The results are reported in a 1991 article in the *American Journal of Alternative Agriculture* (Vol. 6, No. 4, p. 154-160).

Growers used a variety of systems to collect the chaff. Most included an auger located directly behind the combine shoe and a blower assembly to deliver the chaff into an attached wagon. When the wagon fills, the combine operator can dump the load into the field for later retrieval. Pickup systems included a chaff blower, stack wagons, push-off stackers and vacuum blowers. The cost per ton of collecting the chaff by these systems was $24, $21, $15 and $33 (Canadian dollars), respectively.

Labor is the largest variable cost component in chaff collection and exceeds fixed costs for the machinery, a factor to be considered when evaluating this practice.

The researchers estimated that the chaff had 75 percent of the value of hay, based on nutrient analysis and digestibility. With a historical price for hay of $67 per ton (adjusted for inflation), the mean value of a ton of chaff equals $51, and two thirds of the time the price would be between $37 and $64 per ton. Thus, in this situation, the feed value of the chaff exceeds the typical collection costs for all systems studied.

In addition to these calculations, the researchers estimated costs for hauling the chaff various distances (five miles was the average for the farms in the survey), the break-even quantity needed for a given collection

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Inside the SFQ

Overcoming seep: Intensive management techniques bring land back into production

— By Bryan Foster, who recently completed a 1994 summer internship with the Alternative Energy Resources Organization (AERO) in Helena, Mont. —

As a teenager, Dale Keil swam in a clear pond next to his brick house. Now, 20 years later, the pond is a gooey bowl, with a stream of brackish water wiggling through white calcium crusts.

The farmer from Conrad, Mont., said the pond was so polluted from saline groundwater that he had to drain it 15 years ago.

Seeps have ruined more than Keil's swimming hole. Irregular muddy patches, some bald and flowing with yellow-brown water, some covered with weeds like foxtail barley, hoary cress and kochia, mottle 10 percent of his

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system to be economical, and the critical price of hay to make chaff a profitable alternative. For example, the per-ton cost for a chaff blower system would increase by about $1 for each additional mile the chaff is hauled from the field. Per-ton costs do decline with increasing tonnage for each system.

In addition to the potential savings from chaff as a substitute for more expensive hay, the farmers in the survey noted other benefits. By removing the chaff, the growers eliminated the problem of plant growth inhibition and weed seed that often occurs when the chaff accumulates in a windrow behind the combine.

Fifty percent of the growers dropped at least one tillage operation per year after they began collecting chaff, while two thirds of the growers either reduced herbicide use or eliminated at least one tillage operation.

About 70 percent of the farmers who fed the chaff to cattle were able to substitute it for at least half of their on-farm hay/straw requirements. The growers in the study realized a greater benefit-to-cost ratio for the reduced tillage or herbicide application of 1.28 to 1, compared to the feed value of 1.07 to 1. When combined, growers who had agronomic benefits as well as feed savings earned $2.35 for each dollar of cost incurred for chaff collection.

The available research on residue management does not suggest that chaff removal will increase erosion potential or cause a measurable loss of nutrients. To verify this further, two experiments were started in Saskatchewan in 1988 to evaluate agronomic impacts. Plots will be sampled in 1998 and the soil test results compared to those from 1988.

One drawback of the practice the researchers point out is the potential for added labor requirements to create a bottleneck during a key period. They used a standard hourly rate for labor in the calculations, which may underestimate the true costs of collecting chaff.

However, the potential to reduce weed seed in cereal fields over time may be significant. And, as more industrial uses for farm products such as chaff emerge, this could provide an incentive for chaff collection by growers who do not have livestock. ❐

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AERO introduces sustainable agriculture project coordinator

Stephanie Rittmann of Madison, Wis., has joined the staff of the Alternative Energy Resources Organization (AERO) in Helena, Mont., as sustainable agriculture program associate.

Rittmann will help AERO manage its growing role in regional sustainable development. SFQ readers probably will meet her at farm tours and other regional activities.

Rittmann has diverse sustainable agriculture knowledge gained from a collection of experiences in the midwestern U.S., Thailand, Norway, and Hong Kong. She earned a B.A. in East Asian Studies from Ohio's Oberlin College, and spent her junior year in a sustainable agriculture program in Norway.

