Soil Survey Investigations Report No. 18

Soil Survey Laboratory Data and Descriptions for Some Soils of...

... INDIANA

SOIL CONSERVATION SERVICE U.S. DEPARTMENT OF AGRICULTURE
In cooperation with
INDIANA AGRICULTURAL EXPERIMENT STATION

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1. SAMPLE COLLECTION AND PREPARATION
   A. Field sampling
      1. Site selection
      2. Soil sampling
         a. Stony soils
   B. Laboratory preparation
      1. Standard (airdry)
         a. Square-hole 2-mm sieve
         b. Round-hole 2-mm sieve
      2. Field moist
      3. Carbonate-containing material
      4. Carbonate-indurated material
2. CONVENTIONS
   A. Size-fraction base for reporting
      1. <2-mm
      2. <size specified
   B. Data-sheet symbols
      tr: trace, not measurable by quantitative procedure used or less than reportable amount
      tr(s): trace, detectable only by qualitative procedure more sensitive than quantitative procedure used
      - : analysis run but none detected
      -(s): none detected by sensitive qualitative test
      blank: analysis not run
      nd: analysis not run
      <: less than reported amount or none present
3. PARTICLE-SIZE ANALYSES
   A. <2-mm fraction (pipet method)
      1. Airdry samples
         a. Carbonate and noncarbonate clay
      2. Moist samples
         a. Carbonate and noncarbonate clay
   B. >2-mm fraction
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      2. Volume estimates
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      1. Saran-coated clods
         a. Field state
         b. Airdry
         c. 30-cm absorption
         d. 1/3-bar desorption I
         e. 1/3-bar desorption II
         f. 1/3-bar desorption III
         g. 1/10-bar desorption
         h. Ovendry
      2. Paraffin-coated clods
         a. Ovendry
      3. Cores
         a. Field moist
      4. Nonpolar-liquid-saturated clods
   B. Water retention
      1. Pressure-plate extraction (1/3 or 1/10 bar)
         a. Sieved samples
         b. Soil pieces
         c. Natural clods
         d. Cores
      2. Pressure-membrane extraction (15 bars)
      3. Sand table absorption
      4. Field state
      5. Airdry
   C. Water-retention difference
      1. 1/3 bar to 15 bars
      2. 1/10 bar to 15 bars
   D. Coefficient of linear extensibility
      1. Dry to moist
   E. Micromorphology
      1. Thin sections
         a. Preparation
         b. Interpretation
         c. Moved-clay percentage
5. ION-EXCHANGE PROPERTIES
   A. Cation-exchange capacity
      1. NH_4OAc, pH 7.0
         a. Direct distillation
         b. Displacement, distillation

5A. Cation-exchange capacity (cont.)
      2. NaOAc, pH 8.2
         a. Centrifuge method
      3. Sum of cations
         a. Acidity by $BaCl_2$-TEA, pH 8.2; bases by NH_4OAc, pH 7.0
      4. KOAc, pH 7.0
      5. $BaCl_2$, pH 8.2
         a. Barium by flame photometry
   B. Extractable bases
      1. NH_4OAc extraction
         a. Uncorrected
         b. Corrected (exchangeable)
      2. KCl-TEA extraction, pH 8.2
   C. Base saturation
      1. NH_4OAc, pH 7.0
      2. NaOAc, pH 8.2
      3. Sum of cations
   D. Sodium saturation (exchangeable Na pct.)
      1. NaOAc, pH 8.2
      2. NH_4OAc, pH 7.0
   E. Sodium adsorption ratio
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   A. Organic carbon
      1. Acid-dichromate digestion
         a. $FeSO_4$ titration
         b. CO_2 evolution, gravimetric
      2. Dry combustion
         a. CO_2 evolution I
         b. CO_2 evolution II
      3. Peroxide digestion
         a. Weight loss
   B. Nitrogen
      1. Kjeldahl digestion
         a. Ammonia distillation
      2. Semimicro Kjeldahl
         a. Ammonia distillation
   C. Iron
      1. Dithionite extraction
         a. Dichromate titration
         b. EDTA titration
      2. Dithionite-citrate extraction
         a. Orthophenanthroline colorimetry
      3. Dithionite-citrate-bicarbonate extraction
         a. Potassium-thiocyanate colorimetry
      4. Pyrophosphate-dithionite extraction
   D. Manganese
      1. Dithionite extraction
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      1. HCl treatment
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         b. Manometric
         c. Weight loss
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         e. Titrimetric
      2. Sensitive qualitative method
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   F. Gysum
      1. Water extract
         a. Precipitation in acetone
   G. Aluminum
      1. KCl extraction I, 30 min
         a. Aluminon I
         b. Aluminon II
         c. Aluminon III
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      2. KCl extraction II, overnight
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         a. Aluminon III
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         a. Aluminon III
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      1. $BaCl_2$-triethanolamine I
         a. Back-titration with HCl
      2. $BaCl_2$-triethanolamine II
         a. Back-titration with HCl
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         a. Back-titration with NaOH
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      1. Saturation extract
         a. Acid titration

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   J. Bicarbonate
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         a. Acid titration
   K. Chloride
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         a. Mohr titration
         b. Potentiometric titration
   L. Sulfate
      1. Saturation extract
         a. Gravimetric, $BaSO_4$
      2. NH_4OAc extraction
         a. Gravimetric, $BaSO_4$
   M. Nitrate
      1. Saturation extract
         a. PDS acid colorimetry
   N. Calcium
      1. Saturation extract
         a. EDTA titration
      2. NH_4OAc extraction
         a. EDTA-alcohol separation
         b. Oxalate-permanganate I
         c. Oxalate-permanganate II Fe, Al, and Mn removed
         d. Oxalate-cerate
      3. NH_4Cl-EtOH extraction
         a. EDTA titration
      4. KCl-TEA extraction
         a. Oxalate-permanganate
   O. Magnesium
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         a. EDTA titration
      2. NH_4OAc extraction
         a. EDTA-alcohol separation
         b. Phosphate titration
         c. Gravimetric, $Mg_2P_2O_7$
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         a. EDTA titration
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      1. Saturation extract
         a. Flame photometry
      2. NH_4OAc extraction
         a. Flame photometry
   Q. Potassium
      1. Saturation extract
         a. Flame photometry
      2. NH_4OAc extraction
         a. Flame photometry
   R. Sulfur
      1. $NaHCO_3$ extraction, pH 8.5
         a. Methylene blue
   S. Total phosphorus
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         a. Molybdovanadophosphoric-acid colorimetry
7. MINERALOGY
   A. Instrumental analysis
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         b. Organic-matter removal
         c. Iron removal
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      2. X-ray diffraction
      3. Differential thermal analysis
   B. Optical analysis
      1. Grain studies
   C. Total analysis
      1. Chemical
      2. X-ray emission spectrography
   D. Surface area
      1. Glycerol retention
8. MISCELLANEOUS
   A. Saturated paste, mixed
      1. Saturation extract
         a. Conductivity
      2. Conductivity, saturated paste
   B. Saturated paste, capillary rise
      1. Saturation extract
         a. Conductivity
   C. pH
      1. Soil suspensions
         a. Water dilution
         b. Saturated paste
         c. KCl
   D. Ratios
      1. To total clay
      2. To noncarbonate clay
      3. Ca to Mg (extractable)

PREFACE

This publication is one in a new U.S. Department of Agriculture series established to preserve and make available technical information resulting from soil survey investigations. These investigations have been going on for about two decades. Data from them have been distributed in unpublished form to those immediately concerned. Some of the data and descriptions have appeared in technical journals, in regional bulletins, in USDA technical bulletins, and in the text of published soil surveys. But most were not available to all who might use them.

We intend to publish in this series all data from the soil survey laboratories that form reasonably complete characterizations of soils. Already-assembled data and descriptions will be published just as rapidly as they can be prepared for printing. Fragmentary data collected as reference points for specific soil surveys will not be included.

While these data were being assembled, there were many changes in laboratory methods. Some were improved and some new ones were devised. Consequently, laboratory data for different soils cannot always be directly compared without allowance for the method.

The method used is indicated by symbol in the column headings of the data table. These symbols are identified in the code sheet on the opposite page. Each method is described in the first number of this series, "Soil Survey Laboratory Methods and Procedures for Collecting Soil Samples," SSIR No. 1.

Ways of describing soils have also changed. Soil descriptions have become explicit on more and more features. The systems for designating horizons and for classifying soils have been changed.

The soil descriptions published here were prepared as working documents to meet a specific need of a soil survey at the time the soil samples were collected. The soil scientists who wrote them had no idea they would be published. Editing has been limited for the most part to that necessary for conformance to the "Soil Survey Manual." Field textural estimates have been retained, even though some are at variance with the laboratory data, because the field estimates themselves are important data.

There were several reasons for sampling these soils. Some were sampled to study soil genesis, some to facilitate classification, and some to obtain data to permit more useful interpretations. Those sampled for genesis or classification studies do not always fit neatly into our present concepts of soil series. Partly because of these studies, our concepts of some soil series have been modified. As a consequence, the soil series name assigned a soil at the time of sampling is not always the name that would be assigned today. Soil series names in this publication follow 1965 series definitions.

Soil Survey
Soil Conservation Service

INDIANA

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SOIL SURVEY LABORATORY Lincoln, Nebr. 1/23/58

SOIL TYPE Alford silt loam **LOCATION** Knox County, Indiana

SOIL NOS. S56Ind-42-1 **LAB. NOS.** 5489-5495

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-6	Ap	0.2a	0.4a	0.3a	0.5a	1.6a	84.2	12.8	44.9	41.2	Tr.	sil
6-9	A2		0.3a	0.4a	0.6a	1.6a	84.7	12.4	44.5	42.1	-	sil
9-13	B1	0.1a	0.4a	0.2a	0.4a	1.1a	76.1	21.7	35.3	42.1	-	sil
13-22	B21t	-	-	-	0.2a	1.0a	69.3	29.5	35.2	35.2	-	sicl
22-32	B22t	-	-	-	0.1a	1.4a	71.3	27.2	39.6	33.2	-	sicl
32-48	B3	-	-	-	-	1.3a	76.2	22.5	43.7	33.8	-	sil
48-55+	C	-	-	-	-	0.8a	79.3	19.9	44.8	35.3	-	sil

DEPTH INCHES	pH 8C1a 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
0-6	6.7			0.86	.084	10						5.2
6-9	6.3			0.85	.084	10						5.2
9-13	6.5			0.33	.046	7						8.2
13-22	6.5			0.17	.034							12.1
22-32	5.6			0.12	.027							11.1
32-48	4.8			0.10								9.3
48-55+	4.8			0.08								8.6

DEPTH INCHES	5A1a CATION EXCHANGE CAPACITY ← NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	5B1a 6Q2a K	BASE SAT. % NH_4Ac EXCH. 5C1	5C3 Base Sat. % on Sum Cations	5B1a Sum Bases	5A3a Sum Cations	8D3 Ca/Mg	MOISTURE AT SATURATION %
		milliequivalents per 100g. soil				→			← me/100g. →			
0-6	8.2	6.7	1.6	4.4	-	0.4	100	66	8.7	13.1	4.2	
6-9	8.6	5.6	1.8	3.2	-	0.3	90	71	7.7	10.9	3.1	
9-13	10.4	7.0	2.6	4.1	0.1	0.3	96	71	10.0	14.1	2.7	
13-22	15.6	8.2	4.6	5.8	0.1	0.4	85	70	13.3	19.1	1.8	
22-32	14.4	5.4	4.3	8.2	0.1	0.4	71	55	10.2	18.4	1.2	
32-48	12.0	3.6	3.4	8.2	0.1	0.3	62	47	7.4	15.6	1.0	
48-55+	11.5	3.5	3.7	7.4	0.1	0.3	66	51	7.6	15.0	0.9	

a. Common irregular dark brown concr. (Mn-Fe?)

Soil Type: Alford silt loam
Soil Nos.: S56Ind-42-1
Location: Knox County, Indiana. T4N, R9W, Grant No. 120, NW 1/4, SE 1/4.
Vegetation: Wheat stubble with good growth of lespedeza.
Drainage: Well drained.
Erosion: Slight.
Relief: 2 percent slope.
Collected by: O. C. Rogers, G. Walker, and A. Beavers, November 2, 1956.
Described by: O. C. Rogers.

Horizon and Lincoln Lab. No.	
Ap 5489	0 to 6 inches. Dark grayish brown to brown (10YR 4/2 to 4/3 moist) silt loam; weak medium granular structure; friable when moist; abrupt smooth boundary.
A2 5490	6 to 9 inches. Brown to dark grayish brown (10YR 5/3 to 4/2 moist) silt loam; penetration of Ap into top of layer along root channels and worm casts; moderate thin platy structure; friable when moist; clear wavy boundary.
B1 5491	9 to 13 inches. Brown to dark brown (7.5YR 4/4 moist) heavy silt loam; very few peds coated with brown to pale brown (10YR 5/3 to 6/3 moist); a few very thin coatings of very dark brown (10YR 2/2 moist); moderate fine subangular blocky structure; slightly firm when moist; clear wavy boundary.
B21t 5492	13 to 22 inches. Brown (7.5YR 4/4 moist) heavy silt loam to light silty clay loam; numerous thin dark reddish brown (5YR 3/4 to 3/3 moist) clay skins; some coatings of very dark brown (10YR 2/2 moist); moderate to strong coarse subangular blocky structure that breaks into fine subangular blocky structure; firm when moist; gradual wavy boundary.
B22t 5493	22 to 32 inches. Brown (7.5YR 4/4 moist) light silty clay loam to heavy silt loam; clay skins of dark reddish brown (5YR 3/4 moist) are less numerous than in the above horizon; numerous very dark brown (10YR 2/2 moist) coatings and streaks that increase with depth; moderate to weak coarse and very coarse subangular blocky structure; firm when moist; gradual wavy boundary.
B3 5494	32 to 48 inches. Brown (7.5YR 4/4 moist) silt loam; a few dark reddish brown (5YR 3/3 to 3/4 moist) clay skins; very few coatings and streaks of light brownish gray (10YR 6/2 moist), pale brown (10YR 6/3 moist), and very dark brown (10YR 2/2 moist); weak to very weak very coarse subangular blocky structure; friable when moist; gradual wavy boundary.
C 5495	48 to 55 inches plus. Brown (7.5YR 4/4 moist) silt loam; an occasional thin crack filled with light brownish gray (10YR 6/2 moist); massive; friable.

Mineralogy (Method 7A2): X-ray diffraction analyses on the B horizons showed the clay to be dominantly montmorillonite with lesser amounts of illite and some kaolinite.

