

Brothers struggle in suddenly acidic soil

Decades of fertilizer use take harsh toll; expensive remedies may take years

By Matthew Weaver, Feb. 24, 2012

VALLEYFORD, Wash. -- Crop yields have dropped as acidity levels have risen on farmland in the Rockford, Wash., area.

On some land, wheat yields fell from 60 bushels per acre to 20 bushels.

Randy Emtman operates Emtman Brothers Farms with his brother Jeff. The Emtmans first noticed a small impact 15 to 20 years ago. About four years ago, Randy Emtman said, they determined that their fertilizer increased the soil's acidity. That brought out the aluminum in the soil, which is toxic to crops.

Emtman estimated 3,000 acres of their 10,000-acre operation have been affected. "All of a sudden, boom, it's like you've dropped off a cliff," he said. "You go from raising a halfway decent crop to getting hardly anything."

Emtman believes acidic soil is more prevalent than people realize. The pH levels in soil are going down in a lot of areas, he said, without any noticeable effect until reaching "that magic number" when aluminum becomes highly toxic to plants.

USDA Agricultural Research Service research plant pathologist Tim Paulitz said the area was originally forested, then bluegrass was grown on it and now much of it is in wheat production. Sixty years of ammonium fertilizer has dropped the pH level -- a measure of acidity -- of the soil. The lower the pH, the higher the acidity.

Microbes react in the soil to convert the ammonium into nitrate, releasing acid. Once the soil is more acidic, the yields begin to decline, Paulitz said.

Paulitz said 30,000 acres around the Rockford, Wash., area are affected, impacting bluegrass, wheat, barley and legume production. Acidity levels are rising in the Palouse, but other areas are not as acidic because they were originally grassland. One solution is to add ground-up limestone to the soil and increase the pH level, Paulitz said. But there are few cheap sources of limestone in the region.

Emtman said it would take several tons of limestone to correct the problem. Limestone does not have an instant response. He noted that it takes time to work through the soil profile. "In the meantime, as a farmer, you say, 'How am I going to make a living for the next five years?'" he said. "Long term, we need to fix the soil; short term we need to have an income."

There are also efforts at Washington State University to find genetic resistance in wheat varieties. The soft white winter wheat Madsen has outperformed many aluminum-tolerant varieties, Paulitz said, and some local varieties look promising for acid tolerance.

More testing is needed, Paulitz said, but breeders will add the genetic marker for resistance to some of their breeding lines.