Rittman has worked with farmer networks and farmers who use management-intensive rotational grazing in Minnesota and Wisconsin. She also has training in Holistic Resource Management (HRM). ❐

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200-acre wheat field. He curses the seeps, saying they kill his grains, mire his tractor and spread weeds that are almost impossible to control. "Ducks don't even come near them," said Mike Habets, a neighboring farmer, adding that one Conrad rancher put 40 head of cattle into a pasture with a seep-infected reservoir, and 20 died within two days.

Saline seeps often begin on land that has been overirrigated, overgrazed, or fallowed. Altogether, seeps have contaminated aquifers, streams, rivers and ponds and salinized over 3 million acres of crop and range land in the northern Great Plains, including 300,000 acres in Montana, said Jane Holzer, director of the Montana Salinity Control Association (MSCA) in Conrad.

Holzer's organization has reduced seep spread by providing low-cost technical advice on salinity control. Holzer and her three assistants drill monitoring wells to determine the recharge source for specific seeps, then suggest a plan for restoring the sterilized land — usually planting alfalfa, a deep-rooted perennial, in the recharge zone, the area where the water soaks into the soil and later discharges as a seep.

Holzer's office is located in the middle of a rich wheat and barley growing region known as the "Golden Triangle." Rain and snow pond easily in the roller-coaster "knob and kettle" topography in this area and quickly soak into the ground. Glacial till then impregnates the water with salts and minerals, and draws it to an impermeable shale layer, where it flows laterally until surfacing as a seep.

The farming practices and geology of the Golden Triangle make the area particularly susceptible to saline seeps. Many farmers in the region don't irrigate, but rotate strips of cropland with uncropped fallow each year to build soil moisture for the successive crop. Without plants to intercept it, precipitation often soaks deep into the fallow soil, picking up salts and minerals along the way. The unused moisture can then emerge as a seep on a hill slope or lowland, perhaps after miles of travel. "We have two test wells: one out in crop-fallow and one in ungrazed grassland," said Scott Brown, assistant director of MSCA. "Over three years, the water table has risen eight feet in the crop-fallow, and fallen eight feet in the grassland."

Irrigation can create seeps too. Many irrigation districts require their subscribers to pay at the beginning of the summer for the water they think they'll need for the entire season. If the summer turns out unusually wet, many farmers still irrigate, slightly increasing the yield of their crop, though also increasing below-ground runoff. Leaky irrigation ditches can also propagate seeps; the ditch water above Keil's mottled wheatland slipped into the ground, grabbing salts from the soil, then surfaced at dips in his field.

Wishing to restore his seep-infected land, Keil formed the Bullhead Water Quality Association in 1989. Named after a local stream, it brings farmers together to cooperate on reducing seeps. The Bullhead Water Quality Project offers federal grant money to help farmers reduce seeps on their own or other people's property. The grants provide $41 for every $1 generated by the participating farmer. The project has received $660,000 in federal grant money over the last five years to develop and implement reclamation plans.

Dale Keil stands in front of what used to be a swimming hole, before it was contaminated by a saline seep and drained.

MORE CONTROL, PAGE 4

'Leaf spot' mystifies plant pathologists

— By David Granatstein, coordinator of the Washington State University Center for Sustaining Agriculture and Natural Resources in Wenatchee, Wash. —

In 1990, a number of dryland wheat fields in north-central Oregon exhibited an unusual condition on the plant leaves. Researchers were unable to diagnose it as a known disease and instead coined the term "physiologic leaf spot" to describe the condition until more was known

Richard Smiley, an Oregon State University plant pathologist at Pendleton, initiated a series of studies to learn more about the condition and potential remedies.

Smiley conducted a number of analyses to determine if a microorganism was causing the problem. While several common fungi and bacteria were found to be present, no organism could be linked to the leaf spot. Five different fungicides were tested for possible suppression of the condition, and none were effective. Suspecting the cause could be nutritional, Smiley applied a foliar micro nutrient with and without urea to unaffected plants. There did appear to be some benefit of micro nutrient spray in preventing the condition if used early in the season before any symptoms appeared.