SCS-421
10-64 (Rev. 9-66)

U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Alford silt loam SOIL Nos. 48Ind-61-4 LOCATION Parke County, Indiana

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 55707 - 55714

Depth (In.)	Horizon	181b Total Sand (2-0.05)	Silt (0.05-0.002)	Clay (< 0.002)	Size class and particle diameter (mm) 3A1 Sand: Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Silt: (0.05-0.02)	Int. III (0.02-0.002)	Int. II (0.2-0.02)	(2-0.1)		3B2 Cm	Coarse fragments 3B1: 2A2 ≥ 2 Pct.	2-19	19-76
		Pct. of < 2 mm															Pct. of < 76mm	
1/4-0																		
0-3			83.3	14.4	0.1	0.3	0.4	0.6	0.9		55.0	29.6				-		
3-12			82.5	15.4	0.1	0.2	0.3	0.6	0.9		55.5	28.2				-		
12-15			76.1	22.5	-	0.1	0.2	0.4	0.7		51.8	25.2				-		
15-29			68.8	30.1	-	-	0.1	0.2	0.8		43.0	26.7				-		
29-38			68.3	27.3	-	-	0.1	0.6	3.7		38.5	33.9				-		
38-72			76.0	20.6	-	-	-	0.2	3.2		33.7	45.6				-		
72+			40.9	25.5	1.7	3.9	6.1	13.0	8.9		26.1	31.0				7		

Depth (In.)	6A1a Organic carbon Pct	Nitrogen Pct.	C/N		Carbonate as $CaCO_3$ Pct.	Ext. iron as Fe Pct.	Bulk density: g/cc	4A1e ⅓ bar g/cc	4A1h Oven dry g/cc	4D1 COLE	Water content: Pct.	4B1c ⅓ bar Pct.	4B2 15 bar Pct.		4C1 WRD in/in	pH:	8C1c (1:1) KCl	8C1a (1:1) H_2O [a]
1/4-0	-																	6.6
0-3	1.63																	6.0
3-12	0.87																	5.8
12-15	0.34																	5.5
15-29	0.18																	4.8
29-38	0.08																	4.7
38-72	0.07																	4.8
72+	0.06																	5.7

Depth (In.)	Extractable bases 5B1a: 8N2d Ca	8O2b Mg	8P2a Na	8Q2a K	Sum	6H2a Ext. acidity	CEC: 5A3a Sum cations		6G1d Ext Al		Ratios to clay: CEC Sum	Ext iron	15-bar water	8D3 Ca/Mg		Base saturation: 5C3 Sum cations Pct.	5C1 NH_4OAc Pct
	meq/100 g																

Depth (In.)	Clay Fraction Analysis 7A1b-d: Mt	Chl	Vm	Mi	Int.	Qtz	Kl	Gibbsite	
	7A2 X-ray						7A3		

a 1/4-0 pH value is for 1:4 dilution.

Mt. = Montmorillonite, Chl = chlorite, Vm. = Vermiculite, mi = mica, Int. = interstratified layer, Qtz. = quartz, Kl. = Kaolinite

Relative amounts: blank = not determined, dash = not detected, tr. = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant

Soil Type: Alford silt loam
Soil No.: 48Ind-61-4
Location: Parke County, Indiana. SE 1/4 SE 1/4 Sec. 22, T 15 N, R 7 W.

Horizon and Beltsville Lab. No.	
55707	1/4 to 0 inches. Very dark gray (10YR 3/1) somewhat granular leaf mold containing leaves in all stages of decomposition. Practically no roots present. pH 7.0.
55708	0 to 3 inches. Brown (10YR 4/3) silt loam, fine crumb structure. Tendency to platiness. Full of feeder roots. Friable when wet. Varies in thickness. pH 6.5.
55709	3 to 12 inches. Dark grayish brown (10YR 4/2) silt loam. Platy structure. Fewer roots present than layer above. Grades into layer below. This layer varies in thickness from 7 to 10 inches. pH 6.3.
55710	12 to 15 inches. Yellowish brown (10YR 5/6) light silty clay loam. Medium crumb structure with slight tendency to platiness. Many roots present. Rather plastic when moist. pH 6.0.
55711	15 to 29 inches. Dark yellowish brown (10YR 4/4) silty clay loam. Medium subangular blocky structure. In the bank some tendency toward columnar structure is shown. More roots present than layer below. This layer varies considerably in thickness, often much thicker. Plastic when wet. Grades into underlying layer. pH 5.2.
55712	29 to 38 inches. Yellowish brown (10YR 5/4) light silty clay loam. Medium subangular blocky structure. Some roots present in this layer. Quite plastic when moist. Grades into layer below. pH 5.2.
55713	38 to 72 inches. Yellowish brown (10YR 5/4) medium platy structure silt faintly mottled with pale brown (10YR 6/3) splotches. The plates break down into a fine to medium crumb structure. Rather friable. pH 5.4.
55714	72 inches plus. Yellowish brown (10YR 5/4) heavy silt loam till. Slightly mottled with very pale brown (10YR 8/4). Massive blocky structure. Some igneous pebbles present. pH 5.8.

SOIL SURVEY LABORATORY Lincoln, Nebr. 1/23/58

SOIL TYPE Alford silt loam **LOCATION** Posey County, Indiana

SOIL NOS. S56Ind-65-1 **LAB. NOS.** 5496-5505

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-2	A1	0.4a	2.0a	0.8a	1.3a	1.6a	86.7	7.2	37.1	51.9	-	si
2-4	A21	0.1a	0.3a	0.2a	0.4a	1.0a	84.8	13.2	36.0	50.0	-	sil
4-10	A22	-	0.1a	0.2a	0.2a	0.8a	83.0	15.7	36.2	47.7	-	sil
10-15	B1	-	0.1a	0.1a	0.3a	0.8a	79.6	19.1	35.9	44.7	-	sil
15-19	B21t	-	-	-	0.1a	0.8a	73.0	26.1	34.2	39.7	-	sil
19-31	B22t	-	-	-	0.1a	1.0a	69.8	29.1	37.4	33.5	-	sicl
31-37	B23	-	-	-	0.1a	1.7a	74.3	23.9	42.4	33.7	-	sil
37-49	B3	-	-	-	0.2a	1.7a	78.0	20.1	45.5	34.3	-	sil
49-66+	C	-	-	-	0.2a	1.5a	78.1	20.2	49.3	30.4	-	sil
112-118		-	-	-	-	2.2a	87.4	10.4	56.7	32.9	-	si

8C1a pH 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM /25°C.	6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
6.6			3.63	.303	12							12.0
6.4			2.10	.209	10							9.1
6.0			0.85	.096	9							7.0
5.0			0.40	.053	8							7.4
4.8			0.24	.041								10.3
4.8			0.17	.030								12.2
4.7			0.15									10.4
4.7			0.11									9.2
4.7			0.11									8.9
6.6			0.08					-				5.0

5A1a CATION EXCHANGE CAPACITY ← NH4Ac	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K	5B1a BASE SAT. % NH4Ac EXCH.	5C1	5C3 Base Sat. % on Sum Cations	5B1a Sum Bases	5A3a Sum Cations		8D3 Ca/Mg	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →								me/100g. →				
19.2	15.0	3.3	4.9	-	0.5	98		79	18.8	23.7		4.5	
14.4	9.4	3.4	4.5	-	0.3	91		74	13.1	17.6		2.8	
9.4	4.8	2.0	5.7	0.1	0.2	76		55	7.1	12.8		2.4	
9.3	3.8	1.9	5.3	0.1	0.2	64		53	6.0	11.3		2.0	
13.3	4.3	2.9	9.2	0.1	0.3	57		45	7.6	16.8		1.5	
16.3	5.3	4.0	10.1	0.1	0.4	60		49	9.8	19.9		1.3	
14.1	4.2	3.8	9.7	0.1	0.3	60		46	8.4	18.1		1.1	
12.4	3.3	3.2	9.2	0.1	0.2	55		43	6.8	16.0		1.0	
11.6	3.0	2.9	8.2	0.2	0.2	54		43	6.3	14.5		1.0	
7.0	4.2	2.9	1.6	0.1	0.1	100		82	7.3	8.9		1.4	

a. Common irregular dark brown concr. (Mn-Fe?)

Soil Type: Alford silt loam
Soil Nos.: S56Ind-65-1
Location: Posey County, Indiana. T5S, R13W, Sec. 31, NE 160, NW 40, NW 10. 85 feet west and 110 feet south of State Highway No. 69 and T road.
Vegetation: Maple, tulip, beech, and elm.
Drainage: Well drained.
Erosion: Slight to none.
Relief: 3 to 4 percent slope.
Collected by: O. C. Rogers, J. K. Ableiter, November 1, 1956.
Described by: O. C. Rogers.

Horizon and Lincoln Lab. No.	
A1 5496	0 to 2 inches. Very dark grayish brown (10YR 3/2 moist) silt loam; weak fine granular structure; friable when moist; numerous fine feeder tree roots; abrupt smooth boundary. 1/4 to 2 inches of accumulation of recent leaves on surface, very few last year's leaves present.
A21 5497	2 to 4 inches. Dark grayish brown to dark gray (10YR 4/2 to 4/1 moist) silt loam; some penetration of A1 in wormholes and along small cracks; weak fine subangular blocky structure; friable when moist; abrupt smooth boundary.
A22 5498	4 to 10 inches. Brown (10YR 4/3 moist) silt loam; penetration of A1 in root channels and worm casts; weak to moderate fine subangular blocky structure; friable when moist; abrupt smooth boundary.
B1 5499	10 to 15 inches. Yellowish brown (10YR 5/4 to 5/6 moist) silt loam; moderate fine subangular blocky structure; friable when moist; clear smooth boundary.
B21t 5500	15 to 19 inches. Brown (7.5YR 4/4 moist) heavy silt loam; very thin coating of light brownish gray to pale brown (10YR 6/2 to 6/3 moist) on most peds; dark brown (7.5YR 4/4 to 4/2 moist) clay skins are common; moderate medium and coarse subangular blocky structure; firm when moist; clear wavy boundary.
B22t 5501	19 to 31 inches. Brown to strong brown (7.5YR 4/4 to 5/6 moist) light silty clay loam; dark brown (7.5YR 4/3 moist) clay skins are common; pale brown (10YR 6/3 dry) occurs along vertical cracks; cracks up to 1/8 inch in diameter decrease with depth; a few very dark brown (10YR 2/2 moist) thin coatings and streaks present; weak medium prismatic to moderate to strong coarse subangular blocky structure; very hard when dry and firm when moist; clear wavy boundary.
B23 5502	31 to 37 inches. Strong brown (7.5YR 5/6 moist) light silty clay loam; reddish brown (5YR 4/3 moist) clay skins are numerous; yellowish brown (10YR 5/4 moist), light gray (10YR 7/2 dry) streaks and crack filling; cracks are up to 1/4 inch in diameter; numerous very dark brown (10YR 2/2 moist) thin coatings and streaks; moderate coarse and very coarse subangular to very weak coarse prismatic structure; very hard when dry and firm when moist; gradual wavy boundary.
B3 5503	37 to 49 inches. Brown to strong brown (7.5YR 4/4 to 5/6 moist) silt loam; a few reddish brown (5YR 4/3 moist) clay skins; very few very dark brown (10YR 2/2 moist) thin coatings and streaks; a few thin coatings and a few crack fillings of brown (10YR 5/3 moist) light gray (10YR 7/2 dry); very weak very coarse subangular blocky structure; very hard when dry and friable when moist; gradual wavy boundary.
C 5504	49 to 66 inches plus. Brown to strong brown (7.5YR 4/4 to 5/6 moist) silt loam; a few streaks of brown (10YR 5/3 moist); massive; hard when dry and friable when moist.
5505	112 to 118 inches. Auger sample.

Mineralogy (Method 7A2): X-ray diffraction analyses on the B horizons showed the clay to be dominantly montmorillonite with lesser amounts of illite and some kaolinite.

SCS-421
10-64 (Rev. 9-66)

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL: Bedford silt loam SOIL Nos.: 52 LOCATION: Floyd County, Indiana

SOIL SURVEY LABORATORY: Beltsville, Maryland LAB Nos.: 551033 - 551041

Depth (In.)	Horizon	1B1b Total: Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Size class and particle diameter (mm) 3A1 — Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: (0.05–0.02)	Int III (0.02–0.002)	Int II (0.2–0.02)	(2–0.1)		3B2 Cm	Coarse fragments 3B1: 2A2 ≥ 2 Pct.	2–19	19–76
		Pct of < 2 mm														Pct.	Pct. of < 76mm	
0-8	A1		78.4	15.8	0.9	1.9	0.9	1.0	1.1		47.7	32.8				-		
8-12	A2		72.3	23.5	0.8	1.2	0.7	0.7	0.8		45.9	27.5				-		
12-17	B1		69.9	26.4	0.6	1.2	0.5	0.6	0.8		44.5	26.5				-		
17-21	B21		68.9	27.0	0.8	1.4	0.5	0.6	0.8		43.8	26.1				-		
21-27	B22		68.3	24.1	2.4	2.3	0.7	0.9	1.3		44.1	25.9				-		
27-34	Bx1		67.7	26.6	1.4	1.6	0.6	0.9	1.2		44.2	25.2				-		
34-40	Bx2		62.3	31.9	1.3	3.2	0.3	0.7	0.3		41.4	21.3				-		
40-66	IIC1		48.2	40.8	2.7	4.2	0.4	1.7	2.0		32.5	18.4				-		
66-84	IIC2		60.7	29.5	2.9	3.8	0.3	1.4	1.4		37.3	25.3				-		
84-132	IIC3		18.0	62.8	0.7	2.2	0.4	7.4	8.5		10.6	21.5				-		
132+	IIC4		33.2	54.4	1.2	2.5	0.7	2.2	5.8		25.6	14.6				-		

Depth (In.)	6A1a Organic carbon Pct	Nitrogen Pct.	C/N		Carbonate as $CaCO_3$ Pct.	Ext. iron as Fe Pct.	Bulk density: g/cc	4A1e ⅓ bar g/cc	4A1h Oven dry g/cc	4D1 COLE	Water content: Pct.	4B1c ⅓ bar Pct.	4B2 15 bar Pct		4C1 WRD in/in	pH:	8C1c (1:1) KCl	8C1a (1:1) H_2O
0-8	1.24																	6.8
8-12	0.26																	6.1
12-17	0.13																	4.5
17-21	0.10																	4.4
21-27	0.05																	4.5
27-34	0.02																	4.4
34-40	0.02																	4.6
40-66	0.05																	4.7
66-84	0.01																	4.5
84-132	0.05																	4.9
132+	0.05																	4.9

Depth (In.)	Extractable bases 5B1a: 6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum	6H1a Ext. acidity	CEC: 5A3a Sum cations		6G1d Ext Al			Ratios to clay: CEC Sum	Ext. iron	15-bar water	8D3 Ca/Mg		Base saturation: 5C3 Sum cations Pct	5C1 NH_4OAc Pct
	meq/100 g																	
0-8	8.0	0.9	0.1	0.2		10.1	19.3										48	
8-12	5.6	1.6	0.1	0.2		3.1	10.6										71	
12-17	3.8	1.3	0.1	0.2		3.8	9.2										59	
17-21	3.2	1.3	0.1	0.2		8.8	13.6										35	
21-27	2.5	1.5	0.1	0.2		10.7	15.0										29	
27-34	1.0	1.5	0.1	0.2		11.5	14.3										20	
34-40	1.3	1.8	0.1	0.2		12.2	15.6										22	
40-66	1.7	3.0	0.1	0.2		12.3	17.3										29	
66-84	1.1	2.2	0.1	0.2		10.4	14.0										26	
84-132	8.2	3.7	0.2	0.5		12.2	24.8										51	
132+	5.4	4.0	0.1	0.2		11.6	21.3										46	

Depth (In.)	Clay Fraction Analysis 7A1b-d: Mt.	Chl.	Vm.	Mi	Int.	Qtz.	Kl	Gibbsite	
	7A2 X-ray						7A3		

Mt. = Montmorillonite, Chl = chlorite, Vm = Vermiculite, mi = mica, Int. = Interstratified layer, Qtz. = quartz, Kl. = Kaolinite

Relative amounts: blank = not determined, dash = not detected, tr = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant.

Soil Type: Bedford silt loam
Soil No.: 52
Location: Floyd County, Indiana. NE 1/4 SW 1/4 SW 1/4 sec. 11, T. 2 S., R. 5 E., 87.5 miles from the Wabash River, along the southern traverse.
Physiography: 17 inch loess over residium from cherty limestone.

