SECTION V—SOIL GENESIS, MORPHOLOGY, AND CARTOGRAPHY

Some Physical Changes Accompanying Prairie, Wiesenboden, and Planosol Soil Profile Development from Peorian Loess in Southwestern Iowa

RUDOLPH ULRICH

A study by Hutton (6, 7) revealed the functional relationship of the Peorian, or Wisconsin, loess distribution pattern in southwestern Iowa and certain morphological, chemical, and physical properties of the gently sloping Prairie soils. Hutton's study as well as earlier studies in Illinois by Bray (2, 4) and Smith (13) suggested that functional relationships exist for the associated nearly level Prairie soils, Wiesenboden soils, and Planosols. The data presented here are a portion of an investigation of the level soils to determine the relationships between their genesis and characteristics and the loess distribution pattern. Although several chemical properties were also determined, the data presented for five profiles are largely limited to physical properties.

DEPTH AND DISTRIBUTION OF PEORIAN LOESS

The area studied, as previously described by Hutton (6, 7), consists of about 25 counties in southwestern Iowa. Hutton established two northwest-southeast traverses called No. 1 and No. 2 parallel to what is believed to have been the prevailing wind direction during the time of loess deposition. In this study, Traverse No. 3 was established for the associated nearly level soils. Traverse No. 3 is slightly different in direction than Traverse No. 1 due to the restricted occurrence of suitable level sites with representative profiles.

To ascertain the thickness of the loess along Traverse No. 3, measurements were made with an extension auger at or near each profile site. These data are presented in Table 1. For comparison purposes, the points along Traverse No. 3 have been referred to the same origin as for Traverse No. 1 of Hutton. The data from both Traverse No. 1 and No. 3 are presented in Fig. 1. The two sets of data are in good agreement. Thus the conclusion of Hutton as to the application of his curve for the thickness of loess at varying distances from point of initial deposition seems valid.

MORPHOLOGICAL STUDIES

Profile samples were collected mostly from undisturbed roadside borders now largely in bluegrass sod. These sites were considered representative of virgin-like conditions. In two instances—Minden, P-217; Winterset, P-218—profile samples were taken in cultivated fields.

Soil profile descriptions using Munsell colorations for the profiles in order of increasing development along Traverse No. 3 follow:

Minden silt loam, P-217, location: NW NE NW, Sec. 19, T79N, R39W, Shelby County, site:

A1—0-16 inches, black (10YR 2/1; 4/1 dry) depth to dark grayish brown (10YR 4/2) loam grading to light silty clay loam; fine granular structure.

A1—B1—16-21 inches, very dark brown (10YR 5/2) to dark brown (7/5YR 3/2) light silty clay loam; weakly developed subangular blocky structure; worm casts abundant.

B1—21-31 inches, very dark grayish-brown grading to dark brown (10YR 3/2 to 4/3) light silty clay with weakly developed subangular blocky structure; numerous fine vesicular openings.

G—39-48 inches, pinkish-gray (5YR 6/2) light silty clay loam, with reddish-yellow (5YR 7/4) mottlings; massive structure with some tendency to cleave vertically; fine vesicular openings numerous.


2 Former Graduate Assistant, Department of Agronomy, Iowa State College, Ames, Iowa. The author wishes to express his appreciation to Dr. Frank F. Riecken, under whose direction, guidance, and helpful criticisms, this study was conducted.

3 Figures in parentheses refer to "Literature Cited", p. 295.

4 All colors moist unless otherwise designated.