Sassafras
Maryland State Soil

Soil Science Society of America

Introduction

Many states have designated an official state bird, flower, fish, tree, rock, etc. Similarly, each state has a state soil. A state soil is a soil that has significance or is very important to the state. The Sassafras soil is the official state soil of Maryland. Let's explore the importance of Sassafras soil to Maryland!

History

The Sassafras soil was one of the first soil series established in the early days of soil survey activities in 1901, making it one of the oldest soil series in the United States. The USDA/Natural Resources Conservation Service (NRCS) has designated Sassafras as a *Benchmar*k and Hall of Fame soil series, which is in recognition of its historical significance in the evolution of soil science in the United States. Sassafras was chosen as the Maryland state soil based on the dominance of soil map unit acreage across a large area of the state. In addition, Sassafras is a high producing soil with few limitations for most uses.

What is Sassafras Soil?

Sassafras soil is a deep, well-drained soil that is easy to work and warms up quickly in the spring. It occurs on upland landscapes on slopes ranging from 0 to 40 percent. It is highly productive under good management. Sassafras soils are suited to practically all uses, except where limited by slope and the risk of erosion. They have few limitations for building sites and moderate limitations for septic tanks filter fields, except where limited by slope.

Except for organic soils, every soil can be separated into three separate size mineral fractions called *sand, silt,* and *clay,* which makes up the *soil texture*. They are present in almost all soils in different proportions and say a lot about the character of the soil. The following paragraph describes a typical Sassafras soil and the texture of each layer or horizon.

Sassafras soil formed in sandy marine and old alluvial (by moving water) sediments of the Coastal Plain *physiographic province*. It consists of a dark brown *sandy loam topsoil or plow layer*, 11 inches thick; a strong brown *sandy clay loam subsoil* in the upper part, and strong brown sandy loam in the lower part with a brownish yellow loamy *sand* substratum (bottom layer). **(Figure 1)**

Fig. 1. Soil profile of a Sassafras soil formed in sandy marine sediments. Credit: USDA-NRCS

Photo Soil Monolith: Chip Clark/Smithsonian Institution

Fig. 2. Location of the Sassafras Series in Maryland extending to the neighboring states of Delaware and New Jersey. Credit: Smithsonian Institution's Forces of change http://forces.si.edu/soils/interactive/state-soils/index.html

Where to Dig Sassafras

Yes, you can dig a soil. It is called a soil pit and it shows you the soil profile. The different horizontal layers of the soil are called soil horizons. This does not mean that other types of soil cannot be found there but that the Sassafras is common. Sassafras soil can be found on the Coastal Plain of Maryland, and has been mapped on nearly 500,000 acres or 7 percent of the land area in the state, encompassing 15 counties. It is a soil that you would dominantly find on the "Eastern Shore" of Maryland **(Figure 2).** In all, there are a total of three hundred named soils (series) in Maryland.

Importance

What makes the Sassafras soil so important is its use and prevalence in the State. One of the top leading industries in Maryland is Agriculture. The state of Maryland has over 12,000 farms, and Sassafras occurs on many of these farms. Sassafras is categorized as a Prime Farmland Soil, which means it is one of the most productive soils in the state in agriculture and forestry.

Uses

In general, soils can be used for agriculture (growing foods, raising animals, stables); engineering (roads, buildings, tunnels); ecology (wildlife habitat, wetlands), recreation (ball fields, playground, camp areas) and more.

In addition to being a very productive soil for growing crops, vegetables and forest products **(Figure 3),** Sassafras is one of the best suited soils to construction and recreational development. It has few limitations for usage.

Fig. 3. Vegetable production on Sassafras sandy loam. Credit: USDA-NRCS.

Limitations

When a soil cannot be used for one or more of the described functions, it is referred to as a limitation. Soil experts, called Soil Scientists, studied Sassafras soil and identified that it has just a few moderate limitations.

Sassafras soil has moderate limitations for septic tank usage due to slower infiltration of the *subsoil* layer. Also, because of its sandy texture, caution should be taken in any kind of excavation, due to the potential of the soil caving in.

Management

Controlling a moderate hazard of erosion and blowing soil is the main management concern. Contour farming, grassed waterways, use of no-till, and use of cover crops in a rotation that includes grasses and legumes will reduce erosion and enhance soil health.

Soil Formation

Before there was soil there were rocks and in between, CLORPT. Without CLORPT, there would be no soil. So, what is CLORPT? There are five factors recognized for influencing development of a soil like the Sassafras soil. It stands for **CL**imate, **O**rganisms, **R**elief, **P**arent material, and **T**ime. CLORPT is responsible for the development of *soil profiles* and chemical properties that differential soils. So, the characteristics of Sassafras (and all other soils) are determined by the influence of CLORPT. Weathering takes place when environmental processes such as rainfall, freezing and thawing act on rocks causing them to dissolve or fracture and break into pieces. CLORPT then acts on rock pieces, marine sediments and vegetative materials to form soils.