Horizon and Beltsville Lab. No.	
A1 551033	0 to 8 inches. Brown (10YR 5/3), silt loam, smooth, containing iron concretions.
A2 551034	8 to 12 inches. Yellowish brown (10YR 5/6), silt loam, mostly smooth (< 2 percent grit), containing iron concretions.
B1 551035	12 to 17 inches. Brownish yellow (10YR 6/8), light silty clay loam, mostly smooth (< 5 percent grit), containing iron concretions.
B21 551036	17 to 21 inches. Brownish yellow (10YR 6/8) light silty clay loam, gritty (about 5 percent grit), containing iron concretions.
B22 551037	21 to 27 inches. Mottled very pale brown (10YR 7/3), brownish yellow (10YR 6/6), and very dark brown (10YR 2/2), light silty clay loam, gritty, containing iron concretions.
Bx1 551038	27 to 34 inches. Mottled light gray (10YR 7/1), yellowish brown (10YR 5/6), and very dark brown (10YR 2/2), silty clay loam, gritty, containing iron concretions.
Bx2 551039	34 to 40 inches. Mottled light gray (10YR 7/1), strong brown (7.5YR 5/8), and very dark brown (10YR 2/2), heavy silty clay loam, gritty, containing iron concretions.
IIC1 551040	40 to 66 inches. Mottled yellowish red (5YR 5/8), strong brown (7.5YR 5/8), and pale yellow (2.5Y 8/4), silty clay, gritty, iron concretions.
IIC2 551041	66 to 84 inches. Mottled reddish yellow (7.5YR 6/8), brown (7.5YR 4/4), brownish yellow (10YR 6/6), and very dark brown (10YR 2/2), silty clay loam, gritty, containing iron concretions.
IIC3	84 to 132 inches. Mottled yellowish red (5YR 5/8), strong brown (7.5YR 5/8) and yellow (2.5Y 8/8), heavy silty clay (or clay), very gritty.
IIC4	132 inches plus.

SCS-421
10-64 (Rev. 9-66)

U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Bedford silt loam SOIL Nos. 50 LOCATION Washington County, Indiana

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 551015 - 551023

Depth (In)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand Very coarse (2–1)	Sand Coarse (1–0.5)	Sand Medium (0.5–0.25)	Sand Fine (0.25–0.1)	Sand Very fine (0.1–0.05)	Silt (0.05–0.02)	Silt Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)		3B2 Cm	Coarse fragments 3B1 2A2 ≥ 2 Pct.	2 – 19	19 – 76
		Pct. of < 2 mm														Pct. of < 76mm		
0-4	A1		78.0	14.0	0.3	0.7	0.6	3.1	3.3		45.0	38.6				-		
4-7	A2		72.0	22.7	0.1	0.3	0.3	2.0	2.6		44.9	31.4				-		
7-10	B1		70.9	23.9	-	0.4	0.2	2.0	2.6		44.1	31.0				-		
10-15	B21		69.5	24.8	0.1	0.3	0.3	2.2	2.8		41.8	32.4				-		
15-28	B22		64.0	24.3	0.8	0.8	0.4	4.2	5.5		40.5	32.4				-		
28-36	B23		57.1	26.1	1.2	1.2	0.6	6.1	7.7		37.0	32.9				-		
36-48	IIC1		53.8	30.5	0.3	0.9	0.6	6.4	8.2		35.1	31.7				-		
48-60	IIC2		51.4	33.2	0.3	0.4	0.5	6.3	7.9		33.1	31.5				-		
60-72	IIC3		53.6	27.4	0.2	0.7	0.7	7.5	9.9		33.9	36.0				-		
72-90	IIC4		53.9	31.3	0.1	0.4	0.5	5.8	8.0		34.0	32.9				-		
90-112	IIC5		45.4	23.2	0.4	1.2	1.1	12.7	16.0		30.0	42.1				-		

Depth (In)	6A1a Organic carbon Pct	Nitrogen Pct	C/N		Carbonate as $CaCO_3$ Pct.	Ext. iron as Fe Pct.	Bulk density g/cc	Bulk density 4A1e ⅓ bar g/cc	Bulk density 4A1h Oven dry g/cc	4D1 COLE	Water content g/cc Pct.	Water content 4B1c ⅓ bar Pct.	Water content 4B2 15 bar Pct.		4C1 WRD in/in	pH 8C1c (1:1) KCl	pH 8C1a (1:1) H_2O
0-4	0.96																7.2
4-7	0.33																6.9
7-10	0.22																6.7
10-15	0.12																6.6
15-28	0.06																4.8
28-36	0.10																4.7
36-48	0.06																4.7
48-60	0.05																4.7
60-72	0.06																4.8
72-90	0.09																4.8
90-112	0.04																4.8

Depth (In.)	Extractable bases 5B1a 6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum	6H1a Ext. acidity	CEC 5A3a Sum cations		6G1d Ext. Al			Ratios to clay CEC Sum	Ext. iron	15-bar water	8D3 Ca/Mg		Base saturation 5C3 Sum cations Pct.	5C1 NH_4OAc Pct.
	meq/100 g																	
0-4	8.0	1.5	tr.	0.2		2.2	11.9										82	
4-7	6.7	tr.	0.1	0.2		2.6	9.6										73	
7-10	6.8	0.9	0.1	0.2		2.8	10.8										74	
10-15	7.2	1.1	0.1	0.2		3.3	11.9										72	
15-28	3.8	1.6	0.1	0.2		6.9	12.6										45	
28-36	2.3	1.1	0.1	0.2		8.2	11.9										31	
36-48	1.8	1.2	0.1	0.2		8.6	11.9										28	
48-60	1.8	1.5	0.1	0.2		8.8	12.4										29	
60-72	1.1	1.4	0.1	0.2		7.5	10.3										27	
72-90	2.8	1.7	0.2	0.2		8.2	13.1										37	
90-112	6.0	1.0	0.1	0.2		6.0	13.3										55	

Depth (In.)	Clay Fraction Analysis 7A1b-d Mt	Chl	Vm.	Mi	Int	Qtz.	Kl.	Gibbsite	
	7A2 X-ray						7A3		

Mt. = Montmorillonite, Chl. = chlorite, Vm. = Vermiculite, mi = mica, Int. = Interstratified layer, Qtz = quartz, Kl. = Kaolinite

Relative amounts: blank = not determined, dash = not detected, tr. = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant.

Soil Type: Bedford silt loam
Soil No.: 50
Location: Washington County, Indiana. SW 1/4 SW 1/4 NW 1/4 sec. 26, T. 1 N., R. 2 E., 68.9 miles from the Wabash River, along the southern traverse.
Physiography: 28 inch loess over residium from cherty limestone.

Horizon and Beltsville Lab. No.	
A1 501015	0 to 4 inches. Brown (10YR 5/3), silt loam, mostly smooth (about 4 percent very fine to fine sand), very few iron concretions.
A2 501016	4 to 7 inches. Light brown (7.5YR 6/4), silt loam, mostly smooth, (about 3 percent grit, mostly very fine sand), a few iron concretions.
B1 501017	7 to 10 inches. Strong brown (7.5YR 5/6) slightly heavy silt loam, mostly smooth (about 2 percent fine to medium sand), containing iron concretions.
B21 501018	10 to 15 inches. Strong brown (7.5YR 5/6), heavy silt loam, mostly smooth (about 2 to 3 percent very fine to fine sand), containing iron concretions.
B22 501019	15 to 28 inches. Reddish yellow (7.5YR 6/5), silty clay loam, mostly smooth (about 4 percent very fine to medium sand), containing iron concretions.
B23 501020	28 to 36 inches. Yellowish red (5YR 5/8) mottled with light yellowish brown (10YR 6/4), silty clay loam, gritty (about 10 percent sands), containing iron concretions.
IIC1 501021	36 to 48 inches. Yellowish red (5YR 5/8) mottled with light yellowish brown (10YR 6/4), light silty clay loam, gritty, containing iron concretions.
IIC2 501022	48 to 60 inches. Red (2.5YR 5/6) mottled with very pale brown (10YR 7/3), heavy silt loam, gritty, containing iron concretions.
IIC3 501023	60 to 72 inches. Mottled strong brown (7.5YR 5/6), light yellowish brown (10YR 6/4), and red (2.5YR 5/6), silt loam, gritty, containing iron concretions.
IIC4	72 to 90 inches. Mottled strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6), silt loam, gritty, containing iron concretions.
IIC5	90 to 112 inches. Mottled red (2.5YR 5/8) and reddish yellow (5YR 6/7), silt loam, gritty, containing iron concretions.

SCS-421
10-64 (Rev. 9-66)

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL: Bethel silt loam SOIL Nos.: WW-1 LOCATION: Wayne County, Indiana

SOIL SURVEY LABORATORY: Beltsville, Maryland LAB. Nos.: 531552 - 531560

Depth (In.)	Horizon	1B1b Total: Sand (2-0 05)	Silt (0.05-0.002)	Clay (< 0.002)	Size class and particle diameter (mm) 3A1 — Sand: Very coarse (2-1)	Coarse (1-0 5)	Medium (0 5-0 25)	Fine (0.25-0.1)	Very fine (0 1-0 05)	Silt: 0.05-0 02	Int. III (0.02-0 002)	Int. II (0.2-0.02)	(2-0.1)		3B2 Cm	Coarse fragments 3B1: 2A2 > 2 Pct	2 - 19	19-76
		Pct of < 2 mm															Pct. of < 76mm	
0-2	A1		67.8	14.5	1.1	2.9	3.5	6.4	3.8		42.0	33.0				1		
2-5	A21		68.8	14.1	0.7	2.7	3.4	6.3	4.0		41.0	35.1				0		
5-11	A22g		67.9	16.9	0.9	2.6	2.8	5.3	3.6		42.4	31.9				1		
11-15	B1t		64.7	23.7	0.4	1.5	2.1	4.3	3.3		38.9	31.4				1		
15-19	B21t		52.9	33.2	0.4	1.4	2.3	5.6	4.2		32.5	27.7				2		
19-23	IIB22t		27.8	37.9	1.6	4.5	6.6	13.4	8.2		16.9	26.4				3		
23-27	IIB23t		15.7	32.2	2.0	6.2	11.4	22.8	9.7		8.7	28.3				9		
27-31	IIB3t		20.1	27.4	1.4	3.4	8.0	28.4	11.3		11.1	35.0				3		
31-43	IIC		39.6	17.4	5.0	6.5	6.7	14.1	10.7		22.1	36.1				15		

Depth (In.)	6A1a Organic carbon Pct.	Nitrogen Pct	C/N		Carbonate as $CaCO_3$ Pct.	Ext iron as Fe Pct.	Bulk density: 4A1e ⅓ bar g/cc	4A1h Oven dry g/cc	4D1 COLE	Water content: Pct.	4B1c ⅓ bar Pct.	4B2 15 bar Pct.		4C1 WRD in/in	pH:	8C1c (1:1) KCl	8C1a (1:1) H_2O
0-2	4.39																5.4
2-5	.69																4.6
5-11	.34																4.9
11-15	.22																4.8
15-19	.21																5.0
19-23	.20																6.2
23-27	.30																7.1
27-31	.26																7.7
31-43	.18																

Depth (In.)	Extractable bases 5B1a: 6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum	6H1a Ext. acidity	CEC: 5A3a Sum cations		6G1d Ext. Al		Ratios to clay: CEC Sum	Ext. iron	15-bar water	8D3 Ca/Mg		Base saturation: 5C3 Sum cations Pct.	5C1 NH_4OAc Pct
	meq/100 g																
0-2	1.0	2.2	tr.	0.3		11.2	14.7									24	
2-5	1.1	0.4	tr.	0.1		10.2	11.8									14	
5-11	1.6	0.5	tr.	0.1		8.0	10.2									22	
11-15	3.3	2.0	0.1	0.2		9.2	14.8									38	
15-19	7.7	5.2	0.1	0.4		8.6	22.0									61	
19-23	12.3	8.2	0.2	0.4		5.4	26.7									80	
23-27	11.6	7.9	0.1	0.3		3.4	23.3									85	
27-31	10.2	6.1	0.1	0.3		3.8	20.5									81	
31-43																	

Depth (In.)	Clay Fraction Analysis 7Alb-d: Mt.	Chl.	Vm.	Mi.	Int.	Qtz.	Kl.	Gibbsite
	X-ray 7A2						DTA 7A3	
0-2	x		xxxx	x			x	
2-5	x		xxxx	x			x	
5-11	x		xxxx	x			xx	
11-15	xx		xxx	xx			x	
15-19	xxx		xx	xx			x	
19-23	xxx		xx	xx			x	
23-27	xxx		xx	xx			x	
27-31	xx		xx	xxx			x	
31-43								

Mt. = Montmorillonite, Chl. = chlorite, Vm = Vermiculite, mi = mica, Int. = interstratified layer, Qtz = quartz, Kl = Kaolinite

Relative amounts: blank = not determined, dash = not detected, tr. = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant.

Soil Type: Bethel silt loam
Soil No.: WW-1
Location: Wayne County, Indiana. Woodlot at the south edge of Earlham College Dairy farm, NE 1/4 of NW 1/4 of S 18, Twp. 13 N., Range 1 W.
Vegetation and land use: Beech, elm, ash, and oak forest.
Sampled: October 8-12, 1953.

Horizon and Beltsville Lab. No.	
A1 531552	0 to 2 inches, gray (10YR 6/1-5/1) to light gray (10YR 7/1) silt loam; weak, fine, granular structure; friable.
A21 531553	2 to 5 inches, grayish brown (2.5Y 5/2) silt loam; massive to weak, thin, platy structure; friable.
A22g 531554	5 to 11 inches, grayish brown (10YR 5/2) to light brownish gray (10YR 6/2) silt loam; common, medium mottles of yellowish brown (10YR 5/4) and few, fine mottles of weak red (2.5YR 4/2); massive to very weak, platy structure; slightly hard, friable.
B1t 531555	11 to 15 inches, pale brown (10YR 6/3) heavy silt loam; common, medium mottles of brown (7.5YR 5/4); few streaks of white silt loam; weak, medium, subangular blocky structure; slightly hard, friable.
B21t 531556	15 to 19 inches, brown (7.5YR 5/4) silty clay loam; common, medium, very dark gray (N 3/) mottles; moderate, coarse and very coarse, subangular blocky structure; hard; peds coated with grayish brown (10YR 5/2) silt loam.
IIB22t 531557	19 to 23 inches, yellowish brown (10YR 5/4) heavy clay loam; weak, very coarse, prismatic, breaking to moderate, coarse, blocky structure; hard; thin, very dark grayish brown (10YR 3/2) clay skins on surfaces of peds.
IIB23t 531558	23 to 27 inches, dark brown (10YR 4/3) or dark yellowish brown (10YR 4/4), heavy clay loam; weak, very coarse, prismatic, breaking to moderate, coarse, subangular blocky structure; hard; thick, very dark grayish brown (10YR 3/2-3/3), clay skins on surfaces of peds.
IIB3t 531559	27 to 31 inches, brownish gray (2.5Y 5/2) loam, light gray (2.5Y 7/2) to pale yellow (2.5Y 7/4) when dry; massive, breaking to coarse, blocky structure; hard; thin, continuous, very dark grayish brown (10YR 3/2) coatings of clay on blocky peds.
IIC 531560	31 to 43 inches, gray brown (2.5Y 5/2) to light olive brown (2.5Y 5/4) loam, light gray (2.5Y 7/2) to pale yellow (2.5Y 7/4) when dry; massive, breaking to coarse, blocky structure; hard; very thin, discontinuous films of clay on blocky peds; calcareous.

Notes: Colors refer to moist soils unless indicated otherwise.

SOIL SURVEY LABORATORY Mandan, N. D.

