

Agriculture by Robert L. Baker

Fallow soil syndrome

The Mississippi-Missouri floods have damaged farmland in a way that will have lingering effects into 1994.

The trendy farm magazines call it "fallow soil syndrome," but whatever you call it, the problems of deteriorating soil condition in the U.S. Midwest as a result of this summer's flooding and "ponding" are serious, and will not go away quickly or easily.

The facts of soil management are known to any good farmer, and make the current statements by so-called economists, to the effect that there will be little impact on the food chain resulting from the floods, just so much hogwash. The costs and problems involved in remedying "fallow soil syndrome" alone give the lie to that statement.

True soil is composed both of mineral and organic particles. Soil texture, a characteristic of the soil which has great importance for agriculture, refers to particle sizes, such as sand (the largest particle), silt (medium-sized), and clay (the smallest particle). These particles are mixed with the organic matter of dead plants, which is known as humus.

A healthy, dynamic soil is made up of some combination of the humus and soil particles along with micro-bacteria, fish worms, water, air, and living plant matter.

The micro-bacteria eat and digest inorganic fertilizer and dead plant material and convert it into a form that is available to the plant.

Fish worms eat the micro-bacteria and aboveground dead plant material and, by burrowing through the soil, allow oxygen to filtrate through it.

But when a soil becomes saturated with water over an extended period of

time, the lack of oxygen in the soil creates an anaerobic condition that can shut down the biological activity of bacteria and other living organisms that decompose the fertilizer nutrients into compounds that can be taken up by the root systems of the growing crops. Thus the crop produces abnormally low yields, grows poor-quality grain, or, in extreme cases, dies.

Very few scientific studies have been done on flooded field management.

The lingering and detrimental impact on flooded and rain-soaked areas of the midwestern farm belt will become worse if farmers are forced to harvest crops while the land is still rain-soaked.

Those soils hit by hard, driving rains, flooding, and erosion, have very poor soil structure now, and heavy farm equipment could leave deep ruts and compact the soil this fall, leaving the soil in very poor condition, which could seriously affect next year's crop. If soil freezes deeply this winter, the soil compaction will loosen up when the ground thaws out in the spring. Without a hard freeze, the soil could stay compacted into the next year.

Flooding or long-term wetness don't affect a soil's phosphorus or potassium content, as those minerals are not translocated in the soil. Nitrogen, however, will disappear from flooded or saturated fields, as it moves up and down in the soil with the water table, or volatilizes into a gas, or is converted into a chemical form that is not available to the plant for growth.

Fallow soil syndrome is caused by the loss of soil organisms that help roots take in phosphorus. When a field is flooded and left without plant cover for most of the season, the next year's crops will suffer from a phosphorus deficiency. Soil phosphorus may be at adequate levels, but, due to inadequate activity by micro-organisms, the amount of phosphorus available in a utilizable chemical form is too low. Thus, low yields can be predicted for the next growing season.

When fields went under water during this summer's floods, earthworm populations went way down. If the plant residue was covered by silt deposits, nightcrawler populations died out from lack of food. An estimated 17 million acres in nine states were flooded.

Most herbicides are broken down by aerobic bacteria. In most cases, herbicide residue will be diluted by the flood water, but if dirt is washed onto another field with heavy concentrations of herbicides, there is a problem with chemical carryover that could stunt the next year's crop. The anaerobic condition of flooded soil inhibits bacterial growth and chemical breakdown.

Normally, by the end of summer, the topsoil is about as dry as it gets, and can absorb the heaviest of fall rains. But in the flooded areas this year, the soil is like a water-soaked sponge, and there is no way that it can absorb more moisture.

This means that there's an unusually high potential for serious flooding this fall. Even though the Mississippi River is now falling, it is still well above normal levels.

Wet weather, floods, cool weather, cloudy skies, and the potential for a killing frost continue to cast a long shadow over the potential yield of the 1993 corn and soybean crop, and the 1994 crop as well.