History of the Miami Series in Indiana

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Introduction

In 1900, when the Miami series was established, soil units were differentiated by surface texture alone. The term series had been borrowed from geology where it was used to define a time-stratigraphic group of sedimentary rock formations. The first definition of the term soil series was published in 1903 as "soils with a common feature, i.e., parent rock, and restricted to a physiographic province" (4). In that same year the Miami series was described as soils that were chiefly derived from morainic material of either glacial or alluvial orgin" (4).

In 1904 soil survey field parties were advised that the Miami series was described as "light-colored sand or loam resting on light-colored glacial till or loess" and that it was restricted to areas north of the Ohio River (4). In 1906 the series was redefined as "light-colored upland timbered soils of glacial or loessial regions" (5). The color of the surface layer became a criterion for series differentiation, particularly for those soils in which the vegetational history greatly influenced soil color; therefore, many prairie areas previously mapped as the Miami series were distinguished as the Carrington series. The topographic setting was now required in series descriptions.

In 1914 the Miami series was redefined as soils with a "brown, light brown, or gray surface over yellowish-brown or darker subsoils, on nearly level to rolling topography, with fair to good drainage, on glacial drift parent material" (1). During this period, new criteria for series differentiation were added including, among other features, the organic matter content and reaction of surface soil and subsoil. Increasing attention was paid to describing drainage and to the identification of parent material.

In the early 1920's, soil began to be recognized as a natural body distinct from geological deposits. It was studied through the soil profile, and differentiating criteria were based on soil morphological features. New criteria introduced for series included the structure of the surface layer and subsoil and depth to carbonates. The Miami series description now included mention of a blocky structure in the subsoil and an acid reaction in the surface layer. The soils identified in the Miami series were all located in areas of calcareous parent material.

In the late 1920's and 1930's, new data greatly expanded our knowledge of how soils are formed. A new system of soil horizon designation, which was

indicative of soil genetic processes and behavior, was devised. Horizon thickness, consistency, and permeability were added to the list of series criteria.

The Soil Survey Manual of 1937 (2) defined a soil series as "a group of soils having genetic horizons similar as to differentiating characteristics and arrangement in the soil profile, and developed from a particular type of parent material. Except for texture, especially of the A horizon, the morphological features of the soil profile, as exhibited in the physical characteristics and thicknesses of the soil horizons, are now allowed to vary significantly within a series". During the 1930's and 1940's, the Miami series concept was subjected to a few other minor changes and the parent material was restricted to the calcareous tills of the Wisconsin glacial stage.

In 1950 work began on a new soil classification system, one with a heavy emphasis on the characteristics of the subsoil. Changes in the Miami series definition during this period reflected the application of greater exactitude, including the adoption of standard soil color designations and inclusion of such indicators of soil genetic processes as clay coatings and color variations on and within peds. Family criteria, which separated soils with different mineralogy and restricted the textural range of the control section for a series, provided further standards for separation of soils in the Miami series from the 1950's to the present.