OIL TYPE Blount silt loam **LOCATION** Allen Co., Indiana

MSL NOS: 3888-3891
BSL NOS: 551429-432

SOIL NOS. S-55-Ind-2-11 **LAB. NOS.**

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-8	ABp	0.7	1.9	3.2	8.1	7.7	48.2	30.2	26.3	34.5	-	cl
8-17	B2t	0.4	1.0	1.4	4.1	4.9	44.2	44.0	18.3	33.4	-	sic
17-24	B3t	0.9	1.4	1.6	4.3	5.1	45.3	41.4	18.3	34.9	-	sic
24-+	C	2.5	1.9	1.7	4.7	5.5	45.4	38.3	19.6	34.3	-	sicl

pH 8C1a 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6S1a % Total P	6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
6.5			1.58	.141	11	0.044	-				
7.0			0.45	.046	10	0.045	-				
7.4			0.45	.047	10	0.054	-				
7.8			0.37	.044	8	0.050	8				

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6Q2b Mg	6H1a H	6P2a Na	6Q2a K	Base Sat. % NH_4Ac Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Bases	5A3a Sum Cations	8D3 Ca/Mg	MOISTURE AT SATURATION %
←	milliequivalents per 100g. soil				→			← me/100g →			
18.8	13.1	3.4	5.2	0.2	0.3		76	17.0	22.2	3.9	
22.7	16.8	6.2	3.4	0.2	0.2		87	23.4	26.8	2.7	
20.5	15.9	6.0	2.6	0.2	0.2		90	22.3	24.9	2.6	
16.9		5.4	0.8	0.3	0.2						

Soil Type: Blount silt loam
Soil Nos.: S55Ind-2-11
Location: NW 1/4 of NW 1/4 of Sec. 28, T32N, R15E, Allen County, Indiana. The sample site is 495 feet south of north section line, 180 feet west of Ohio Line.
Topography: Level, 1 percent slope.
Physiography: Lake plain.
Drainage: Imperfect.
Vegetation: Wheat.
Field No.: Legend No. 2732.
Beltsville Lab. Nos.: 551429-551432.
Described by: James V. Anderson, October 1955.

Horizon and Mandan Lab. No.	
ABp 3888	0 to 8 inches. Dark grayish brown (10YR 4/2) with few small distinct mottles of yellowish brown (10YR 5/8 moist) silt loam; weak fine granular structure; hard when dry; pH 6.6.
B2t 3889	8 to 17 inches. Dark grayish brown (2.5Y 4/2) with many medium distinct mottles of grayish brown (10YR 5/2 moist) silty clay; strong fine angular blocky structure; firm when moist; pH 7.2.
B3t 3890	17 to 24 inches. Grayish brown (2.5Y 5/2) with many large distinct mottles of dark yellowish brown (10YR 4/4 moist) silty clay; strong medium angular blocky structure; firm when moist; pH 7.4.
C 3891	24 inches plus. Grayish brown (2.5Y 5/2) with many large distinct mottles of dark yellowish brown (10YR 4/4) and common medium prominent mottles of light gray (10YR 7/1 moist) silty clay loam; weak fine angular blocky structure; firm when moist; strong effervescence with 2N HCl.

SOIL SURVEY LABORATORY Mandan, N. D.

SOIL TYPE Blount silt loam **LOCATION** Allen Co., Indiana

SOIL NOS. S-55-Ind-2-12 **LAB. NOS.** MSL NOS: 3892-3896 BSL NOS: 551433-437

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-5	Ap	1.6	2.9	3.2	5.8	5.5	61.8	19.2	30.3	40.3	-	sil
5-8	B1t	0.8	2.1	2.5	4.7	4.3	48.5	37.1	21.3	34.1	-	sicl
8-16	B2t	1.0	1.9	2.2	3.9	4.1	50.0	36.9	21.3	35.1	-	sicl
16-22	B3t	1.5	2.6	2.4	4.6	4.4	46.3	38.2	20.3	33.1	-	sicl
22-+	C	2.3	2.9	1.9	5.4	5.1	44.0	38.4	19.4	32.8	-	sicl

pH 8C1a 1:1	1:5	1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6S1a % Total P		6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
6.8			1.75	.145	12	0.039		-				
5.1			0.57	.068	8	0.031						
5.5			0.37	.049	8	0.026						
7.5			0.34	.045	8	0.031		1				
7.9			0.39	.045	9	0.044		17				

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	5B1a 6Q2a K	5C1 Base Sat. % NH_4Ac Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Bases	5A3a Sum Cations		8D3 Ca/Mg	MOISTURE AT SATURATION %
←	milliequivalents per 100g. soil →							← me/100g. →				
13.5	9.6	2.8	4.4	0.1	0.2	94	74	12.7	17.1		3.4	
19.3	8.3	3.3	11.6	0.2	0.2	62	51	12.0	23.6		2.5	
20.6	11.7	4.7	7.8	0.1	0.3	82	68	16.8	24.6		2.5	
21.9	20.1	6.2	3.2	0.1	0.3		89	26.7	29.9		3.2	
14.8		4.6	-	0.1	0.2							

Soil Type: Blount silt loam
Soil Nos.: S55Ind-2-12
Location: SW 1/4 of SW 1/4, Sec. 6, T29N, R15E, Allen County, Indiana. Sample site is 500 feet west, 85 feet north of southeast corner of Sec. 6.
Topography: Level, 1 percent slope.
Physiography: Lake plain.
Drainage: Imperfect.
Vegetation: Wheat.
Field No.: Legend No. 2732.
Beltsville Lab. Nos.: 551433-551437.
Described by: James V. Anderson, October, 1955.

Horizon and Mandan Lab. No.	
Ap 3892	0 to 5 inches. Dark grayish brown (10YR 4/2 moist) silt loam; cloddy structure; soft when dry; pH 6.8.
B1t 3893	5 to 8 inches. Dark grayish brown (2.5Y 4/2) with common medium distinct mottles of dark yellowish brown (10YR 4/4 moist) silty clay loam; moderate medium granular structure; firm when moist; pH 5.7.
B2t 3894	8 to 16 inches. Dark grayish brown (10YR 4/2) with many medium distinct mottles of dark yellowish brown (10YR 4/4 moist) silty clay; weak fine prismatic structure which breaks to moderate fine angular blocky structure; firm when moist; pH 6.8.
B3t 3895	16 to 22 inches. Very dark grayish brown with few medium faint mottles of dark yellowish brown (10YR 4/4 moist) silty clay; moderate fine angular blocky structure; firm when moist; pH 7.4.
C 3896	22 inches plus. Dark grayish brown (2.5Y 4/2) with few medium faint mottles of dark yellowish brown (10YR 4/4 moist) silty clay loam; strong effervescence with 2N HCl.

Remarks: The C horizon also has mottles of segregated lime.

SOIL SURVEY LABORATORY Mandan, N. D.

SOIL TYPE Blount silt loam **LOCATION** Allen Co., Indiana

SOIL NOS. S-55-Ind-2-14 **LAB. NOS.** MSL NOS: 3902-3906 BSL NOS: 551443-447

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	3A1 2A2 > 2 (10mm.)	TEXTURAL CLASS
0-9	Ap	0.5	1.6	1.8	5.8	6.5	65.3	18.5	28.4	46.8	-	sil
9-13	B1t	0.5	1.1	1.4	4.5	5.0	57.7	29.8	22.7	42.6	-	sicl
13-18	B21t	0.3	1.1	1.2	4.0	4.4	42.3	46.7	16.9	32.2	-	sic
18-27	B22t	0.9	1.9	2.0	6.8	3.9	37.7	46.8	16.7	29.1	-	c
27-+	C	2.1	3.3	2.8	7.3	4.7	43.6	36.2	19.9	33.0	5	sicl

8C1a pH 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST'D SALT (BUREAU CUP)		6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
6.0			2.34	.158	15							
4.9			0.62	.062	10							
4.7			0.47	.062	8							
5.4			0.55	.059	9							
7.8			0.41	.047	9			18				

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K	5B1a	5C1 Base Sat. % NH_4Ac Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Bases	5A3a Sum Cations		8D3 Ca/Mg	MOISTURE AT SATURATION %
←	milliequivalents per 100g. soil					→			(me/100g	→			
14.8	9.2	2.2	7.1	0.1	0.3		80	62	11.8	18.9		4.2	
13.8	4.5	2.0	11.1	0.1	0.2		49	38	6.8	17.9		2.2	
22.0	6.7	4.0	15.2	0.1	0.4		51	42	11.2	26.4		1.7	
20.3	9.9	5.5	8.8	0.1	0.3		78	64	15.8	24.6		1.8	
13.1		5.6	0.6	0.1	0.2								

Soil Type: Blount silt loam
Soil Nos.: 855Ind-2-14
Location: NW 1/4 of NE 1/4 of Sec. 20, T29N, R14E, Allen County, Indiana. The sample site is 235 feet south, 205 feet north of center of north side of Sec. 20.
Topography: Level, 1 percent slope.
Physiography: Upland till plain or shallow edge of lake plain.
Drainage: Imperfect.
Vegetation: Oats.
Field No.: Legend No. 142 SM.
Beltsville Lab. Nos.: 551443-551447.
Described by: James V. Anderson, October, 1955.

Horizon and Mandan Lab. No.	
Ap 3902	0 to 9 inches. Very dark grayish brown (10YR 3/2) with many large distinct mottles of brown (10YR 5/3 moist) silt loam; weak very fine crumb structure; loose when dry; pH 6.0.
B1t 3903	9 to 13 inches. Brown (10YR 5/3) with few medium faint mottles of dark yellowish brown (10YR 4/4 moist) silty clay loam; moderate fine subangular blocky structure; friable when moist; pH 5.0.
B21t 3904	13 to 18 inches. Dark grayish brown (10YR 4/2) with common medium faint mottles of dark yellowish brown (10YR 4/4 moist) silty clay; weak medium prismatic structure breaking to moderate medium angular blocky structure; firm when moist; pH 5.2.
B22t 3905	18 to 27 inches. Dark grayish brown (10YR 4/2) with common medium faint mottles of dark yellowish brown (10YR 4/4 moist) silty clay; weak coarse prismatic structure which breaks to weak coarse angular blocky structure; very firm when moist; pH 6.6.
C 3906	27 inches plus. Dark grayish brown (2.5Y 4/2) with many medium distinct mottles of dark yellowish brown (10YR 4/4 moist) silty clay loam; weak medium angular blocky structure; firm when moist; effervesces strongly with 2N HCl.

Remarks: The mottles in the Ap horizon are accounted for by the fact that this field has only been in cultivation for two years and the A1 and A2 horizons are not yet thoroughly mixed. The thickness of the "smear" on this profile is 13 inches.

SOIL SURVEY LABORATORY Lincoln, Nebr. December 1959

SOIL TYPE Celina loam **LOCATION** Miami County, Indiana

SOIL NOS. S59Ind-52-1 **LAB. NOS.** 11744-11750

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 (<19mm.)	TEXTURAL CLASS
0-4	A1	2.8	4.6	8.9	21.3	11.2	40.1	11.1	35.2	26.1	4	l
4-11	A2	1.7	3.3	6.2	17.3	11.7	46.0	13.8	36.7	30.0	Tr.	l
11-16	B1t	2.1	3.8	6.4	19.7	12.8	31.6	23.6	35.0	20.2	4	l
16-26	B21t	1.7	3.2	5.6	21.0	14.8	25.4	28.3	37.7	14.7	3	scl
26-31	B22t	2.9	3.2	5.0	16.0	12.6	30.3	30.0	33.2	18.7	4	cl
31-35	C1	3.6a	4.9a	6.8a	18.2a	12.7a	34.1	19.7	36.0	20.6	7	l
35+	C2	4.6a	6.1a	7.9a	21.9a	13.5a	34.3	11.7	40.0	19.8	15	fsl

pH 8C1a 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	ORGANIC MATTER 6E1a NITROGEN %	ORGANIC MATTER C/N	6C1a Free Iron % Fe_2O_3		6E1a $CaCO_3$ equivalent %	GYPSUM me./100g SOIL	MOISTURE TENSIONS 1/16 ATMOS. %	MOISTURE TENSIONS 1/3 ATMOS. %	MOISTURE TENSIONS 4B2 15 ATMOS. %
6.4			6.58	0.404	16	0.9						14.2
5.8			0.29	0.036	8	1.1						5.4
5.4			0.21	0.033		2.0						9.4
6.6			0.20	0.031		2.3		<1				11.4
7.1			0.27	0.038	7	2.2		<1				12.3
8.1			0.23	0.030		1.5		15				8.5
8.3			0.16	0.019		1.1		24				5.0

5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K	5B1a	5C1 Base Sat. % NH_4OAc Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Ext. Bases	5A3a Sum Ext. Cations	8D3 Ca/Mg		MOISTURE AT SATURATION %
←	milliequivalents per 100g. soil					→			← me/100g. →				
24.9	22.5	2.7	8.2	<0.1	0.3		102	76	25.5	33.7	8.3		
6.6	3.8	1.0	4.2	<0.1	0.1		74	54	4.9	9.1	3.8		
11.8	6.6	2.0	7.2	<0.1	0.2		74	55	8.8	16.0	3.3		
16.0	11.6	3.8	4.5	0.1	0.2		98	78	15.7	20.2	3.0		
17.2	13.1	4.3	3.2	0.1	0.2		103	85	17.7	20.9	3.0		
9.5		2.8	<0.1	0.1	0.1								
4.3		1.2	<0.1	<0.1	0.1								

a. Few carbonates. Limestone fragments?

Soil Type: Celina loam
Soil Nos.: S59Ind-52-1
Location: SW 1/4 of SE 1/4, Sec. 31, T29N, R5E at northwest corner of Little Church on State Road 16, Miami County, Indiana. Site, cut along an abandoned railroad grade.
Vegetation and Use: Deciduous woods, trees consisting of walnut, ash, beech, sugar maple, American elm, hickory, buckeye, etc.
Slope and Land Form: Gently undulating till plain with slope at site of about 1 to 2 percent.
Drainage and Permeability: Moderately well drained to somewhat imperfectly drained. Runoff is slow. Permeability is moderate.
Parent Material: Loam to coarse clay loam till calcareous at 24 to 42 inches.
Collected by: A. L. Zachary, D. F. Post, and H. P. Ulrich for laboratory data to be presented on the International Congress of Soil Science Society Tour, 1960.
Described by: H. P. Ulrich, August 3, 1959.

Horizon and Lincoln Lab. No.	
A1 11744	0 to 4 inches. Very dark grayish brown (10YR 3/2) loam; moderate fine granular structure; friable; neutral; abrupt smooth to wavy boundary one to four inches thick; fibrous roots abundant. Colors for moist conditions here and below.
A2 11745	4 to 11 inches. Pale brown (10YR 6/3) loam with numerous dark gray to gray (10YR 4/1 to 5/1) worm casts and thin patchy light brownish gray (10YR 6/2) clay coatings on the structure faces; moderate fine to medium platy structure; firm; medium acid; clear wavy boundary 5 to 9 inches thick.
B1t 11746	11 to 16 inches. Very pale brown (10YR 7/4) to yellow (10YR 7/6) fine loam to coarse clay loam; moderate, fine to medium subangular blocky structure; slightly firm when moist; hard when dry, slightly plastic and sticky when wet; strongly acid; clear wavy boundary 4 to 6 inches thick. This horizon appears mottled when dry due to many very pale brown (10YR 8/3) coatings on the very pale brown (10YR 7/4) matrix.
B21t 11747	16 to 26 inches. Brown (10YR 5/3) to yellowish brown (10YR 5/6) clay loam with thick light brownish gray (10YR 6/2) to pale brown (10YR 6/3) coatings on ped faces; moderate, medium and coarse angular blocky structure; firm when moist, plastic and sticky when wet, hard when dry; medium acid; clear wavy boundary 7 to 12 inches thick.
B22t 11748	26 to 31 inches. Grayish brown (10YR 5/2) clay loam with thick (1 to 2 mm.) very dark grayish brown (10YR 3/2) clay coatings on ped faces; strong medium to coarse angular blocky structure; firm when moist, plastic and sticky when wet; neutral; clear wavy boundary 3 to 8 inches thick.
C1 11749	31 to 35 inches. Yellowish brown (10YR 5/4) loam to coarse clay loam; massive to weak coarse subangular blocky structure; friable to slightly firm; calcareous.
C2 11750	35 inches plus. Pale brown (10YR 6/3) loam; massive; friable to slightly firm; calcareous.

