

REPORT TO SENATE OF CANADA COMMITTEE ON AGRICULTURE AND FORESTRY : STUDY ON SOIL HEALTH

by

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HEALTH OF SASKATCHEWAN SOILS

This report deals specifically with the soils of Saskatchewan.

The largest acreage of Saskatchewan annual crop land is within the Brown and Dark Brown soil zones that was originally described as Palliser's Triangle after his 1858-1860 explorations



From: Encyclopedia of Saskatchewan Published by the Canadian Plains Research Centre, University of Regina .

Palliser concluded that the area was unfit for agricultural settlement but he visited in low rainfall years. Later studies in wet years concluded that agriculture was viable.

A BRIEF HISTORY OF CROP PRODUCTION IN THE PALLISER TRIANGLE (BROWN AND DARK BROWN SOIL ZONES)

Most of the main area of the Palliser Triangle was settled in the early 1900s when the rail branch lines were being built. That was a wet period so all my Grandfather had to do at Mildred SK was break up the rich prairie sod, plant wheat and haul it to the local elevator for eventual export. In WW1 the price of wheat was very high (\$30+ - bushel in today's \$)) so farmers were rich.

The early 1920s was a short recession and dry years but late 1920s were very prosperous. Then came the next drought cycle with the well known 'dirty 30s' with huge dust storms. Many farms were abandoned and meagre belongings were put on wagons and trekked north to Meadow Lake where it rained. My Grandfather was able to survive and the next wet cycle came along in time for the big crop of 1942 – the mortgage lifter.

Wet and dry cycles continued and the wheat /fallow crop rotation was common. Weed control was by intensive tillage on the bare summerfallow. The soil was very vulnerable to wind erosion and spring dust storms were common.

The 1980s was especially dry and many farmers stopped seeding on a windy day and said "there has to be a better way". That better way was to seed directly into last year's stubble with no tillage. The seed openers to achieve that were all designed in Saskatchewan farm workshops.

By 1993 this is where we were at:

A quiet revolution in crop production

There is a quiet revolution going on in the Canadian Prairies. It has to do with the fundamental principles of how we grow annual crops. Such every day crops as wheat, canola and barley are being grown in a different way. And more acres will be grown in a different way in the future.

Tillage is the issue

The tillage of the soil, and how much is required, is the major issue. My observations tell me brute force, horsepower, diesel fuel, steel and rubber are quickly going to go the way of the draft horse.

By quickly, I mean over the next 10 to 20 years, so don't get too excited. But it is happening and it is being driven by hard, cold economics.

The trend to zero-tillage has been creeping along in continuous crop areas for many years. Much of the driving force in

those areas has been the need to conserve the soil.

The countless tillage operations in an intensive, continuous cropping program on Black Soils was taking its toll on topsoil. It was not unusual to hear about seven or eight tillage operations between the combine and the seeder.

In areas where summerfallow is a big part of the crop acres, attempts to substitute tillage with chemicals often left much to be desired. Either the weed control was less than a smashing success or it cost an arm and a leg. Sometimes chemical summerfallow cost an arm and a leg and still didn't work. Such lessons are very slowly forgotten.

Cheap glyphosate is the key

Time and time again farmers have bemoaned the high cost of herbicides and stuck with traditional tillage practices. And with good reason. Up until recently

they were dead right.

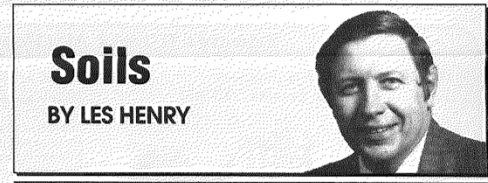
But, along comes much cheaper glyphosate, and new techniques for its use. With good quality water, with lower water volumes and with use of ammonium sulphate, the same rate of application can kill a lot more weeds.

This past summer I saw all kinds of examples where a total summer chemical bill of about \$10 or \$12 per acre did the entire job. The stubble of the 1991 crop was all in place and not a lb of soil had left the field. And, the farmer could sleep at night knowing that not a lb of soil would leave the field in the spring of 1993.

Then came the seeding implements

The other revolution has been in the ways we can get seed into the ground with no need for pre-tillage.

Direct seeding is the topic of almost all winter extension this year and the attendance at meet-



Soils

BY LES HENRY

ings continues to grow.

As I have said many times in the past, direct seeding by itself is nothing new. Gumbo farmers for 40 years have hooked onto the discer to seed stubble land. But today's seeders accomplish the same thing without much soil disturbance and keep most of the stubble intact.

Of course, these fancy new machines come at a pretty penny, so not everyone can afford one at this time. But a switch from diesel fuel, steel and rubber to chemicals for summerfallow is affordable, and affordable right now. Indeed, it is the lower cost factor that is fueling the quiet revolution in the countryside.

Stories of farmers who used to have two or three big tractors and put on hundreds and hundreds of hours are giving way to one real good seeding implement and a sophisticated sprayer. Big tractor hours of 50

to 100 hours are commonplace.

One of the big factors in making the new farming systems work is fertilizer placement. In the *Grainews Spring Planning Manual* we will take a detailed look at fertilizer placement.

I look forward to driving around the countryside this summer. I fully expect the area of black summerfallow to be way down.

For the first time in my days as a soil scientist, it's possible to visualize a spring without dirt in the air. It won't happen this year, and it won't happen next year. But sometime in the next two decades it will happen. When we achieve that goal we will have beat the biggest environmental problem of the Canadian Prairies into the ground.

Les Henry is a professor and extension specialist at the University of Saskatchewan.



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The change to zero-till advanced much as envisaged in 1993.

MORE THAN JUST ZERO-TILL – CROP ROTATION AND NEW CROPS IMPORTANT

As zero-till seeding advanced so did a proper crop rotation with cereals, oilseeds and pulse crops (nitrogen fixing legumes). In the heart of the dry area the clay belt of Mildred, Rosetown, Eston, Elrose the important new crop was lentils. Lentils grow very short, are short season and use less water than cereals and canola. The short stature means that combine headers must ride right on the soil surface so stone free is important.

The introduction of lentils is credit to the Crop Development Centre, University of Saskatchewan and in particular Dr Al Slinkard. Slinkard came from the University of Idaho and bred the famous Laird lentil variety that quickly dominated the clay

belt. Saskatchewan became a world leader in export of lentils. Much of the current net worth of farmers in the clay belt of west central Saskatchewan came from lentils and the very high dollar value of the crop.

The clay soils of the Regina Plains are another important lentil growing area.

The complete package of zero-till and crop rotation has restored the Soil Health of the worst wind eroded soils. A major indication of that is the appearance of Earthworms that did not exist in the tillage days. *Google Les Henry Grainews Earthworms: Our Silent partners and Les Henry Grainews Survey results*

RECURRING DROUGHTS AND WET CYCLES TO BE EXPECTED

Drought periods will be an ongoing threat to crop yields and profit but the soils are largely restored and yields will return with the rains. The 2021 drought was widespread across the prairies, including Manitoba. Serious drought is rare in Manitoba and the Black soil zone areas that wrap around the Palliser Triangle. The much improved 2022 crop yields in that area has led to reports that the drought is over. It is not over in the heart of the Palliser Triangle where 2022 crop yields in many areas are as bad as 2021.

The wet years 2010-2017 gave big yields and profits which led to large increases in land prices. There will be casualties of young farmers highly leveraged (i.e. big debt)

SUMMARY STATEMENT

The Health of Soils of the Palliser triangle of Saskatchewan have been restored by the current agronomic practices. There is no need for a Senate of Canada study of that area.