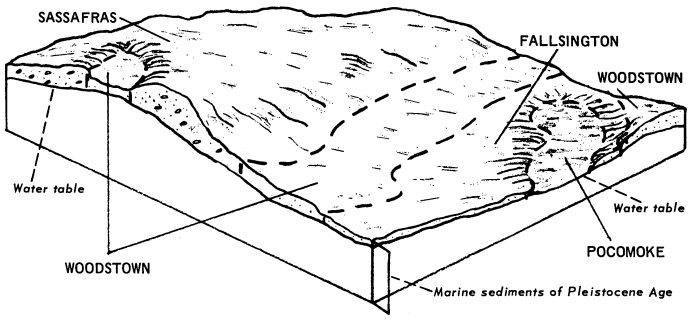

Fig. 4. Sassafras is formed on higher position of the landscape. Credit: USDA-NRCS,

Climate – Temperature and precipitation influence the rate at which parent materials weather and dead plants and animals decompose. They affect the chemical, physical and biological relationships in the soil. The Sassafras soil developed under a warm humid climate with mild temperatures and abundant rainfall. The influence of the two resulted in leaching of soluble bases.

Organisms – This refers to plants and animal life. In the soil, plant roots spread through, animals burrow in and bacteria eat plant and animal tissue. These and other soil organisms speed up the breakdown of large soil particles into smaller ones. Plants and animals also influence the formation and differentiation of soil horizons. Plants determine the kinds and amounts of organic matter that are added to a soil under normal conditions. Animals break down complex compounds into small ones and in so doing add organic matter to soil. Sassafras developed under hardwood or pine forests which deposit leaves, twigs, roots and other plant remains on the surface but these readily degrade and leach through the soil.

Relief – Landform position or relief describes the shape of the land (hills and valleys), and the direction it faces makes a difference in how much sunlight the soil gets and how much water it keeps. Deeper soils form at the bottom of the hill rather than at the top because gravity and water move soil particles downhill. Sassafras soil is well drained because it is formed on the higher position of the landscape **(Figure 4)**.

Parent material (C horizon) – Just like people inherit characteristics from their parents, every soil inherited some traits from the material from which it forms. Some parent materials are transported and deposited by glaciers, wind, water, or gravity. Sassafras soils formed in sandy marine and old alluvial (by moving water) sediments of the Coastal Plain physiographic province.

Time – All the factors act together over a very long time to produce soils. As a result, soils vary in age. The length of time that soil material has been exposed to the soil-forming processes makes older soils different from younger soils. Generally, older soils have better defined horizons than younger soils. Less time is needed for a soil profile to develop in a humid and warm area with dense vegetative cover where the Sassafras soil is than in a cold dry area with sparse plant cover. More time is required for the formation of a well-defined soil profile in soils with fine textured material than in soils with coarse-textured soil material.

Major Land Resource Areas | Maryland

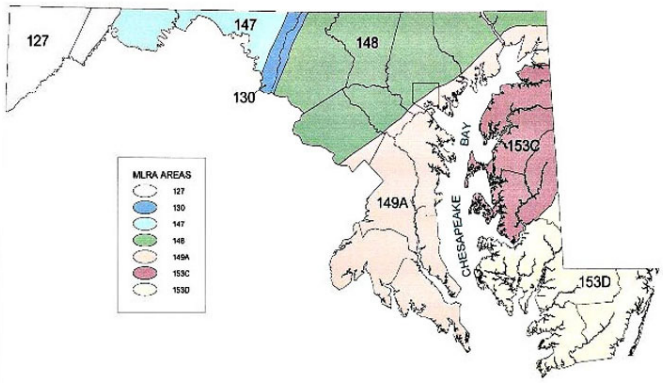

Fig. 5. Sassafras soil occurs in MLRAs 149A, 153C and 153D of the Coastal Plain Physiographic Province. Credit: USDA

MLRAs, Soils and Land Use in Maryland

Maryland can be divided into three well defined physiographic provinces called the Coastal Plain, Piedmont and Appalachian Plateau province. These provinces can be broken down further into seven Major Land Resource Areas (MLRAs) **(Figure 5)**. Sassafras soil occurs in three of the seven MLRAs, all of which are in the Coastal Plain Physiographic Province. Each MLRA has similar soils, water supply, physiography, geology, climate and biological resources. Sassafras soil is divided by the Chesapeake Bay into the eastern and western shores, comprising a total of nearly 5,000 square miles, or about one-half of the area of Maryland.