SOIL SURVEY LABORATORY Lincoln, Nebr. July 1961

SOIL TYPE Crosby silt loam **LOCATION** Fountain County, Indiana

SOIL NOS. S59-Ind-23-2 **LAB. NOS.** 12423-12431

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 (<19mm.)	TEXTURAL CLASS
0-6	Ap	1.2a	2.6a	2.1b	3.4b	1.9b	72.3	16.5	27.6	48.2	4	sil
6-8	A2	0.2a	1.2a	0.9a	1.4b	1.1b	66.3	28.9	21.2	46.9	-	sicl
8-12	IIB1t	<0.1	0.2a	0.2a	0.4c	0.6b	54.0	44.6	16.3	38.5	-	sic
12-19	IIB21t	<0.1	0.2a	0.2a	0.4a	0.4c	52.4	46.4	17.3	35.7	-	sic
19-26	IIB22t	0.3	0.8	1.3	2.2	1.2	56.9	37.3	23.4	35.7	Tr.	sicl
26-34	IIB3t	1.2	2.6	5.2	10.2	6.0	44.8	30.0	27.4	27.8	4	cl
34-45	IIC1	4.0d	4.3d	5.6d	12.1d	7.3d	45.8	20.9	27.9	31.1	13	l
45-54	IIC2	3.5d	5.4d	6.4d	12.7d	7.0d	43.5	21.5	27.0	29.5	10	l
26-29	Lens	1.0	4.0	8.5	13.4	5.0	40.1	28.0	28.4	21.8	13	cl

8C1a pH 1:1	6E1a Carbonate as $CaCO_3$ %	3A1a Carbonate Clay %	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6C1a Free Iron % Fe_2O_3	BULK DENSITY 4A1c 30-cm. g/cc	4A1h Oven-Dry g/cc	WATER CONTENT 4C1 1/3-Bar to 15-Bar %	4B3 30-cm %	4B1b 1/3-Bar pieces %	4B2 15-Bar %
5.5			1.06	0.105	10	1.9						7.3
4.8			0.29	0.046	6	2.1						12.0
4.5			0.33	0.046	7	2.2		1.61	9.7		28.8	19.1
4.5			0.29	0.038	8	2.3	1.38	1.73	8.4	29.7	29.2	20.8
5.5			0.25	0.034	7	2.2	1.52	1.77	5.9	24.1	22.7	16.8
7.5	3		0.21			1.6	1.70	1.80	8.4	15.4	20.4	12.0
8.1	26		0.16			1.1	1.91	1.96	6.5	12.9	14.4	7.9
8.1	23	3	0.15			1.1						8.0
6.6	< 1		0.20			1.8						11.5

5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 6N2b Ca	6Q2b Mg	6H1a H	6P2a Na	6Q2a K	5B1a 5C1 Base Sat. % NH_4OAc Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Ext. Bases	5A3a Sum Ext. Cations	8D3 Ca/Mg	6G2a KCl-Ext. Al	8D1 CEC me per 100g. Clay
		milliequivalents per 100g. soil						me/100g.			me/100g.	
11.0	8.2	1.2	5.1	<0.1	0.2	87	65	9.6	14.7	6.8	<1	67
15.3	8.0	3.0	9.1	0.1	0.4	75	56	11.5	20.6	2.7	2	53
26.1	12.4	6.3	15.2	0.1	0.6	74	56	19.4	34.6	2.0	5	58
30.1	14.5	9.8	12.7	0.2	0.8	84	66	25.3	38.0	1.5	3	65
24.8	13.6	9.2	6.7	0.1	0.8	96	78	23.7	30.4	1.5	<1	66
13.7		6.8	1.5	0.1	0.4						<1	46
6.2		3.3	<0.1	<0.1	0.2							30
6.0		2.8	<0.1	<0.1	0.2							28
16.7	10.1	6.8	3.2	0.1	0.4	104	84	17.4	20.6	1.5		60

a. Many Fe-Mn.
b. Few Fe-Mn.
c. Common Fe-Mn.
d. Few carbonates.

Soil Type: Crosby silt loam
Soil Nos.: S59Ind-23-2
Location: Fountain County, Indiana; NW 1/4 of SE 1/4, Sec. 15, T18N, R7W, 4 miles east of Yeddo, 3-1/4 miles north of Parke County, 200 feet west, 150 feet north of quarter corner.
Vegetation: Clover.
Drainage and Permeability: Somewhat poorly (imperfectly) drained; slow permeability.
Slope: Nearly level, slight concave slopes.
Parent Material: Loam to clay loam glacial till, Wisconsin Age.
Collected by: Robert B. Grossman, Keith Hoffman, November 10, 1959.
Described by: Robert B. Grossman and A. R. Grunewald, November 10, 1959.

Horizon and Lincoln Lab. No.	
Ap 12423	0 to 6 inches. Dark grayish brown (10YR 4/2) silt loam; massive; friable; slightly acid (pH 6.2); roots common; boundary abrupt and smooth.
A2 12424	6 to 8 inches. Grayish brown (10YR 5/2) heavy silt loam mottled with yellowish brown (10YR 5/6); mottles are common medium and distinct; weak medium platy structure; friable to firm; medium acid (pH 5.6); roots few; boundary clear and wavy.
IIB1t 12425	8 to 12 inches. Gray (10YR 5/1) silty clay loam mottled with yellowish brown (10YR 5/8); mottles are common medium and distinct; moderate fine angular blocky structure; plastic; medium acid (pH 5.4); roots few; no Fe-Mn aggregates; boundary clear and smooth.
IIB21t 12426	12 to 19 inches. Gray (10YR 5/1) heavy silty clay loam mottled with yellowish brown (10YR 5/8); mottles are common fine and distinct; weak fine angular blocky structure; plastic and slightly sticky to sticky; medium acid (pH 5.6); few very fine voids; few soft to hard Fe-Mn aggregates (2 to 3 mm. diameter); roots few.
IIB22t 12427	19 to 26 inches. Gray (10YR 5/1) silty clay loam mottled with yellowish brown (10YR 5/4); weak to moderate medium blocky structure; plastic and slightly sticky; slightly acid (pH 6.2); ped surfaces gray (10YR 5/1); voids in ped interior commonly coated with very dark grayish brown (10YR 3/2) clay films; border surrounding voids is gray (10YR 5/1); grayness more pronounced on vertical planes; faint broken clay films on ped surfaces; few soft Fe-Mn aggregates 2 to 3 mm. in diameter; roots few to common; boundary abrupt and wavy.
IIB3t 12428	26 to 34 inches. Grayish brown (10YR 5/2) silty clay loam mottled with yellowish brown (10YR 5/6) with some yellowish brown (10YR 5/4) and brown (10YR 5/3); weak coarse prismatic structure; very firm; upper 1/3 of horizon is clay loam and more uniformly mottled with yellowish brown; many very fine voids and common fine voids, many of which are tubular; grayish brown (10YR 5/2) around larger voids, very dark grayish brown (10YR 3/2) clay films along natural cleavage planes and on walls of voids in ped interiors; few roots largely restricted to vertical planes; mildly alkaline (pH 7.5); abrupt wavy boundary.
12431	Lens from 26 to 29 inches.
IIC1 12429	34 to 45 inches. Light olive brown (2.5Y 5/4) clay loam with pockets of silty clay loam; massive; very firm; mottled with yellowish brown (10YR 5/6), grayish brown (10YR 5/2) and gray (10YR 5/1); mottles are common medium and distinct to faint; highly variable effervescence; carbonate-rich seams with some portions between seams noncalcareous; black (10YR 2/1) coatings common on surfaces of larger voids and in seams; few fine voids; boundary abrupt and wavy.
IIC2 12430	45 to 54 inches. Reddish gray (5YR 5/2) heavy loam grading to light olive brown (2.5Y 5/4) light clay loam in lower part; massive; firm; 1/4 inch to 1 inch diameter scattered seams of gray (5Y 6/1) silty clay loam; yellowish brown (10YR 5/8) along edges of seams; firm; calcareous; seams have same carbonate content but less sand.
IIC3	54 inches plus. Light olive brown (2.5Y 5/4) heavy loam to light clay loam calcareous till.

Remarks: All colors based on field moisture conditions.

Soil voids are described according to following classes:

Abundance classes:		
	Few	1 to 3 per square inch
	Common	4 to 7 per square inch
	Many	7 to 14 per square inch
Diameter classes:		
	Very fine	< 1 mm.
	Fine	1 to 2 mm.
	Medium	2 to 5 mm.
	Coarse	5 to 10 mm.
	Very coarse	> 10 mm.

The Ap, IIB22t and IIC horizons were sampled for the Bureau of Public Roads.

SOIL SURVEY LABORATORY Lincoln, Nebr. July 1961

SOIL TYPE Crosby silt loam **LOCATION** Fountain County, Indiana

SOIL NOS. S59-Ind-23-3 **LAB. NOS.** 12432-12437

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	3A1 2A2 > 2 (<19mm.)	TEXTURAL CLASS
0-7	Ap	0.5a	1.5a	1.6b	2.3b	1.4b	72.1	20.6	26.1	48.4	-	sil
7-11	B1t	0.2a	0.6a	0.9b	1.4b	0.8b	58.3	37.8	20.8	38.9	Tr.	sicl
11-19	B2t	0.7	1.2	1.8	3.1	1.9	50.0	41.3	22.0	31.2	Tr.	sic
19-27	IIB3t	4.0	7.0	9.4	15.6	6.2	31.7	26.1	23.5	20.9	5	l
27-37	IIC11	5.1c	6.8c	8.0c	14.8c	7.3c	38.7	19.3	27.5	25.4	8	l
37-52	IIC12	6.3c	6.7c	8,1c	14.5c	7.3c	38.2	18.9	27.0	25.1	12	l

8C1a pH 1:1	6E1a Carbonate as $CaCO_3$ %	3A1a Carbonate Clay %	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6C1a Free Iron % Fe_2O_3	BULK DENSITY 4A1a Field-State g/cc	4A1c 30-cm. g/cc	4A1h Oven-Dry g/cc	WATER CONTENT 4B4 Field-State %	4B3 30-cm. %	4B2 15-Bar %
5.3			1.66	0.162	10	2.0						9.4
4.9			0.65	0.077	8	2.5	1.54	1.49	1.58	18.2	22.6	15.1
5.5			0.44	0.049	9	2.7	1.49	1.40	1.71	23.5	29.5	17.4
7.7	3		0.23	0.031		1.8	1.50	1.72	1.76	10.9	12.1	10.6
8.1	21	2	0.13			1.2	1.97	1.92	1.96	5.3	11.9	7.8
8.2	22	2	0.12			1.0	2.00	1.96	2.00	5.9	12.0	7.4

5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	5B1a 6Q2a K	5C1 Base Sat. % NH_4OAc Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Ext. Bases	5A3a Sum Ext. Cations	8D3 Ca/Mg	6G2a KCl-Ext. Al me/100g.	8D1 CEC me per 100g. Clay
←	milliequivalents per 100g. soil				→			← me/100g. →				
13.7	7.0	2.4	9.0	< 0.1	0.4	72	52	9.8	18.8	2.9		66
22.2	10.8	6.4	10.1	0.1	0.4	80	64	17.7	27.8	1.7	2	59
27.5	15.8	10.0	7.7	0.2	0.6	97	78	26.6	34.3	1.6	<1	66
13.8		6.7	2.0	0.1	0.3							53
6.5		4.1	<0.1	0.1	0.2							34
5.8		3.7	<0.1	0.1	0.1							31

a. Many Fe-Mn.
b. Few Fe-Mn.
c. Few carbonates.

Soil Type: Crosby silt loam
Soil Nos.: S59Ind-23-3
Location: Fountain County, Indiana, NW 1/4 of NW 1/4, Sec. 14, T18N, R7W, 4½ miles east of Yaddo, 4 miles north of Parke County line, 330 feet south of fence row on south side of gravel road and 15 feet west of utility pole on road.
Vegetation: Corn.
Drainage and Permeability: Somewhat poorly (imperfectly) drained; slowly permeable.
Slope: Nearly level.
Parent Material: Calcareous loam till.
Collected by: Robert B. Grossman and Carl Guernsey, November 10, 1959.
Described by: Robert B. Grossman and Carl Guernsey, November 10, 1959.

Horizon and Lincoln Lab. No.	
Ap 12432	0 to 7 inches. Dark grayish brown (10YR 4/2) silt loam; part massive and part weak medium granular structure; friable to firm; medium acid (pH 5.8); boundary clear and smooth.
B1t 12433	7 to 11 inches. Mottled yellowish brown (10YR 5/8) and gray (10YR 6/1) silty clay loam; moderate fine blocky structure; slightly plastic and slightly sticky; medium acid (pH 5.6); no clay films; no Fe-Mn aggregates; roots few; boundary clear and smooth.
B2t 12434	11 to 19 inches. Mottled yellowish brown (10YR 5/8) and gray (10YR 5/1) heavy silty clay loam; cleavage planes tend to be gray (10YR 5/1); ped interiors tend to have higher chroma than surfaces; moderate fine blocky structure; plastic and slightly sticky; slightly acid (pH 6.2); some shiny surfaces - may be water films rather than clay films; common soft 1- to 2-mm. Fe-Mn aggregates throughout, but more prevalent in lower 1/2 of horizon; roots few; boundary clear and smooth.
IIB3t 12435	19 to 27 inches. Mottled gray (10YR 5/1) and yellowish brown (10YR 5/8) heavy loam; mottling diffuse; voids surrounded by gray (10YR 5/1); weak coarse prismatic structure; slightly plastic and slightly sticky; mildly alkaline (pH 7.5); very dark gray (10YR 3/1) clay films tend to occur on surfaces of vertical planes and on surfaces of voids in ped interiors; films are prominent, broken, up to 1/4-inch thick, and feel like silty clay loam; roots few, concentrated along vertical planes; boundary abrupt and smooth.
IIC11 12436	27 to 37 inches. Grayish brown (2.5Y 5/2) loam; common medium faint and distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/8) mottles; massive; firm; there are also gray (5Y 5/1) seams about 6 inches apart bordered with 1/4-inch bands of yellowish brown (10YR 5/8), and that have dark reddish brown (5YR 3/2) clay films on the periphery; calcareous.
IIC12 12437	37 to 52 inches. Light olive brown (2.5Y 5/4) loam; weak coarse platy structure; gray (5Y 5/1) seams up to 1/2-inch diameter are surrounded with 1/4-inch bands of yellowish brown (10YR 5/8); surface of seams coated with dark reddish brown (5YR 3/2) in dendritic pattern; firm; planes of cleavage slightly darker colored; calcareous.

Remarks: All colors based on field moisture conditions.

Soil voids are described according to following classes:

Abundance classes:		
	Few	1 to 3 per square inch
	Common	4 to 7 per square inch
	Many	7 to 14 per square inch
Diameter classes:		
	Very fine	< 1 mm.
	Fine	1 to 2 mm.
	Medium	2 to 5 mm.
	Coarse	5 to 10 mm.
	Very coarse	> 10 mm.

The Ap, B2t and IIC12 horizons were sampled for the Bureau of Public Roads.

