

## ENVIRONMENT &amp; NATURAL RESOURCES

*Soils*

Dr. Gary O'Dell

Much of Kentucky's agricultural prosperity can be attributed to the fertile and productive soils that are found in many regions of the state. Soil is far more than simply dirt. The late Dr. William G. Survant, much-beloved instructor of soil science at the University of Kentucky, always took pains to emphasize the difference. "Soil," he said, "is a complex substance that supports the growth of plants; dirt is what you sweep up off the floor."

To say that soils are complex is no exaggeration: the soil of a region is the result of many factors that interact over time and contribute to the specific characteristics of that soil. Nor should an existing soil be considered as an end product of these processes, because soils continue to develop and evolve. Soils are made up of both inorganic and organic components: mineral particles, decaying organic matter, living organisms, liquid solutions and various gases.

The inorganic substrate can be either residual; derived in place by the decomposition of bedrock through weathering, or transported from elsewhere by wind, water or ice. In Kentucky, most soils are residual, the product of weathered sedimentary rocks such as sandstone, shale, and limestone. Bottomlands along streams contain alluvial deposits of sediments transported by water, and much of the western part of the state is blanketed with a layer of wind-blown dust - loess - that thins out toward the east.

The upper part of this mineral matter is transformed into soil by biological activity at the surface, through which organic matter is incorporated. The mineral component is classed according to particle size as gravel, sand, silt, and clay. The best soils are comprised of 10-20 percent clay with equal pro-

portions of silt and sand, which provides a soil texture that allows both good drainage and nutrient availability. Soils with high clay content are poorly drained, and those with a high sand content tend to be relatively infertile.

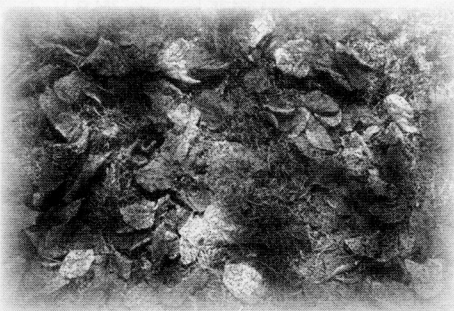
The soils of Kentucky are mainly of three broad groups, inceptisols, ultisols, and alfisols. Inceptisols are immature gray-brown soils associated with young geomorphic surfaces, steep slopes, and resistant parent rock, and occur mainly in the Eastern Coal Field, the Outer Bluegrass and the Western Coal Field.

Ultisols are mature soils, with little humus and a subsurface accumulation of clay. These soils, which occur in the Eastern Coal Field and eastern Mississippian Plateau regions, have a high content of iron and aluminum, which causes their acidic nature and yellow to reddish color. Ultisols tend to be deep,

and are generally of low fertility, although they can be quite productive with the addition of lime and fertilizers.

Alfisols are mature, well-developed soils with a subsurface clay horizon, and occur in the Bluegrass, western section of the Mississippian Plateau, and Mississippian Embayment regions.

The alfisols are among the most productive in Kentucky, and tend to a more basic pH since they are derived from limestone. These soils are light in color and fertile, with a well-balanced and generous availability of nutrients. The high calcium and phosphate content of the soils of the Inner Bluegrass is one important reason that the thoroughbred industry has flourished in this area, for these nutrients tend to develop strong-boned horses.



Source: Sid Webb