Overall, in addition to the micro nutrient spray, several other management strategies may help reduce leaf spot incidence and severity. Smiley suggests selecting a wheat variety resistant to the condition, planting as late as possible (without compromising yield potential), and rotating crops wherever possible. Through his studies to date, he has documented a 10 percent grain yield reduction by the leaf spot condition enough to warrant a management response by growers. ❐

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"In the beginning, there were some who said 'Stay off my land,' particularly when they needed to plant something like 80 acres of alfalfa to control a couple acres of seep," said Habets, the current chair of the five-member Bullhead steering committee. "But after we got some money, some said 'Hey, wait a minute.'" The voluntary-membership organization now has 80 members trying to control 1,800 acres of saline land. "It was like a domino effect," Keil said. "Some folks asked their neighbors to join, and they asked their neighbors, and so on."

Farmers north of the Benton Lake National Wildlife Refuge, where some of the state's worst seeps drain into a migratory bird park, have joined together in a group similar to the Bullhead association. But many other areas still need salinity control organizations, Holzer said.

Geraldine, Mont., has had to relocate its town well three times because of high levels of calcium, sulfate, magnesium and sodium salts from seeps. And saline seeps are emerging in the Dakotas and some of the Canadian provinces. "They say there's not a severe salinity problem in the Dakotas," Holzer said. "But at one time there was no real salinity problem in Conrad, either. These seeps grow an average of 10 percent per year."

Seeps start on only a few acres, Holzer said, then expand, sometimes spreading to other areas of the farm. Farmers can stop seeps while they're still small by keeping the soil dry and covered. But the government can help, particularly where seeps start on another person's land, and where farmers can't afford to change cropping practices on a few hundred acres to protect just a couple acres of seep. But if the incipient seeps aren't controlled, Holzer said, they could quickly get out-of-hand, killing wildlife, ruining drinking water and sterilizing many acres of land.

To mitigate saline seeps, the government needs to do more than offer grants for programs like MSCA and Bullhead, Holzer believes. Some of the seep recharge areas are enrolled in the Conservation Reserve Program, in which the government pays farmers to keep land in ungrazed perennial cover. The government needs to renew expiring CRP contracts, she said, before farmers plow their fescue back to wheat. Much of the land now covered by the CRP program is land that might otherwise create seeps, Holzer explained.

If the government follows Holzer's suggestions, it could solve a serious environmental problem without antagonism. "The government is starting to help us out with what we want to do, rather than telling us what to do," Keil said. "They're giving us the carrot instead of the stick." ❐

Fighting the wheat curl mite by eliminating green bridge

— By David Granatstein, coordinator of the Washington State University Center for Sustaining Agriculture and Natural Resources in Wenatchee, Wash. —

Dryland wheat producers in localized areas of eastern Washington were greeted with an unfamiliar and unwelcome visitor this season. The wheat curl mite (*Eriophes tulipae*) found ideal conditions in several areas where hail damage to crops had been severe the preceding season. This provided more volunteer grain to support mites late in the season, and allowed populations to build up. A mild winter then helped them survive.

The wheat curl mite is normally present in the region, but under a rare combination of events, its population grew rapidly, exceeding 200 mites per plant in late spring. Washington State University extension agents Bob Gillespie and Diana Roberts have been tracking the problem and developing recommendations.

The mite itself is not the problem; its feeding damage is minimal. But the mites transmit wheat streak mosaic virus as they feed, and this disease will seriously reduce wheat growth and yield. Several insecticide trials to control the mite did not prove effective, and once a plant is infected with the virus, little can be done.

Gillespie and Roberts monitored mite movement and dispersal during the season. The mites did move from winter wheat to spring cereals as the winter crop began to mature. However, this occurred late enough in the development of the spring crops that damage from the virus was minimal.

The key to future control of the mite, according to the extension agents, is to prevent a "green bridge" from establishing. Volunteer cereals or green weeds in or around fields after harvest provide habitat for the mite to survive and maintain populations. To break this, growers must have at least 10 to 14 "brown days" (with no green plant material around) prior to emergence of a new winter wheat crop. This can be accomplished by not seeding earlier than normal for the area, by avoiding winter wheat seeding adjacent to later spring grains, and by controlling volunteer grain with herbicide or tillage.

