PACIFIC REGIONAL SOIL SCIENCE SOCIETY

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Editors Comments:

Happy new year to all PRSSS members! We hope you will have a successful year. This brief issue of the newsletter accompanies the announcement of the upcoming BC Soil Science Workshop. Everyone is encouraged to attend, and the program looks very exciting this year. We have also included an article describing the Evening Session held by the PRSSS on November 20, and another book review. See you in February!

People on the move:

In case you've been wondering where your favourite soil scientist is currently located, some recent address changes in the soils community include:

Evelyne Wolterson....Pottinger, Gaherty Ltd., Vancouver.
Bill Price.....Energy Mines and Resources, Victoria.
Paul Sanborn.....Ministry of Forests, Prince George.
Gerry Davis.....Ministry of Forests, Nelson.
Colleen Hackinen.....Waste Management Branch.
MaryJane Douglas.....Cicumnavigation of the world.
Chuck Bulmer.....Kwantlen College, Richmond.

A WORKSHOP ON SOIL ECOLOGY

14th ANNUAL B.C. SOIL SCIENCE WORKSHOP
Thursday and Friday, February 20 and 21, 1992
Room 166, MacMillan Building
University of British Columbia

AGENDA

Thursday, February 20

8:00	Registration and coffee
8:30	Introduction Mr. Geoff Hughes-Games President, Pacific Regional Society of Soil Science
8:40	An Overview of Soil Ecology Dr. Shannon Berch Assistant Professor, Soil Sci. Dept., UBC
9:15	Break

Session 1: Agriculture Ecology Chair: Hubert Timmenga, BC Research

9:30	)
10:00	) 3 speakers
10:30	)
11:00	Poster Session
11:30	Luncheon hosted by Pacific Regional Society of Soil Sci. Annual General Meeting of the PRSSS

Session 2: Rhizosphere Ecology Chair:

1:00	)
1:30	) 3 speakers;
2:00	)
2:30	Break

Session 3: Forest Ecology Chair: Cindy Prescott, UBC Forestry

3:00	)
3:30	) 3 speakers;
4:00	)
4:30	Poster Session

FRIDAY, FEBRUARY 21

Session 5: Biotechnology Chair: Marcia Monreal

9:00	)
9:30	) 2 Speakers
10:00	Break
10:30	)
11:00	) 3 speakers
11:30	)
12:00	Closing Address
12:15	Luncheon hosted by Soil and Water Conservation Society Annual General Meeting of the SWCS

"Issues in Water Quality" Evening Session, November 20, 1991

For those who attended our evening session on Water Quality, I am sure you went away better informed about some aspects of water quality law and monitoring. Anyone living in the Lower Fraser Valley or GVRD is well aware of the issue of Water Quality, but in most cases we do not know which agency to turn to or who sets testing standards or policy.

My thanks to our Vice-President, Evelyn Wotterson, for finding four experts to give their side of the water quality issue. The evening opened with a discussion of the Department of Fisheries and Oceans perspective. Anyone working on or around water in B.C. knows that the Federal Fisheries Act holds the "big stick".

Steve Samis, Biologist, Water Quality Unit, Habitat Management Division, DFO, gave an overview of the legislation and jurisdiction of various agencies in the Pacific Region. Using examples, such as pulp effluent and wood waste, he defined some water quality terms and the impact of various regulation and management actions taken in some sectors of B.C.'s forest industry.

Our second speaker, Brett Betts, State Environmentalist, Sediment Management Unit, Washington State Department of Ecology, elaborated on the policy and political development of water quality standards. In the Puget Sound area, water quality, and in particular sediment quality, have been a hot issue in the last decade. Some sediments in the Sound have been placed in the "Super Fund Cleanup Program" they are so polluted. Brett presented some of the issues surrounding the development of sediment (hence water quality) criteria, regulatory coordination concerning implementation of criteria and the legal and jurisdiction disputes surrounding the application of criteria. I know that Brett's discussion may have been long and involved, but for anyone who is involved with the development and/or implementation of environmental regulations/guidelines, you would have enjoyed and related to many of his comments. As with most guidelines/regulations, he told us that most of the "Sediment Management Standards" (April 1991 Chapter 173-204 WAC) were set by a committee of lawyers representing interest groups. He also told us that when consensus could not be reached at the table, then the scientific community met in the court room where the decision was made.

