

Fragipans in the Northeastern United States.
by D.L. Lindbo and P.L.M. Veneman, 1989.

This report summarizes 40 years of fragipan research. Fragipans occupy 13 percent of the land area. This acreage does not include areas of dense basal till. They formed mostly in colluvium alluvium lacustrine and coastal plain sediments. Dense till areas were eliminated from consideration for fragipans because those soil horizons examined were deemed geogenically dense, not pedogenic. The fragipans have redoximorphic features, clay films, vesicular pores and are massive or platy. Bulk densities range from 1.65 to 2.15 gms/cm³. Densities above and below are lower. They are brittle and they slake when soaked in water. Iron, aluminum and silica contribute to the fragip properties. There does not seem to be a unified theory of pedogenesis. A definition is needed. See figure 2 for particle size distribution of fragipan soils in the United States as summarized by these researchers. Generally, glacial tills having less than 35 percent clay plus silt do not have fragipans. Brittleness is caused by chemical bonding in nonglacial parent materials. It seems to be caused by clay bridging in dense till soils. The soils must be studied to 1.8 meters to permit satisfactory assessment. Better criteria for defining fragipans is necessary.

Occurrence and Characteristics of Fragipans on the Coastal Plains of the Southeastern United States.
by B. R. Smith and R. B. Daniels, 1989.

There are approximately 225,000 acres of soils mapped as having fragipans in this region. Most are in the fine-loamy particle size class. Few have polygons or prisms with roughly vertical bleached faces. Some are reported in North Carolina as being immediately beneath eluvial horizons of poorly drained soils; other areas have them beneath argillic horizons at well drained sites. Plinthite in soils with fragipan soils is unique to this area. There are 1,200,000 acres of soils that have fragipans that are less than 60 percent brittle. A fragic subgroup would be useful for proper classification. The fragipans were called silica hardpans by early researchers. Some horizon designations in this paper limit the fragipan to Ex horizons. It is not clear if Ex and Btx horizons are both considered to be fragipans. Structure is reported as weak subangular blocky, platy or massive. Bulk density is higher than in horizons above and below. The hydraulic conductivity is 1/3 to 1/2 of other horizons. Fragipans are 10 to 44 inches thick. Soil Taxonomy as amended in 1985 restricts Fragic or Fragiaquic Paleudults to less than 5 percent plinthite; there are no such limits on Fragiaquils or Fragiudults. They note that soils with somewhat less than 60 percent brittle matrix behave differently from these with no brittle characteristics. These soils should be noted. A fragic subgroup is needed.

Fragipan Distribution in the South Central States.
by W.H. Hudnall and D. Williams, 1989.

There are 62 series and approximately 11.2 million acres of soils (13.2 percent of the area) identified as having fragipans. These soils occur on old, stable landscapes to young landscapes. Parent materials are loess, cherty limestone, limestone, sandstone, colluvium, alluvium and combinations of these with loess. Particle size classes are