Recent research on management of soil-borne diseases in dryland grain production also points to the importance of controlling the "green bridge." Thus, growers can reduce potential problems from several pests by following this practice.

For more information on the wheat curl mite, call Bob Gillespie at (509) 754-2011. ❐

CALENDAR

OCTOBER

23-31: International Sustainable Agriculture and Food Security Week, Washington, D.C. A calendar of events is available. Contact: Linda Elswick, World Sustainable Agriculture Association, 1331 Pennsylvania Ave. NW, Suite 907 North, Washington, DC 20004; (202) 347-0637 phone or (202) 347-0654 fax.

NOVEMBER

10: "On and Off the Land," a public symposium examining agriculture from urban and rural perspectives, Portland, Ore. Sponsored by the Oregon Committee for the Humanities, speakers include Wendell Berry, Lois Hudson, Fred Kirschenmann, Fred Otly, William Robbins and Ed Marston. Contact: Melissa Marsland at (503) 227-6570 or Theresa Marquez at (503) 285-8279.

11-13: Tilth 20th Anniversary Celebration, Troutdale, Ore. The Tilth organizations of Washington and Oregon began the sustainable agriculture discussion in the region during the mid-1970s. The groups are meeting to reflect on the past and anticipate the future. Some of the "On and Off the Land" speakers will attend. Contact: Tilth at (503) 233-4634.

13-18: American Society of Agonomy Annual Meeting, Seattle, Wash. Contact: ASA, 677 South Segoe Road, Madison, WI 53111; (608) 273-8080

14-17: Green Industry Expo '94, St. Louis, Mo. Contact: Green Industry Expo Office, 1000 Johnson Ferry Road NE, Suite C-135, Marietta, GA 30068; (404) 973-2019; fax (404) 578-607.

JANUARY

27-29: Northern Plains Sustainable Agriculture Society 14th winter conference, Aberdeen, S.D. Kenny Ausubel, award-winning filmmaker and journalist will discuss his personal journey into the loss of biodiversity and nutrition in the food system, and the subsequent formation of Seeds of Change, Inc., the nation's leading organic seed company. Workshops feature farmers, researchers and gardeners working with sustainable and organic methods. The new Northern Plains Organic Marketing Cooperative will meet Friday, Jan., 27. Contact: NPSAS, HC 5 Box 104, Langdon, ND 58249; (710) 256-2424. ❐

RESOURCES

Practical guides to direct marketing and biological pest control

— By Stephanie Rittmann of the Alternative Energy Resources Organization in Helena, Mont. —

Growers who use sustainable agricultural methods can reduce pest problems, expand their markets and increase profits by applying strategies laid out in three recent publications by University of Wisconsin-Extension.

Two publications focus on the biological control of pests:

• *Biological Control of Insects and Mites: An Introduction to Beneficial Natural Enemies and Their Use in Pest Management.* This publication includes basic biological information about insects and how they become pests. Three broad approaches to biological control of insects are discussed: finding new useful natural enemies, enhancing the effectiveness of natural enemies by protecting them from harm, and releasing additional natural enemies when those naturally present are not adequate. More than 80 color photographs and illustrations show the beneficial insects and pathogens in action. 92 pages. Cost: $12.25 postage paid. Publication reference number: NCR481.

•*Biological Control of Insect Pests of Cabbage and Other Crucifers.* This booklet discusses biological and other alternative pest control strategies and includes suggestions on integrating biological control with other crops and pest management practices. It includes more than 30 color photos of natural enemies of these pests. 54 pages. $9.25 postage paid. Publication reference number: NCR471.

The third publication details ways that growers can market their own produce:

• *Direct Marketing of Farm Produce and Home Goods* describes six direct marketing alternatives: pick-your-own, roadside markets, farmers' markets, subscription farming, home deliveries and selling to institutions. The publication also provides a checklist for determining business feasibility and examples to help you anticipate initial costs and set marketing goals. Other sections cover laws regarding the selling of fresh produces and processed goods, pricing, advertising, display strategies, employees, liability and more. 25 pages. $4.55 postage paid. Publication reference number: A3602.

Send checks and purchase orders to Cooperative Extension Publications, Room 245, North Murray Street Madison, WI 53715. For more information, call (608) 262-3346. ❐

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