Our third speaker, known well by most of the audience, was Professor Ken Hall, Civil Engineering, UBC. Ken is also an Environmental Chemist and Assistant Director of the Westwater Research Centre, UBC. Ken's talk, entitled "Water Quality Conditions in the Fraser Basin" centred around a review of the contents of two reports recently released by Westwater on water quality in the Fraser River Basin. Using examples of water chemistry issues, maps and photographs, we were given some "numbers" related to the Fraser Basin. For those interested in further reading, the two books (and a 20 min. video for $20.00) are available from Westwater at $25.00 each.

Volume I: Perspectives on Sustainable Development in Water Management: Towards Agreement in the Fraser River Basin.

Volume II: Water in Sustainable Development: Exploring Common Future in the Fraser River Basin.

Calling herself and "Ecosystem Scientist", our final speaker was Deana Valiela. Deana is currently studying Environmental Law at UBC, but her career has centred around water quality. She worked most recently with the Water Quality Branch, Inland Waters, Environment Canada, where she was involved with a case study on water quality in the Flathead River Valley of the East Kootenays. Deana's presentation centred around this case study of the potential effects of the proposed Sage Creek Coal Mine on water quality and in particular, the potential detrimental effects on trout habitat. We were exposed to the scenic and not so scenic areas of the East Kootenays. Her interesting discussion centred around the local issue, coal mine development, which became an international issue of water quality/fish habitat degradation. The development of this mine was stopped through an international court decision which relied on the environmental impact assessment carried out on the Flathead River. Deana ended her presentation by tying many of the regulatory, policy and scientific perspectives together.

If we learned one thing from this evening on Water Quality, that is that there is much more to learn about water quality and how we set guidelines, regulations, standards and legislation. For those of you who are interested in exploring this issue further, our colleagues from the B.C. Chapter, Soil and Water Conservation Society, are holding a session on Water Supply and Quality, on January 25, 1992 at the Abbotsford campus of the University/College of the Fraser Valley.

Geoff Hughes-Games, P.Ag., President PRSSS

METHODS MANUAL AVAILABLE

Forestry Canada has published a "Methods manual for forest soil and plant analysis" (Y.P. Kalra and D.G. Maynard). This publication is available at no charge from:

Forestry Canada
Northwest Region
Northern Forestry Centre
5320 - 122 Street
Edmonton, Alberta
T6H 3S5

BOOK REVIEW

"WHAT ARE PEOPLE FOR?" by Wendell Berry, North Point Press, 1990.

This latest collection of essays by Wendell Berry is a commentary on various aspects of North American life by a writer/farmer/commentator from Henry County, Kentucky. Members of the Soil and Water Conservation Society may recognize the author as one of the keynote speakers at this year's SWCS Annual Meeting in Lexington, Ky. He has long been a critic of industrial agriculture and its negative impact on rural land, communities and local culture. Universities and agricultural extension professionals come in for their share of criticism for supporting and encouraging technological change with inadequate consideration for its impact on the land, farmers and farm communities. The title essay questions the assumption that there are too many people on the farm. Berry points out that some costs of industrial agriculture and the depopulation of rural areas have been ignored, for example, the loss of rural services, and decline in the quality of rural life. Secondly, the mass migration of rural people into the cities has resulted in unemployment and serious social problems. Fundamentally he feels that the problems of agriculture require more, not fewer people.