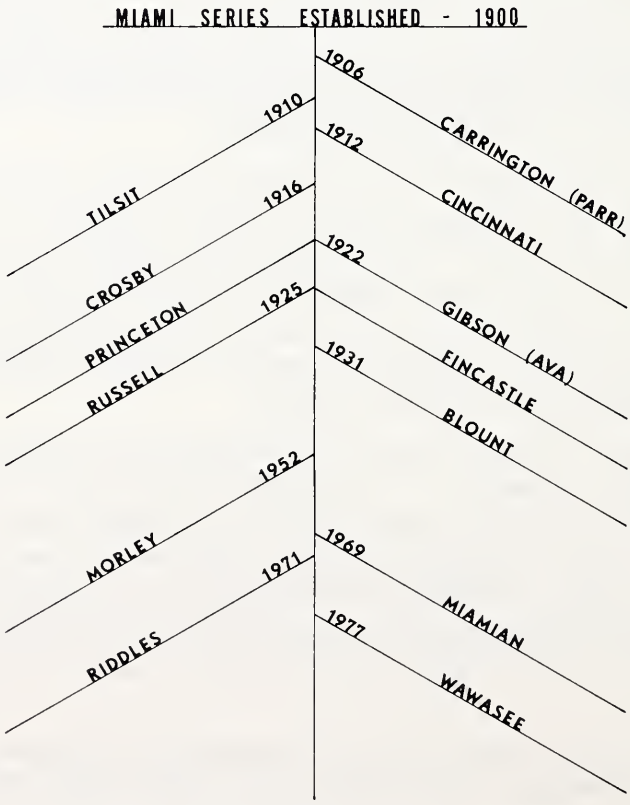

Fig. 1. - - Diagram showing major divisions of the Miami soil series, 1900 to 1978

Miami in Indiana

In Indiana, the major divisions of the Miami series and the times they were made are shown in (Fig. 1). Between 1900 and 1910, many of the upland soils in Indiana and some of the depressions were mapped in the Miami series. The reason for such wide use of one series at that time was the belief that soils were chiefly related to the broad classes of parent materials from which they formed. Most early soil scientists were trained as geologists and had little experience in studying the physical properties of soils or the genetic features responsible for their development.

It was not until much more was known about soils that soil features rather than simply the broad nature and physiography of the soil parent material became the main concern in defining the soil series.

Published reports during this period were very general and maps were broad and of small scale. Allen, Greene, Madison, Marion, Marshall, Newton, Posey, Scott, Tippecaone, and Warrick (Boonville) were counties mapped during this period.

In the Madison County Soil Survey (published in 1903) Miami was conceived in a broad manner to represent 83 percent of the county area. Miami occurred on gently rolling and level areas of glacial gravelly clays. The soils were loams or clay loams grading to clay or clay loam subsoils. These extended from dissected land along streams across the broad interstream divides. Consequently, water ran off much of the land very slowly and large areas were somewhat poorly drained. Many of the dark level to depressional soils were poorly drained, and some of these were separated as Miami black clay loam.

Similar divisions were made of such geologic material in Newton, Marshall, and Tippecanoe Counties. In these counties, soils on deposits of wind-reworked sands were at least partially separated as Miami fine sand or Miami sand.

The Miami series was also characterized in Greene and other southern Indiana counties in a broad manner. The soils in the series were described as being developed in loess. The underlying till or bedrock was recognized but not considered to be a part of the soil. The soils were described as being silty and having more clay in the subsoil than in the surface. Flat areas had gray and mottled subsoils, and the soil on side slopes was yellow or reddish yellow. The description also pointed out the presence of a hardpan in some areas. We now recognize the hardpan layer as a fragipan.

In 1906 the Carrington series was established. This division recognized soils developed under prairie vegetation and had a dark surface layer high in organic matter. Those soils remaining in the Miami series had light colored surfaces and developed under forest vegetation.

In 1910 the Tilsit series was established. This division recognized soils that were associated with sandstone, siltstone, and shale and separated them from the Miami series.

In 1912 the Cincinnati series was established. This division spearated the soils developed in loess capped Illinoian age till from the Miami series. After this, the Miami series was no longer used in surveys south of the south boundary of the Wisconsin age till.

In 1916 the somewhat poorly drained soils were separated from the Miami series and called Crosby. The Crosby series has since been separated into several series including Blount, Fincastle, and Crosier.

In 1922 in the Gibson County soil survey, the Princeton and Gibson (now Ava) series were established and used instead of the Miami series. The Gibson soils were soils that developed in loess where no carbonates were present. The Princeton series included soils that had carbonates in the loess parent material.

In 1925 in the survey of Wayne County, the Russell series was established. The Russell soils were till soils with a significant loess capping. This division left in the Miami series only the soils that developed in Wisconsin age till with thin to no loess capping. The Fincastle series was also established in this survey and was a division of the previously established Crosby series but also had a significant loess capping.

