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TO: All Soil Scientists

FROM: Alan M. Dunn, Supervisor *AMD*
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SUBJECT: Ortstein and Ortstein-Like Characteristics

Ortstein horizons or layers occur only in soils that are sand, loamy sand, or loamy fine sand throughout. The unique properties of ortstein and ortstein-like layers are caused by the extremely high concentrations of iron in these soils.

In its true form, an ortstein layer is dark red in color and is strongly cemented. As the concentration of iron increases, the soil color and cementation become more prominent. The darker red color masks the gray mottles normally associated with wetness. Both the ortstein and ortstein-like soil materials are limiting layers that restrict the downward movement of water and septic system effluent.

Soils that exhibit the ortstein-like properties are difficult to identify under normal field conditions. This soil material behaves similar to a true ortstein material in that it too severely limits the downward movement of water and septic system effluent. Therefore, it is important to know when and where to expect to find these pseudo-ortstein soils.

The following conditions have been observed in the field and may be associated with suspected ortstein and ortstein-like soil materials:

1. They generally are associated with the deep sand and loamy sand soils along the Kankakee River and the delta areas of the Yellow River. They typically occur in Jasper, Lake, LaPorte, Newton, Porter, Pulaski, and Starke Counties.
2. The ortstein and ortstein-like materials typically occur in Zadog, Maumee, and Morocco soils. They have also been observed in the better drained Brems and Oakville soils.

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3. These soils are typically darker red in color than the yellowish brown non-ortstein sand soils.
4. These soils may contain actual pieces of "bog" iron on their surface or within some of their individual soil horizons. The "bog" iron is an indicator of the extremely high iron concentrations within the soil matrix.
5. The sand or loamy sand directly below these ortstein and ortstein-like layers generally have the typical gray colors associated with wetness characteristics in sand soils.
6. The higher iron content in these soil horizons causes the true "fine sand" texture to feel like it has a higher clay content. When textured in the field under moist conditions, a fine sand can feel like sandy loam, loam, or even a light clay loam texture.
7. Under moist conditions, these soil materials are harder and appear to be more dense than normal non-ortstein materials. When digging with a backhoe, these ortstein and ortstein-like materials are more resistant to the backhoe bucket than normal non-ortstein materials.
8. Under moist soil conditions, these ortstein and ortstein-like areas may actually contain nodules or small pieces of sand that appear to be cemented together. When crushed between the fingers, these small pieces appear to be brittle.
9. Most importantly, under dry soil conditions, these soil materials are extremely difficult to recognize. This is especially true for the ortstein-like soil materials. Under dry conditions, the darker red color becomes the sole physical property that can be identified in the field.

cc: Local Health Departments
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