The book held a great deal of personal significance for me as I read much of it during a recent visit to central Illinois, in which many of the manifestations of modern agriculture are exemplified. A word of advice, however, to someone who is unfamiliar with Wendell Berry's philosophy and writing, this may not be the best of his works to begin reading. It represents the latest in a progression of books beginning with "The Unsettling of America" published in 1977 and "The Gift of Good Land" in 1981. The reader might be better to begin by reading one of the earlier books as they tend to be more focussed on agricultural and rural issues. Berry meanders about in a hodge-podge of topics in "What are People For?" including computers, feminism and Mark Twain. Also Berry's writings seem to cry out for a touch of humor to leaven the serious issues which he feels compelled to deal with.

In summary, I don't necessarily agree with all that Wendell Berry says and "What are People For?" may not be the best of his works to sample, however, people interested in agriculture and conservation and the roles of people in these endeavors should at least introduce themselves to this author. He has much to say about current problems in the agricultural economy and the rural environment.

Art Bomke
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Saskatchewan Research

Legumes in Cereal-Based Rotations: Influence on Profitability and Soil Quality

By C.A. Campbell, R.P. Zentner and G.P. Lafond

Rotation studies in Saskatchewan show that the quantity and quality of soil organic matter can be increased as effectively by fertilizing continuous wheat as by inclusion of legumes or hay crops in cereal rotations. Both legumes and fertilization were shown to improve economics and profitability.

AN ONGOING CROP ROTATION STUDY has been carried out on a moderately fertile, medium textured, thin Black Chernozem at Indian Head, Saskatchewan, for over 30 years. The project has provided a unique opportunity to compare the relative benefits of legumes and fertilizers used in cereal-based cropping systems. The rotations included fallow-wheat (F-W), continuous wheat, green manure (sweet clover)-wheat-wheat (GM-W-W) and a 6-year rotation of fallow-wheat-wheat-hay-(brome-alfalfa)-hay-hay (F-W-W-H-H-H). The legume-containing systems received no fertilizers, but the monoculture systems each had fertilized and unfertilized treatments.

Results

Early in the study, fallow wheat yields in the 6-year rotation averaged 9 to 16 percent higher than in the moderately fertilized F-W or the fallow-wheat-wheat (F-W-W) rotations, and 22 to 30 percent higher than in the two unfertilized monoculture wheat rotations. However, since 1978, when higher rates of N were applied to the monoculture wheat systems based on soil tests, the yields of wheat after wheat in the 6-year rotation averaged about 20 percent less than wheat grown on stubble in the fertilized F-W-W and continuous wheat systems.

Economic analysis showed that fertilized F-W-W, fertilized continuous wheat, and the two legume-containing systems resulted in good economic performance under most economic situations (Table 1). Fertilization generally increased net returns, especially for the longer rotations. Straw baling did not decrease net returns. Risk analysis showed that rotations containing high proportions of fallow or legumes had the lowest frequency and risk of financial loss.

Assessment of the effect of these rotations on soil organic matter quantity (Figures 1 and 2) and quality (Figure 3) confirmed the benefits of legumes in improving soil quality. It also showed that fertilization of continuous wheat at soil-recommended rates can be as effective as legumes in improving soil organic matter quality. Surprisingly, straw-baling had little influence on soil organic matter.

This information demonstrates that achievement of sustainable agricultural production is not predicated solely on the use of organic sources for maintaining or enhancing soil fertility. Properly fertilized monoculture cropping can provide economically viable systems that improve soil quality. These results, though valid for a soil of medium fertility located in a region of generally reliable

(continued on next page)

Table 1. Annual net incomes[1] for rotations during two fertility periods.[2]

Rotation Sequence	N & P Fertilized	1960-77 Mean	1960-77 Min	1960-77 Max	1978-84 Mean	1978-84 Min	1978-84 Max
		$/A					
F-W	No	4	-40	49	-.5	-32	41
F-W	Yes	7	-44	49	1	-32	49
F-W-W	No	-2	-51	62	-10	-46	34
F-W-W	Yes	6	-51	62	7	-29	57
F-W-W (straw baled)	Yes	9	-57	66	12	-16	58
GM-W-W	No	17	-54	72	9	-18	39
F-W-W-H-H-H	No	9	-44	61	13	-18	41
Continuous wheat	No	-23	-64	70	-40	-99	30
Continuous wheat	Yes	-4	-71	97	7	-96	93

[1]Base assumptions: Wheat = $4/bu; hay = $61/ton; fertilizer N = 26¢/lb; P_2O_5 = 27¢/lb; labor = $10/hr; interest = 11 percent.
[2]Fertilized according to general recommendations for the region in period 1960-77, but according to soil tests in 1978-84; the latter period required much higher rates of N.