In 1952 the Morley series was established. This series separated the soils with silty clay loam and clay loam parent material from other soils of the Miami series, which had loam or sandy loam parent material. Morley soils also had a more clayey subsoil than Miami.

In 1969 the Miamian series was established. This division separated from the Miami series soils that have more than 35 percent clay in the textural control section (3) and yet overlie loam parent materials. The soils remaining in the Miami series were all in a fine-loamy family.

In 1971 the Riddles series was established. This soil had been recognized and separated from other Miami soils for several years, but a series had not previously been established. The Riddles series separated from the Miami series the soils that were leached of carbonates to more than 40 inches and had a solum more than 40 inches thick. Miami soils are now considered to have a solum less than 40 inches thick and carbonates within a depth of 40 inches.

In 1977 the Wawasee series was established. This division separated from the Miami series the soils that have less clay in the subsoil and are moderately permeable.

Miami Soils in 1978

At present the Miami series consists of deep, well drained soils with a moderately permeable subsoil and moderately slowly permeable underlying material. Miami soils formed in less than 18 inches of loess and in calcareous loam till. They are on uplands and have slopes of 0 to 30 percent.

Taxonomic class: Fine-loamy, mixed, mesic Typic Hapludalfs (3).

Typical Pedon

A1—0 to 3 inches; very dark grayish brown (10YR 3/2) silt loam; moderate medium and coarse granular structure; friable; slightly acid; clear wavy boundary. (1 to 3 inches thick)

A21—3 to 8 inches; brown (10YR 5/3) silt loam; moderate fine medium granular structure; friable; medium acid; clear smooth boundary. (0 to 7 inches thick)

A22—8 to 12 inches; yellowish brown (10YR 5/4) silt loam; weak medium platy structure; friable; medium acid; clear wavy boundary. (0 to 5 inches thick)

IIB21t—12 to 17 inches; dark brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; thin discontinuous pale brown (10YR 6/3) clay films on faces of peds; few pebbles; medium acid; clear smooth boundary. (4 to 7 inches thick)

IIB22t—17 to 25 inches; dark brown (10YR 4/3) clay loam; moderate medium and coarse angular block structure; firm; thin pale brown (10YR 6/3) and dark brown (7.5YR 4/4) continuous clay films on faces of peds and lining some voids; few pebbles; medium acid; clear wavy boundary. (4 to 10 inches thick)

IIB23t—25 to 29 inches; dark brown (10YR 4/3) loam; weak coarse subangular blocky structure; friable; few thin discontinuous dark brown (7.5YR 4/4) clay films on faces of peds and lining some voids; few pebbles; neutral; clear wavy boundary. (3 to 6 inches thick)

IIB3—29 to 36 inches; brown (10YR 5/3) loam; massive; friable; thin discontinuous dark brown (10YR 4/3) clay films; few pebbles; mildly alkaline; slight effervescence; clear irregular boundary. (0 to 8 inches thick)

IIC—36 to 60 inches; light yellowish brown (10YR 6/4) loam till; massive; firm; few pebbles; moderately alkaline; strong effervescence. Range in Characteristics:

Solum thickness 24 to 40 inches
Depth to carbonates less than 40 inches
Texture of surface silt loam or loam
Texture of subsoil typically clay loam with subhorizons which range from silty clay loam to loam
Texture of underlying material in loam

Conclusions

The soils remaining in the Miami series are extensive throughout central and northern Indiana. All divisions of the original Miami series have served a useful purpose. As the scientific knowledge about soils increased, differences among soils within the Miami series became easier to recognize, define and show on maps. Because increased uses of soil survey information required knowledge of soils to greater depths, the need for refinement of the series became more obvious.

As soil technology continues to develop and use of soil information continues to increase, perhaps more divisions of the Miami series will be made.

Acknowledgment

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