Within the Coastal Plain province are three MLRAs. They are MLRA 149A, Northern Coastal Plain, MLRA 153C, Mid-Atlantic Coastal Plain, and 153D, Northern Tidewater Area. The composition of the Coastal Plain province consists of relatively unconsolidated layers of sand, silt, clay and some gravel which forms a sedimentary layer over the underlying crystalline rocks. The sands and gravels in these sediments are excavated for construction purposes. The depth of these soils ranges up to 8,000 feet at Ocean City, Maryland, and nearly disappears at the Fall Line as one travels west from the Atlantic Ocean. The nearly level features of this province are very conducive to agriculture, while the soils that developed on this province range from excessively well drained to very poorly drained. The Coastal Plain sediments have been mined for bog iron, glass sand, foundry sand, ceramic and brick clay, and titanium from the mineral ilmenite, in sand deposits.

Glossary

Benchmark soil: Is a soil that is present in large extent in one or more major land resource areas (MLRAs). It is very important in soil classification system, has a large amount of data available, has a special importance to one or more significant land uses, and is of significant ecological importance.

Clay: A soil particle that is less than 0.002 mm in diameter. Clay particles are so fine they have more surface area for reaction. They hold a lot of nutrients and water in the soil. A clay soil is a soil that has 40% or more clay, less than 45% sand and less than 40% or less silt.

Fluviomarine deposits: Of or pertaining to material deposited by oceans and reworked and deposited by streams after exposure.

Horizon: see Soil Horizon

Leaching: The removal of soluble material from soil or other material by percolating water.

Loamy sand: Soil material that is a mixture of between 70-90% sand, up to 30% silt, and less than 15% clay. It has more sand than sandy loam.

Major land resource areas (MLRAs): Geographically associated land resource units. Identification of these large areas is important in statewide agricultural planning and has value in interstate, regional, and national planning. Each MLRA has similar soils, water use, physiography, geology, climate and biological resources. They influence the type of land cover that can exist and the range of land use practices that are possible.

Organic matter: Material derived from the decay of plants and animals. It always contains compounds of carbon and hydrogen.

Physiographic province: Broad-scale subdivisions based on terrain texture, rock type, and geologic structure and history.

Sand: A soil particle between 0.05 and 2.0 mm in diameter. Soil material that is 85% or more sand and the percent silt plus 1.5 times the percent clay is less than 15%.

Sandy loam: Soil material that contains 43% sand, 0-50% silt and less than 7% clay.

Sandy clay loam: Soil material that contains 20-35% clay, less than 28% silt, and 45% or more sand.

Silt: A soil particle between 0.002 and 0.05 mm diameter. As a soil textural class, soil that is 80% or more silt, and less than 12% clay.

Soil Horizon: A layer of soil with properties that differ from the layers above or below it.

Soil Management: The sum total of how we prepare and nurture soil, select type of crops suitable for a type of soil, tend the crop and the soil together, select type of fertilizer and other materials added to the soil so as to maintain productivity and preserve the soil.

Soil Profile: The sequence of natural layers, or horizons, in a soil. It extends from the surface downward to unconsolidated material. Most soils have three major horizons, called the surface horizon, the subsoil, and the substratum.

Soluble bases: Elements (calcium, magnesium, sodium and potassium) that are present in soil as ions and form what is called cation exchange capacity. The amount in the soil can be reduced through leaching

Subsoil (B horizon): The soil horizon rich in minerals that eluviated, or leached down, from the horizons above it. Not present in all soils.

Additional Resources

Soil! Get the Inside Scoop. David Lindbo and others. Soil Science Society of America, Madison, WI.

Know Soil, Know Life. David L. Lindbo, Deb A. Kozlowski, and Clay Robinson, editors. Soil Science Society of America, Madison, WI.

Web Resources

Soils for Teachers—www.soils4teachers.org

Soils for Kids—http://www.soils4kids.org/

Have Questions? Ask a Soil Scientist—https://www.soils.org/ask

Soil Science Society of America—https://www.soils.org/

Natural Resources Conservation Service, Maryland Homepage – www.nrcs.usda.gov/wps/portal/nrcs/site/md/home/

Natural Resources Conservation Service, Soils—www.nrcs.usda.gov/wps/portal/nrcs/main/national/soils/

Natural Resources Conservation Service, K through 6 Educational Resources—www.nrcs.usda.gov/wps/portal/nrcs/main/soils/edu/kthru6/

Maryland Association of Soil Conservation Districts, including Maryland Envirothon—www.mascd.net/

Maryland Soil Conservation Districts—http://mda.maryland.gov/resource_conservation/counties/Maryland's%20Soil%20Conservation%20Districts.pdf

National Association of Conservation Districts. Maryland.—www.nacdnet.org/northeast-region/

References

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Soil Survey of Worcester County, Maryland. www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/maryland/worcesterMD2004/worcesterMD2004.pdf

Web Soil Survey. http://websoilsurvey.nrcs.usda.gov

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