The authors are research scientists with Agriculture Canada; Dr. Campbell and Dr. Zentner are located at Swift Current Research Station, Saskatchewan and Dr. Lafond is located at Indian Head Research Station, Saskatchewan, Canada.

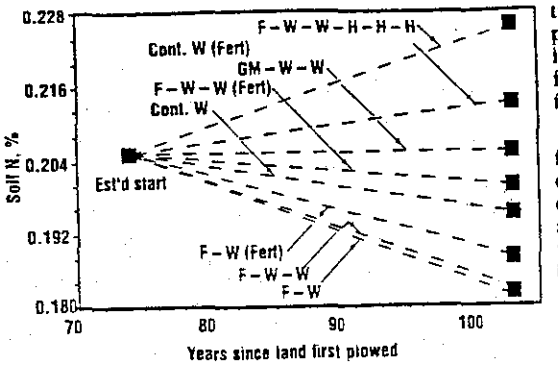

Figure 1. Fallow-containing monoculture cereal systems and unfertilized continuous wheat have failed to maintain soil organic matter of the 0 to 6 inch layer, but legumes in rotation and fertilized continuous wheat have increased it.

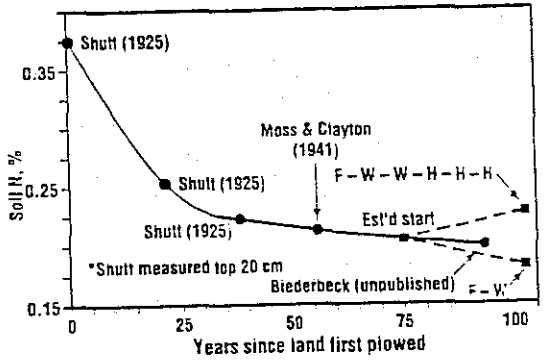

Figure 2. Even the best management system has failed to return the organic matter to its original level in 30 years. (F = fallow; W = spring wheat; GM = sweetclover green manure; H = brome-alfalfa hay).

Legumes . . . from page 29

precipitation, may not be applicable to soils in drier regions where moisture limits the use of the hay-containing and clover GM systems with cereals. In the more fertile (10 percent organic matter) thick Black Chernozem areas where moisture is not limiting, inclusion of legume green manure or hay crops may only serve to maintain soil organic matter and help suppress diseases and pests. The results at Indian Head should be applicable to the Dark Gray and Gray Luvisols areas of the Prairie Provinces.

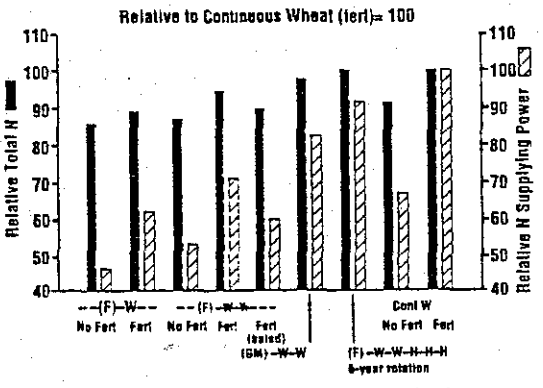

Figure 3. Benefits from fertilizers, increased cropping frequency, maintaining straw, including legume green manure or grass-legume hay crops in rotation with cereals, are shown by the N supplying power more dramatically than by the total N.

Conclusions

Where moisture is not limiting and soil fertility is not already high, legume green manure or hay crops grown in rotation with cereals will enhance soil quality and economics, but so can the judicious use of fertilizers with annual cropping to wheat.■