SCS-421
10-64 (Rev. 9-68)

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Crosby silt loam SOIL Nos. WW-4 LOCATION Randolph County, Indiana

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 531574 - 531580

Depth (In.)	Horizon	1B1b Total: Sand (2-0.05)	Silt (0.05-0.002)	Clay (< 0.002)	Size class and particle diameter (mm) 3A1 — Sand: Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Silt: 0.05-0.02	Int. III (0.02-0.002)	Int. II (0.2-0.02)	(2-0.1)		3B2 Cm	Coarse fragments 3B1: 2A2 ≥ 2 Pct.	2-19	19-76
		Pct. of < 2 mm														Pct.	Pct. of < 76mm	
0-3	A1		53.4	19.9	1.4	3.4	4.4	10.4	7.1[a]		38.9	27.5				2		
5-8	A2		52.7	20.2	1.4	3.0	4.4	10.3	8.0		37.5	29.3				3		
8-12	A3-B1		51.0	22.1	1.2	3.3	4.4	10.3	7.7		37.3	27.5				4		
12½-16	B21t		45.7	31.6	0.8	2.8	3.6	8.6	6.9		32.4	25.4				3		
16-20	B22t		34.8	43.6	1.3	2.5	3.2	8.0	6.6		25.1	21.1				6		
20-24	C1		35.8	37.2	2.1	2.9	3.5	9.7	8.8		22.2	28.4				12		
26-30	C2		42.0	21.4	5.0	5.8	4.9	10.7	10.2		25.6	33.1				14		

Depth (In.)	6A1a Organic carbon Pct.	Nitrogen Pct.	C/N		Carbonate as $CaCO_3$ Pct.	Ext. iron as Fe Pct.	Bulk density: g/cc	4A1e ⅓ bar g/cc	4A1h Oven dry g/cc	4D1 COLE	Water content: Pct.	4B1c ⅓ bar Pct.	4B2 15 bar Pct.		4C1 WRD In/in	pH	8C1c (1:1) KCl	8C1a (1:1) H_2O
0-3	4.01																	5.6
5-8	1.51																	4.8
8-12	0.77																	4.8
12½-16	0.71																	5.3
16-20	0.79																	6.2
20-24	0.67																	7.4
26-30	0.36																	7.9

Depth (In.)	Extractable bases 5B1a: 6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum	6H1a Ext. acidity	CEC: 5A3a Sum cations		6G1d Ext Al			Ratios to clay: CEC Sum	Ext iron	15-bar water	8D3 Ca/Mg		Base saturation: 5C3 Sum cations Pct.	5C1 NH_4OAc Pct.
	meq/100 g																	
0-3	10.9	2.9	tr.	0.3		9.9	24.0										59	
5-8	3.4	1.2	tr.	0.1		11.2	15.9										30	
8-12	2.1	1.2	tr.	0.1		9.7	13.1										26	
12½-16	6.3	4.0	0.1	0.2		7.9	18.5										57	
16-20	11.4	7.1	0.1	0.4		6.4	25.4										75	
20-24	12.7	7.0	0.1	0.3		3.3	23.4										86	
26-30	19.3	2.9	0.1	0.1		0.6	23.0										97	

Depth (In.)	Clay Fraction Analysis 7A1b-d: Mt	Chl	Vm.	Mi.	Int.	Qtz.	Kl.	Gibbsite
	7A2 X-ray						7A3	

a Undecomposed organic matter in sand fractions.

Mt. = Montmorillonite, Chl. = chlorite, Vm. = Vermiculite, mi = mica, Int. = Interstratified layer, Qtz. = quartz, Kl. = Kaolinite

Relative amounts blank = not determined, dash = not detected, tr. = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant.

Soil Type: Crosby silt loam
Soil No.: WW-4
Location: Randolph County, Indiana. 3/8 mile N. of Crete in N.W. 1/4 of Section 22, T. 16N., R 1 W.
Vegetation and land use: Oak-hickory second growth.

Horizon and Beltsville Lab. No.	
A1 531574	0 to 3 inches. Light brownish gray (10YR 6/2 dry) to dark grayish brown (10YR 4/2) weak granular structure; friable silt loam; abrupt wavy boundary.
A2 531575	5 to 8 inches. Nearly white (10YR 8/2 dry) to light brownish gray (10YR 6/2) friable, weakly platy silt loam. (upper part like A1). Fine black concretions; clear wavy boundary.
A3 - B1 531576	8 to 12 inches. Gradational from A to B.
B21 531577	12 1/2 to 16 inches. Mottled light gray (10YR 7/2) and yellowish brown (10YR 5/4) in upper part, silty clay loam with fine silt loam streaks of mottled brown (10YR 4/3) and gray (10YR 5/1) silty clay loam moderate medium subangular blocky structure; in lower part. Transitional; gradual wavy boundary.
B22t 531578	16 to 20 inches. Brown (10YR 5/3) and dark brown (10YR 3/3) blocky-prismatic heavy clay loam with few light gray silty streaks. Dark-brown (10YR 3/3) clay films on blocks; clear wavy boundary.
C1 531579	20 to 24 inches. Pale brown (10YR 6/3 dry) to brown (10YR 5/3) blocky to massive clay loam, weakly calcareous, and with a few threads and streaks of dark brown (10YR 4/3) clay. Lime increases with depth; gradual wavy boundary.
C2 531580	26 to 30 inches. Pale-yellow (2.5Y 7/3 dry) to light olive brown (2.5Y 5/3) nearly massive but slightly porous, calcareous, light clay loam till.

Notes: Colors refer to moist soil unless indicated otherwise.

SOIL SURVEY LABORATORY Lincoln, Nebr. July 1961

SOIL TYPE Elston loam **LOCATION** Fountain County, Indiana

SOIL NOS. S59-Ind-23-4 **LAB. NOS.** 12438-12446

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 (<19mm.)	TEXTURAL CLASS
0-6	A1p	4.4	32.1	19.0	5.4	1.3	23.6	14.2	10.7	15.5	-	cosl
6-11	A11	4.1	29.0	17.2	5.1	1.2	27.0	16.4	10.4	19.0	-	cosl
11-20	A12	5.1	30.5	17.4	4.8	1.2	24.4	16.6	9.9	16.9	2	cosl
20-26	A3	15.6	34.3	14.6	4.2	1.1	18.0	12.2	7.7	12.4	8	cosl
26-32	B1	20.5	33.2	17.2	5.4	1.3	10.7	11.7	5.9	7.4	22	cosl
32-42	B21t	23.0	29.5	14.6	4.8	1.6	7.1	19.4	6.0	4.1	24	cosl
42-50	B22	34.0	36.1	11.6	2.8	0.9	5.5	9.1	4.0	3.0	24	lcos
50-64	B3	17.1	53.7	11.5	5.7	1.6	5.3	5.1	5.7	2.8	3	cos
64-76	C1	12.7a	60.8a	11.6a	4.3a	1.7a	7.1	1.8	6.8	3.2	3	cos

8C1a pH 1:1	6E1a Carbonate as $CaCO_3$ %	Carbonate Clay %	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6C1a Free Iron % Fe_2O_3	BULK DENSITY 4A1c 30-cm. g/cc	4A1h Oven-Dry g/cc	WATER CONTENT 4C1 1/3-Bar to 15-Bar %	4B3 30-cm. %	4B1b 1/3-Bar pieces %	4B2 15-Bar %
6.6	< 1		1.72	0.125	14	1.3			8.5b		14.8b	6.3
6.2			1.66	0.129	13	1.4	1.50	1.54	12.9b	16.4	19.8b	6.9
5.3			1.14	0.085	13	1.4	1.50	1.55	11.2b	16.7	18.2b	7.0
5.1			0.71	0.060	12	1.4	1.54	1.56	8.6b	14.4	15.0b	6.4
5.0			0.40			1.4						5.4
4.9			0.30			1.8	1.48	1.49		17.1		8.4
5.1			0.22			1.3						4.3
5.4			0.13			1.0						2.6
8.5	20		0.13			0.7						1.1

5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	5B1a 6Q2a K	5C1 Base Sat. % NH_4OAc Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Ext. Bases	5A3a Sum Ext. Cations	8D3 Ca/Mg	6G2a KCl-Ext. Al me/100g.	8D1 CEC me per 100g. Clay
←	milliequivalents per 100g. soil				→			← me/100g.	→			
12.1	10.2	1.3	4.9	< 0.1	0.2	97	70	11.7	16.6	7.8		85
13.0	9.2	1.3	6.3	< 0.1	0.2	80	62	10.7	17.0	7.1		79
10.3	5.2	0.8	8.8	< 0.1	0.1	59	41	6.1	14.9	6.5		62
7.2	3.2	0.7	6.3	< 0.1	0.1	56	39	4.0	10.3	4.6		59
6.2	2.7	0.4	4.6	< 0.1	0.1	52	41	3.2	7.8	6.8		53
10.2	5.0	1.6	6.4	< 0.1	0.2	67	52	6.8	13.2	3.1	2	52
5.6	2.7	0.9	3.9	< 0.1	0.1	66	49	3.7	7.6	3.0		62
3.2	1.5	0.6	2.4	< 0.1	0.1	69	48	2.2	4.6	2.5		63
1.4		0.5	<0.1	< 0.1	<0.1							78

a. Few carbonates.

b. 1/10-Bar moisture used for sandy material.

Soil Type: Elston loam
Soil Nos.: S59Ind-23-4
Location: Fountain County, Indiana, SE 1/4 of NW 1/4, Sec. 14, T20N, R9W, 2½ miles north of Covington, 1 mile east of Wabash River, 66 feet east of mausoleum and 250 feet north of road center line.
Vegetation: Clover and brome grass.
Slope: Gently sloping (3 to 6 percent) top of ridge, slopes both east and west.
Drainage and Permeability: Well to excessively drained; moderately rapid to rapid permeability.
Parent Material: Stratified medium and coarse sands with some gravels.
Collected by: Robert B. Grossman and Carl Guernsey, November 11, 1959.
Described by: Robert B. Grossman and Carl Guernsey, November 11, 1959.

Horizon and Lincoln Lab. No.	
Alp 12438	0 to 6 inches. Black (10YR 2/1) loam; upper 2 inches weak coarse granular; lower part massive; friable; neutral (pH 6.8); roots fine, common to many.
A11 12439	6 to 11 inches. Black (5YR 2/1) sandy loam; color visibly lighter than Alp; massive; friable; neutral (pH 6.6); roots fine, few to common.
A12 12440	11 to 20 inches. Black (5YR 2/1) to dark reddish brown (5YR 2/2) sandy loam; massive; friable to slightly sticky; slightly acid (pH 6.0); insignificant amounts of gravel; few scattered clean sand grains throughout; roots few to common; boundary gradual.
A3 12441	20 to 26 inches. Dark brown (7.5YR 3/2) light sandy loam; massive; friable; slightly sticky to sticky; medium acid (pH 5.6); less than 5 percent gravel; roots few to common; boundary gradual.
B1 12442	26 to 32 inches. Reddish brown (5YR 4/3) gravelly sandy loam; massive to single grain; slightly sticky, nonplastic; medium acid (pH 5.6); approximately 2 percent gravel larger than 3/4-inch diameter; roots common; boundary gradual.
B21t 12443	32 to 42 inches. Dark reddish brown (5YR 3/3) gravelly sandy loam; massive; slightly sticky and slightly plastic; medium acid (pH 5.6); boundary gradual.
B22 12444	42 to 50 inches. Reddish brown (5YR 4/4) to dark reddish brown (5YR 3/4) coarse sandy loam; (ranges in texture from sandy clay loam to loamy sand); massive; slightly sticky, slightly plastic; strongly acid (pH 5.4); approximately 20 percent gravel; insignificant amount of gravel above 3/4-inch diameter; roots few; boundary wavy.
B3 12445	50 to 64 inches. Dark brown (10YR 4/3) coarse sand; massive; friable; medium to slightly acid (pH 6.0); less than 2 percent gravel; 75 percent of sand grains have observable coatings; roots few; boundary irregular.
C1 12446	64 to 76 inches. Yellowish brown (10YR 5/4) medium and coarse sand; loose; less than 2 percent gravel; dark Fe-Mn minerals and shell fragments.
C2	76 inches plus. Yellowish brown (10YR 5/4), light yellowish brown (10YR 6/4) and pale brown (10YR 6/3) medium and coarse sand; calcareous.

Remarks: All colors based on field moisture conditions.

The A12, B22 and C1 horizons were sampled for the Bureau of Public Roads.

OIL SURVEY LABORATORY Lincoln, Nebr. July 1961

SOIL TYPE Elston loam **LOCATION** Fountain County, Indiana

SOIL NOS. S59-Ind-23-5 **LAB. NOS.** 12447-12454

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 (<19mm.)	TEXTURAL CLASS
0-7	Ap	1.3	10.2	11.1	34.5	8.4	23.4	11.1	34.4	14.1	Tr.	fsl
7-12	A3	1.2	9.1	9.7	29.0	7.6	27.7	15.7	32.1	17.3	Tr.	fsl
12-18	B1t	1.4	11.1	9.4	24.8	6.9	26.8	19.6	28.6	17.6	Tr.	fsl/scl
18-27	B21t	5.3	22.2	13.5	17.6	5.4	15.4	20.6	19.9	9.5	19	scl
27-33	B22t	11.6	38.2	18.8	5.8	1.7	7.9	16.0	6.2	5.2	10	cosl
33-40	B31	18.9	47.1	19.3	3.6	0.6	4.9	5.6	2.9	3.3	18	cos
40-50	B32	11.6	56.2	19.6	3.8	0.6	4.6	3.6	1.7	4.2	5	cos
50-62	C	25.6 a	51.4 a	10.8 a	2.1 a	1.2 a	7.3	1.6	5.1	4.0	8	cos

8C1a pH 1:1	6E1a Carbonate as $CaCO_3$ %	Carbonate Clay %	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6C1a Free Iron % Fe_2O_3	BULK DENSITY 4A1a Field-State g/cc	4A1c 30-cm. g/cc	4A1h Oven-Dry g/cc	WATER CONTENT 4B4 Field-State %	4B3 30-cm. %	4B2 15-Bar %
7.0	< 1		1.02	0.090	11	1.0						5.2
6.4			0.80	0.072	11	1.3	1.61	1.60	1.63	9.6	15.2	6.0
5.1			0.64	0.070	9	1.5	1.52	1.50	1.54	12.4	17.8	8.0
4.9			0.56	0.056	10	1.8	1.54	1.53	1.57	13.9	17.9	7.6
4.9			0.36			1.6	1.54	1.53	1.58	13.8	17.6	6.9
5.1			0.12			1.2						2.6
5.3			0.12			1.0						1.3
8.5	20		0.12			0.7						0.7

5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K	5C1 Base Sat. % NH_4OAc Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Ext. Bases	5A3a Sum Ext. Cations	8D3 Ca/Mg	6G2a KCl-Ext. Al	8D1 CEC me per 100g. Clay
←	milliequivalents per 100g. soil				→			← me/100g →			me/100g.	
9.3	8.9	0.7	3.2	< 0.1	0.1	104	75	9.7	12.9	12.7		84
9.7	7.5	0.8	4.6	< 0.1	0.1	86	65	8.4	13.0	9.4		62
10.5	5.0	1.1	8.3	< 0.1	0.2	60	43	6.3	14.6	4.5		54
11.3	4.9	1.5	8.6	< 0.1	0.2	58	43	6.6	15.2	3.3	2	55
9.4	4.1	1.7	6.6	< 0.1	0.2	64	48	6.0	12.6	2.4		59
3.7	1.4	0.7	2.4	< 0.1	0.1	59	48	2.2	4.6	2.0		66
2.5	1.0	0.5	1.7	< 0.1	<0.1	60	47	1.5	3.2	2.0		69
1.4		0.5	<0.1	< 0.1	<0.1							88

a. Few carbonates.

