HOW MUCH LONGER CAN WE GET AWAY WITH TREATING OUR GOOD GRASSLAND SOILS LIKE DIRT?

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For the past few years I have been noticing deterioration of surface structure and porosity in some southern Willamette Valley soils. These are the soils that are subjected to annual burning of ryegrass and orchardgrass fields, heavy applications of fertilizer in the early spring, as well as periodic land smoothing to remove humps and depressions. Changes due to these practices are significant enough to change the classification of the soil above the series level. The interaction of these operations seems to be worsening the natural drainage and aeration of the surface soil through compaction and reduction (or at least alteration) of the organic matter content in the soil. These ill effects are most noticeable in soils with moderately fine textured surfaces, and in moderately well-drained and somewhat poorly drained soils with medium textured surfaces.

During the spring of 1973 while mapping in Linn County, I reclassified large areas to Concord Soils (Typic Ochraqualfs) that had been mapped as Amity (Argiaquic Xeric Argialbolls) as recently as 10 to 15 years ago in farm planning surveys. These soils are now mottled to the surface and the only mollic epipedons remaining are along old fences. These changes were not due to changes in soil taxonomy or to personal mapping differences by the soil scientists involved—we normally agree quite closely on this separation. I also found areas where an initial examination of the surface horizon made me think I was on Conser or Coburg, but augering revealed the well-drained subsoil to Malabon (Pachic Ultic Argixeroll).

I have asked farmers in these areas if they weren’t concerned that the loss of organic matter would cause increasing problems in tilth and production of grass seed and wheat. They told me that their soil tests from the Oregon State University soil testing lab still show that they have 3 to 4% organic matter in the surface. They feel that their production would be lower if they quit field burning, due to nematodes, competition for nitrogen, and excessive amounts of straw. But I wonder if risking long term soil damage for short term gains in production is wise.

This poses questions which may have been the subject of research that I am unaware of, and perhaps someone can enlighten me with answers to the following questions:

1) Can annual burning of straw, with its destruction of the lignin-containing portions of the residue, result in a decrease of the lignin content of the soil organic matter without significant reduction in total organic matter percentage?

2) If so, how long would this take, and what might we expect to be the effect on soil structure, color, and other properties?

3) Are we really doing the farmer a disservice in allowing him to continue annual field burning?

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