Soil Type: Elston loam
Soil Nos.: S59Ind-23-5
Location: Fountain County, Indiana, SE 1/4 of SE 1/4 of Sec. 15, T20N, R9W, 1½ miles north of Covington, 1 mile east of Wabash River, 245 feet east and 190 feet north of round concrete cover post where gravel road turns north.
Vegetation: Corn.
Drainage and Permeability: Well to excessively drained; moderately rapid to rapidly permeable.
Slope: Gently sloping.
Parent Material: Stratified medium and coarse sand with some gravel.
Collected by: Robert B. Grossman, A. R. Grunewald, and Keith Huffman, November 11, 1959.
Described by: A. R. Grunewald, November 11, 1959.

Horizon and Lincoln Lab. No.	
Ap 12447	0 to 7 inches. Very dark brown (10YR 2/2) loam; massive; friable; neutral (pH 7.0); corn roots are common; boundary abrupt and smooth.
A3 12448	7 to 12 inches. Dark brown (7.5YR 3/2) loam; massive; friable; neutral (pH 6.6); sharp color break; few roots; few coarse sand grains visible; boundary clear and wavy.
B1t 12449	12 to 18 inches. Dark reddish brown (5YR 3/3) light clay loam; massive; slightly sticky and slightly plastic; strongly acid (pH 5.4); few roots; few fine pebbles 1/8 inch; common coarse sand grains; boundary clear and wavy.
B21t 12450	18 to 27 inches. Dark reddish brown (5YR 3/3) light clay loam; massive; slightly sticky and slightly plastic; strongly acid (pH 5.4); lower 1/3 of horizon has 30 percent gravel 3/4 inch to 1 inch; few 2 inch pebbles; few roots; boundary abrupt and wavy.
B22t 12451	27 to 33 inches. Dark reddish brown (5YR 3/4) light sandy loam; loose to massive (coherent masses); very friable; slightly sticky and slightly plastic; medium acid (pH 5.6); coarse sand grains visible; very few roots; gradual wavy boundary.
B31 12452	33 to 40 inches. Dark reddish brown (5YR 3/4) coarse loamy sand; massive in place, but breaks out into very weak secondary angular fine blocky structure; weak very friable aggregates, nonsticky, nonplastic; slightly acid (pH 6.0); very few roots, less than 2 percent gravel greater than 3/4 inch; very few 3-inch to 4-inch gravels; boundary gradual.
B32 12453	40 to 50 inches. Dark brown (7.5YR 4/4) coarse sand; single grain; loose; slightly acid (pH 6.2); nonsticky, nonplastic; few pebbles variable in size, none larger than 3 inches; abrupt irregular boundary.
C 12454	50 to 62 inches. Brown (10YR 5/3) medium and coarse sands with some light yellowish brown (10YR 6/4) and pale brown (10YR 6/3) colors; loose; variable amounts gravel; pebble size ranges up to 1 inch, no pebbles over 3 inches observed; some ferromagnesian minerals and shell fragments; several opaque sand grains; weakly effervescent.

Remarks: Colors based on field moisture condition.

Extensive tonguing of B32 into C. Some tongues extend 78 inches; widths vary from 5 inches to 11 inches.

The Ap, B21t, and C horizons were sampled for the Bureau of Public Roads.

SCS-421
10-64 (Rev. 9-66)

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Fincastle silt loam SOIL Nos. WW-7 LOCATION Fayette County, Indiana

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 531588 - 531593

Depth (in.)	Horizon	1B1b Total Sand (2-0.05)	Total Silt (0.05-0.002)	Total Clay (< 0.002)	Sand: Very coarse (2-1)	Sand: Coarse (1-0.5)	Sand: Medium (0.5-0.25)	Sand: Fine (0.25-0.1)	Sand: Very fine (0.1-0.05)	Silt (0.05-0.02)	Silt: Int III (0.02-0.002)	Int. II (0.2-0.02)	(2-0.1)		3B2 Cm	Coarse fragments 3B1: 2A2 > 2 Pct.	2-19	19-76
		Size class and particle diameter (mm) 3A1															Pct. of < 76mm	
		Pct of < 2 mm																
6-10	A2		75.2	18.8	0.9	2.0	1.1	1.0	1.0		47.4	29.3				-		
20-24	B21t		65.5	30.7	0.2	0.6	0.6	0.9	1.5		37.3	30.3				-		
34-36	B22t		67.1	26.1	0.2	0.9	1.1	1.8	2.8		30.6	40.3				-		
38-42	IIB23		31.7	26.3	1.8	4.9	11.1	17.3	6.9		18.6	27.9				5		
50-54	IIB3		31.2	31.0	3.2	6.1	6.7	12.9	8.9		20.2	27.3				8		
57-60	IIC1		41.2	23.4	2.6	5.4	5.8	11.9	9.7		24.8	32.9				7		

Depth (in.)	6A1a Organic carbon Pct.	Nitrogen Pct.	C/N		Carbonate as $CaCO_3$ Pct.	Ext iron as Fe Pct.	Bulk density: g/cc	Bulk density: 4A1e ⅓ bar g/cc	Bulk density: 4A1h Oven dry g/cc	4D1 COLE	Water content: Pct.	Water content: 4B1c ⅓ bar Pct.	Water content: 4B2 15 bar Pct.		4C1 WRD in/in	pH: 8C1c (1:1) KCl	pH: 8C1a (1:1) H_2O
6-10	0.85																4.8
20-24	0.25																4.6
34-36	0.18																4.6
38-42	0.24																4.8
50-54	0.30																6.4
57-60	0.23																7.6

Depth (in.)	Extractable bases 5B1a: 6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum	6H1a Ext acidity	CEC: 5A3a Sum cations	CEC	6G1d Ext Al			Ratios to clay: CEC Sum	Ext. iron	15-bar water	8D3 Ca/Mg		Base saturation: 5C3 Sum cations Pct	5C1 NH_4OAc Pct
	meq/100 g																	
6-10	1.6	1.2	tr.			9.5	12.4										23	
20-24	2.0	2.7	0.1			15.1	20.3										26	
34-36	2.8	3.4	0.1			11.4	18.0										37	
38-42	4.5	4.3	0.1			7.8	17.0										54	
50-54	8.5	5.6	0.1			2.9	17.3										83	
57-60	10.7	6.1	0.1			0.4	17.5										98	

Depth (in.)	Clay Fraction Analysis 7A1b-d: Mt	Chl	Vm	Mi	Int.	Qtz.	Kl.	Gibbsite
	7A2 X-ray						7A3	

Mt. = Montmorillonite, Chl = chlorite, Vm = Vermiculite, mi = mica, Int. = Interstratified layer, Qtz. = quartz, Kl = Kaolinite

Relative amounts blank = not determined, dash = not detected, tr. = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant.

Soil Type: Fincastle silt loam
Soil No.: WW-7
Location: Fayette County, Indiana. 1 1/8 mile S and 5/8 mile W of N.E. corner of Fayette County.
Vegetation and land use: Beech and maple forest.

Horizon and Beltsville Lab. No.	
A2 531588	6 to 10 inches. Nearly white (10YR 8/2 dry) to light brownish gray (10YR 6/2.5) friable, nearly massive silt loam. Porous and weak platy in lower part.
B21t 531589	20 to 24 inches. Very pale brown (10YR 7/5 dry) to yellowish brown (10YR 5/4), with threads and thin streaks of light gray, silty clay loam of subangular blocky structure. Some fine black concretions.
B22t 531590	34 to 36 inches. Mottled yellowish brown (10YR 5/4), brown (10YR 5/3), light brownish gray (10YR 6/2) and nearly white (darker when wet) silty clay loam with a few small black concretions.
IIB23 531591	38 to 42 inches. Brown to dark brown (10YR 5/3 - 4/3) porous sandy clay loam with many fine mottles of yellow, black and white. Noncalcareous.
IIB3 531592	50 to 54 inches. Brown (10YR 5/4), weathered, medium acid clay loam till; with common medium yellowish brown (10YR 5/4) and grayish brown (10YR 5/2) mottlings, massive, firm material; abrupt irregular boundary.
IIC1 531593	57 to 60 inches. Very pale brown (10YR 7/4 dry) to brown (10YR 5/3), calcareous light loam till.

Notes: Colors refer to moist soil unless indicated otherwise.

SOIL SURVEY LABORATORY Lincoln, Nebr. February 1960

SOIL TYPE Fincastle silt loam LOCATION Tippecanoe County, Indiana

SOIL NOS. S59Ind-79-2 LAB. NOS. 12638-12647

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	3A1 2A2 > 2 (<19mm.)	TEXTURAL CLASS
0-5	A1	0.2a	0.8a	1.2b	2.2c	2.1c	76.8	15.7	27.7	52.3	Tr.	sil
5-9	A2	0.4a	1.4a	1.4b	2.6c	2.7c	75.3	16.2	30.9	48.4	Tr.	sil
9-17	B1t	0.3a	0.7a	1.0b	1.9c	2.1c	68.6	25.4	26.0	45.7	Tr.	sil
17-22	B21t	0.1a	0.4a	0.7b	1.5c	3.2c	62.3	31.8	30.1	36.2	Tr.	sicl
22-32	B22t	0.1a	0.6a	0.8b	1.8c	3.7c	62.2	30.8	37.9	28.9	Tr.	sicl
32-36	B23t	2.0	3.7	5.7	13.4	7.7	35.4	32.1	29.2	20.5	4	cl
36-46	IIB3t	2.4	4.5	5.8	13.9	8.5	34.6	30.3	28.8	21.4	6	cl
46-53	IIC1	2.5d	4.8d	5.8e	14.2e	9.4e	43.1	20.2	33.4	26.6	7	l
53-59	IIC2	3.2d	4.3d	5.0e	12.3e	8.4e	46.3	20.5	31.7	29.4	9	l
175+	IIC3	2.9d	3.6d	3.1e	6.2e	4.6e	56.3	23.3	23.3	40.7	7	sil

8C1a pH 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6C1a Free Iron % Fe_2O_3		6K1a $CaCO_3$ equiv. %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
6.2			1.77	0.150	12	1.4						8.2
5.6			0.60	0.063	10	1.6						6.5
4.9			0.44	0.055	8	1.7						10.1
4.8			0.34	0.047	7	1.9						13.5
4.7			0.30	0.039	8	2.1						13.9
5.7			0.30	0.035	8	2.0						13.5
6.7			0.30	0.033	9	1.9						12.7
8.1			0.21	0.022		2.0		21				8.5
8.3			0.19	0.022		1.4		25				8.4
7.5			0.67	0.037	18	0.5		22				8.8

5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K	5B1a	5C1 Base Sat. % NH_4OAc Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Ext. Bases	5A3a Sum Ext. Cations	8D3 Ca/Mg		
←	milliequivalents per 100g. soil					→			← me/100g. →				
13.7	8.1	2.5	8.1	0.1	0.3		80	58	11.0	19.1	3.2		
9.3	4.3	1.4	6.9	<0.1	0.1		62	46	5.8	12.7	3.1		
14.1	4.6	2.5	11.7	0.1	0.2		52	39	7.4	19.1	1.8		
19.7	6.0	5.2	13.2	0.1	0.3		59	47	11.6	24.8	1.2		
20.2	6.8	6.8	11.1	0.1	0.3		69	56	14.0	25.1	1.0		
21.1	9.8	9.2	5.5	0.1	0.3		92	78	19.4	24.9	1.1		
19.2	9.9	8.8	2.9	0.1	0.3		99	87	19.1	22.0	1.1		
9.0		4.3	<0.1	0.1	0.2								
8.9		4.6	<0.1	0.1	0.1								
3.8		4.1	<0.1	<0.1	0.2								

a. Many (Fe-Mn?) concr.
b. Common (Fe-Mn?) concr.
c. Few (Fe-Mn?) concr.
d. Many carbonates. Limestone fragments?
. Few carbonates. Limestone fragments?

Soil Type: Fincastle silt loam
Soil Nos.: S59Ind-79-2
Location: NE 1/4 of NE 1/4, Sec. 2, T23N, R5W at south end of borrow pit by old pear orchard, Tippecanoe County, Indiana.
Vegetation: Original vegetation included deciduous forest with ash, elm, maple, sycamore as prominent species. Present vegetation at sample site is bluegrass.
Slope and Land Form: Gently undulating till plain with slope at site of 1 to 2 percent.
Drainage and Permeability: Imperfectly drained; runoff is slow to very slow; permeability is moderately slow.
Parent Material: Loam to coarse clay loam till (Wisconsin Age) at 42 to 55 inches.
Collected by: A. L. Zachary and D. F. Post for laboratory data to be presented on the International Congress of Soil Science Society Tour, 1960.
Described by: A. L. Zachary, December 2, 1959.

Horizon and Lincoln Lab. No.	
A1 12638	0 to 5 inches. Dark grayish brown (10YR 4/2) or very dark grayish brown (10YR 3/2) silt loam; weak medium granular structure; friable; abrupt smooth boundary; neutral.
A2 12639	5 to 9 inches. Grayish brown (10YR 5/2) to light brownish gray (10YR 6/2) silt loam; weak fine platy structure; friable; slightly acid; clear smooth boundary.
B1t 12640	9 to 17 inches. Brown (10YR 5/3) mottled with yellowish brown (10YR 5/4) and light brownish gray (10YR 6/2) fine silt loam; mottles are common, medium and distinct; moderate medium subangular blocky structure; friable to slightly firm; very strongly to strongly acid; gradual wavy boundary.
B21t 12641	17 to 22 inches. Brown (10YR 5/3) mottled with yellowish brown (10YR 5/5) and pale brown (10YR 6/3) coarse silty clay loam with grayish brown (10YR 5/2) clay or organic coatings on numerous ped faces; mottles common, medium and distinct; moderate medium subangular blocky structure; firm; very strongly to strongly acid; gradual wavy boundary.
B22t 12642	22 to 32 inches. Brown (10YR 5/3) mottled with yellowish brown (10YR 5/4) and pale brown (10YR 6/3) silty clay loam; mottles are common, medium and distinct; thin clay or organic coatings are many and distinct on ped faces; moderate medium subangular blocky structure; firm; medium to strongly acid; gradual wavy boundary; some grit and small glacial pebbles at 28 inches.
B23t 12643	32 to 36 inches. Light yellowish brown (10YR 6/4) mottled with yellowish brown (10YR 5/4) silty clay loam; mottles are common, medium and distinct; thin clay or organic coatings are common on ped faces; firm; medium acid to neutral; clear wavy boundary.
IIB3t 12644	36 to 46 inches. Light yellowish brown (10YR 6/4) mottled with light brownish gray (10YR 6/2) coarse clay loam to clay loam; mottles are many, fine and distinct; weak coarse subangular blocky structure; clay coatings on ped faces are common; firm; neutral in upper part of horizon; gradual wavy boundary.
IIC1 12645	46 to 53 inches. Pale brown (10YR 6/3) fine loam to coarse clay loam; clay or organic coatings on ped faces and on walls of old root channels; weak coarse subangular blocky structure; slightly firm; calcareous.
IIC2 12646	53 to 59 inches.1/ Pale brown (10YR 6/3) loam; massive or weak coarse subangular blocky structure; friable; calcareous.
IIC3 12647	175 inches plus. Gray (7.5YR 5/0) to gray (7.5YR 6/0) fine loam to coarse clay loam; massive structure; slightly firm; highly calcareous.

Remarks: Colors given are for moist soil. Soil was moist to wet when sampled. A1 was slightly frozen when sampled. Reaction determined in field by colorimetric test using spot plate.

1/ Assumed to extend to 175 inches.

SOIL SURVEY LABORATORY Mandan, N. D.

OIL TYPE Haskins silt loam **LOCATION** Allen Co., Indiana

SOIL NOS. S-55-Ind-2-8 **LAB. NOS.** MSL NOS: 3871-3877 BSL NOS: 551412-418

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	3A1 0.02-0.002	2A2 > 2 (19mm.)	TEXTURAL CLASS
0-7	Ap	2.1	3.8	5.7	14.3	7.8	45.9	20.4	32.3	28.9	-	l
7-10	AB	1.4	2.4	4.3	12.0	7.2	46.7	26.0	29.1	31.0	-	l
10-13	B1t	1.4	2.0	3.7	10.6	3.6	39.4	39.3	21.3	26.3	5	cl
13-17	B2t	1.7	3.3	4.3	11.8	8.0	35.1	35.8	26.4	23.2	-	cl
17-26	B3t	4.5	4.4	3.2	9.6	9.0	36.1	33.2	27.0	24.1	-	cl
26-28	C1	9.0	7.0	4.6	9.4	8.4	34.1	27.5	23.9	24.2	2	cl
28-+	IIC2	2.8	3.3	2.9	7.2	6.9	43.6	33.3	22.7	32.3	4	cl

pH 8C1a 1:1	1:5	1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)		6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
6.4			1.48	.131	11							
6.7			0.77	.076	10							
6.9			0.34	.044	8			-				
7.2			0.33	.042	8			-				
7.2			0.41	.045	9			-				
7.9			0.44	.041	11			9				
8.0			0.37	.038	10			26				

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6Q2b Mg	6H1a H	6P2a Na	6Q2a K	5C1 Base Sat. % NH_4Ac Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Bases	5A3a Sum Cations		8D3 Ca/Mg	MOISTURE AT SATURATION %
←	milliequivalents per 100g. soil				→			← me/100g. →				
15.1	10.7	2.3	4.0	0.2	0.2	89	77	13.4	17.4		4.6	
16.4	12.2	2.7	4.2	0.2	0.1	93	78	15.2	19.4		4.5	
25.4	19.8	4.4	3.6	0.2	0.3	97	87	24.7	28.3		4.5	
23.6	19.8	4.6	3.6	0.2	0.2		87	24.8	28.4		4.3	
22.0	18.0	4.1	2.6	0.2	0.2		90	22.5	25.1		4.4	
14.9		3.0	0.4	0.2	0.2							
10.7		2.5	-	0.2	0.1							

Soil Type: Haskins silt loam
Soil Nos.: S55Ind-2-8
Location: SE 1/4 of NE 1/4 of Sec. 5, T30N, R14E, Allen County, Indiana. The sample site was 1,400 feet south, 536 feet west of the northeast corner of Sec. 5.
Topography: Gently undulating, 1 percent slope.
Physiography: Lake plain.
Drainage: Imperfect.
Vegetation: Oats.
Field No.: Legend No. 2142 SM.
Beltsville Lab. Nos.: 551412-551418.
Described by: James V. Anderson, October, 1955.

Horizon and Mandan Lab. No.	
Ap 3871	0 to 7 inches. Dark grayish brown (10YR 4/2 moist) silt loam; weak very fine crumb structure; friable when moist; pH 6.6.
AB 3872	7 to 10 inches. Grayish brown (10YR 5/2) with many medium distinct mottles of strong brown (7.5YR 5/6 moist) silty clay loam; weak coarse angular blocky structure; firm when moist; pH 6.8.
B1t 3873	10 to 13 inches. Dark brown (10YR 4/3) with many medium faint mottles of dark brown (7.5YR 4/4 moist) silty clay loam; moderate coarse angular blocky structure; firm when moist; pH 7.1.
B2t 3874	13 to 17 inches. Very dark gray (10YR 3/1) with many medium distinct mottles of yellowish brown (10YR 5/6 moist) gravelly clay loam; moderate coarse angular blocky structure; firm when moist; pH 7.4.
B3t 3875	17 to 26 inches. Dark grayish brown (10YR 4/2) with few medium faint mottles of yellowish brown (10YR 5/6 moist) clay loam; moderate medium angular blocky structure; firm when moist; pH 7.4.
C1 3876	26 to 28 inches. Dark grayish brown (10YR 4/2 moist) silty clay loam; moderate medium angular blocky structure; firm when moist; slight effervescence with 2N HCl.
IIC2 3877	28 inches plus. Dark grayish brown (10YR 4/2) with common medium distinct mottles of dark yellowish brown (10YR 4/4) and white (10YR 8/1 moist) silty clay loam; moderate medium angular blocky structure; firm when moist; strong effervescence with 2N HCl.

Remarks: This profile appears to have formed in stratified drift. The brown color of the IIC2 horizon is caused by coatings on peds. The white mottles are caused by lime.

OIL SURVEY LABORATORY Mandan, N. D.

SOIL TYPE Haskins silt loam **LOCATION** Allen Co., Indiana

MSL NOS: 3878-3882

SOIL NOS. S-55-Ind-2-9 **LAB. NOS.** BSL NOS: 551419-423

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 (<19mm.)	TEXTURAL CLASS
0-6	Ap	3.0	6.3	5.9	9.5	4.0	46.1	25.2	23.7	31.0	-	l
6-13	B1t	2.5	3.7	3.6	6.9	4.4	42.5	36.4	21.1	29.4	-	cl
13-21	B2t	4.3	4.6	3.8	8.1	4.7	38.8	35.7	21.2	26.6	-	cl
21-25	C1	21.1	9.2	7.3	15.1	5.3	30.2	11.8	26.1	17.7	22	cosl
25-+	IIC2	2.5	2.3	2.1	5.5	5.4	44.8	37.4	18.8	34.9	3	sicl

8C1a pH 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)		6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
6.9			1.29	.112	12			-				
6.8			0.45	.047	10			-				
7.2			0.38	.040	10			-				
8.0			0.38	.027	14			18				
7.9			0.48	.050	10			20				

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K	5C1 Base Sat. % NH_4Ac Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Bases	5A3a Sum Cations		8D3 Ca/Mg	MOISTURE AT SATURATION %
←		milliequivalents per 100g. soil			→			← me/100g →				
18.2	14.3	3.4	3.4	0.1	0.2	99	84	18.0	21.4		4.2	
24.6	18.8	5.5	3.4	0.1	0.3		88	24.7	28.1		3.4	
22.8	16.5	5.7	2.6	0.2	0.3		90	22.7	25.3		2.9	
6.5		2.0	-	0.1	0.1							
12.8		3.8	-	0.2	0.2							

Soil Type: Haskins silt loam
Soil Nos.: S55Ind-2-9
Location: NW 1/4 of NE 1/4 of Sec. 23, T30N, R14E, Allen County, Indiana. The sample site is 155 feet south of center of north side of Sec. 23.
Topography: Level, 1 percent slope.
Physiography: Lake plain.
Drainage: Imperfect.
Vegetation: Soybeans.
Field No.: Legend No. 2142 SM.
Beltsville Lab. Nos.: 551419-551423.
Described by: James V. Anderson, October, 1955.

Horizon and Mandan Lab. No.	
Ap 3878	0 to 6 inches. Dark grayish brown (10YR 4/2 moist) silt loam; moderate fine crumb structure; very firm when moist; pH 6.6.
B1t 3879	6 to 13 inches. Grayish brown (10YR 5/2) with common medium distinct mottles of yellowish brown (10YR 5/6 moist) silty clay loam; moderate fine angular blocky structure; firm when moist; pH 7.0.
B2t 3880	13 to 21 inches. Grayish brown (10YR 5/2) with many large distinct mottles of yellowish brown (10YR 5/6 moist) silty clay loam; moderate medium angular blocky structure; firm when moist; pH 7.4.
C1 3881	21 to 25 inches. Grayish brown (10YR 5/2 moist) gravelly fine sand; structureless; loose when moist; strong effervescence with 2N HCl.
IIC2 3882	25 inches plus. Dark brown (10YR 4/3) with many large prominent mottles of gray (10YR 5/1 moist) silty clay loam; massive structure; very firm when moist; strong effervescence with 2N HCl.

SOIL SURVEY LABORATORY Mandan, N. D.

SOIL TYPE Haskins silt loam **LOCATION** Allen Co., Indiana

MSL NOS: 3934-3939

SOIL NOS. S55Ind-2-20 **LAB. NOS.** BSL NOS: 551475-480

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	3A1 0.02-0.002	2A2 > 2 (<19mm.)	TEXTURAL CLASS
0-9	A_p	1.8	3.4	4.8	11.9	8.1	50.1	19.9	29.9	34.3	2	sil
9-12	AB	2.8	4.8	8.4	15.5	8.2	36.7	22.7	27.0	25.6	3	l
12-14	B_{1t}	1.6	6.4	11.8	20.2	8.1	21.9	30.0	23.3	15.5	5	scl
14-22	B_{2t}	2.5	26.2	11.7	16.6	3.6	12.4	27.0	14.2	8.0	5	scl
22-33	B_{3t}	0.7	2.9	4.7	11.2	6.5	33.1	40.9	21.5	23.7	-	c
33- ↓	C	1.6	2.2	2.0	7.1	7.7	49.2	30.2	27.5	33.7	1	cl

pH 8C1a 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
6.2			1.58	.128	12					
5.3			0.35	.042	8					
5.3			0.31	.044	7					
5.4			0.26	.038	7					
6.8			0.42	.048	9	-				
8.0			0.43	.039	11	18				

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6Q2b Mg	6H1a H	6P2a Na	6Q2a K	5B1a 5C1 Base Sat. % NH_4Ac Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Bases	5A3a Sum Cations	8D3 Ca/Mg	MOISTURE AT SATURATION %
←	milliequivalents per 100g. soil				→			← me/100g. →			
14.2	7.9	2.0	7.3	0.1	0.2	72	58	10.2	17.5	3.9	
10.5	5.9	1.4	6.1	0.1	0.2	72	55	7.6	13.7	4.2	
15.0	8.1	2.1	8.1	0.1	0.3	71	57	10.6	18.7	3.9	
14.2	8.2	2.1	6.7	0.1	0.2	75	61	10.6	17.3	3.9	
22.1	17.3	4.0	4.6	0.2	0.3	99	82	21.8	26.4	4.3	
12.8		2.8	0.6	0.1	0.2						

Soil Type: Haskins silt loam
Soil Nos.: S55Ind-2-20
Location: NE 1/4 of NW 1/4 of Sec. 32, T32N, R14E, Allen County, Indiana. The sample site is 825 feet east, 40 feet south of the center of the north side of Sec. 32.
Topography: Gently undulating, 1 percent slope.
Physiography: Upland till plain.
Drainage: Imperfect.
Vegetation: Corn.
Field No.: Legend No. 142 SM.
Beltsville Lab. Nos.: 551475-551480.
Described by: James V. Anderson, October, 1955.

Horizon and Mandan Lab. No.	
Ap 3934	0 to 9 inches. Dark grayish brown (10YR 4/2 moist) silt loam; weak very fine crumb structure; soft when dry; pH 6.6.
AB 3935	9 to 12 inches. Dark yellowish brown (10YR 4/4) with many large distinct mottles of pale brown (10YR 6/3 moist) silty clay loam; weak fine subangular blocky structure; soft when dry; pH 5.8.
B1t 3936	12 to 14 inches. Dark yellowish brown (10YR 4/4) with few medium faint mottles of dark yellowish brown (10YR 4/4 moist) silty clay loam; weak fine angular blocky structure; firm when moist; pH 5.6.
B2t 3937	14 to 22 inches. Very dark grayish brown (10YR 3/2) with many large distinct mottles of dark yellowish brown (10YR 4/4 moist) clay loam; moderate medium angular blocky structure; firm when moist; pH 5.6.
B3t 3938	22 to 33 inches. Dark grayish brown (10YR 4/2) with common medium faint mottles of dark yellowish brown (10YR 4/4 moist) silty clay loam; strong coarse angular blocky structure; very firm when moist; pH 7.0.
C 3939	33 inches plus. Yellowish brown (10YR 5/6) with few small faint mottles of gray (10YR 6/1 moist) silty clay loam; moderate coarse angular blocky structure; very firm when moist; strong effervescence with 2N HCl.

Remarks: The thickness of smear or overburnden is extremely variable in this as in most other areas where it is found. In this area it was common to find 48 inches of smear 10 feet from an area which had none. The thickness in this profile was 22 inches.

SOIL SURVEY LABORATORY Lincoln, Nebr. August 1961

SOIL TYPE Henshaw silt loam **LOCATION** Daviess County, Indiana

SOIL NOS. S60Ind-14-1 **LAB. NOS.** 13484-13491

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	3A1 0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-8	Ap	0.8a	0.8a	0.6a	5.1b	14.9	67.2	10.6	50.6	35.5	Tr.	sil
8-11	A2	1.0a	1.0a	0.5a	4.5b	14.2	59.9	18.9	45.1	32.7	Tr.	sil
11-14	B1t	0.4a	0.6a	0.5a	4.2b	11.7	51.3	31.3	37.7	28.5	Tr.	sicl
14-18	B21t	0.1a	0.3a	0.4a	3.4b	10.2	44.1	41.5	32.0	25.0	-	sic
18-25	B22t	<0.1	0.4a	0.5a	3.3b	9.4	43.7	42.7	29.8	25.8	-	sic
25-35	B23t	<0.1	0.1a	0.3a	3.1b	9.6	46.7	40.2	30.0	28.7	-	sic/sicl
35-44	B3Ct	0.1a	0.2a	0.3b	2.9c	10.0c	49.7	36.8	29.4	32.7	-	sicl
47-56	IIC	<0.1	0.2a	0.2b	1.1c	6.4c	74.1	18.0	43.3	38.0	-	sil

pH 8C1a 1:1	1:5	1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	Free Iron Fe_2O_3% 6C1a		6E1c $CaCO_3$ equivalent %	Carbonate Clay %	WATER CONTENT 4B1b 1/3-Bar Pieces %	4C1 1/3-Bar to 15-Bar %	4B2 15-Bar %
6.2			0.83	0.083	10	1.2				18.8	14.1	4.7
6.6			0.20	0.030	7	1.7				19.9	12.3	7.6
5.8			0.24	0.035	7	2.0						13.0
5.6			0.32	0.044	7	2.2						17.0
5.4			0.29	0.037	8	2.4				25.1	8.1	17.0
6.7			0.30			2.0						16.8
8.0			0.25			2.2		9.2		23.5	7.6	15.9
7.8			0.15			1.4		31.9				8.6

5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 6N2b Ca	6Q2b Mg	6H1a H	6P2a Na	6Q2a K	BASE SAT. % NH_4OAc EXCH. 5C1	Base Sat. % on Sum Cations 5C3	BULK DENSITY Field State 4B4 H_2O %	4A1a g/cc	30-cm. 4B3 H_2O %	4A1c g/cc	Oven-Dry 4A1h g/cc
←	milliequivalents per 100g. soil				→							
7.4	5.2	1.0	4.7	<0.1	0.1	85	57	18.4	1.54	20.4	1.53	1.56
9.8	6.8	2.2	2.7	<0.1	0.1	93	77	14.9	1.67	17.7	1.64	1.70
16.7	10.8	4.6	5.5	0.1	0.2	94	74					
23.2	14.0	6.5	6.8	0.1	0.4	90	76					
25.7	14.9	7.9	7.4	0.1	0.4	91	76	23.5	1.54	23.1	1.56	1.84
24.1	16.4	8.5	3.8	0.1	0.3	105	87					
19.7		8.0	1.5	0.1	0.2			19.3	1.70	20.1	1.67	1.82
10.3		3.4	<0.1	0.1	0.2							

a. Many Fe-Mn? concr.
b. Common Fe-Mn? concr.
c. Few carbonate concretions and limestone fragments.

Soil Type: Henshaw silt loam
Soil Nos.: S60Ind-14-1
Location: Daviess County, Indiana, NW 1/4 of Sec. 35, T2N, R7W; 270 feet south of gravel road in line with first power line pole east of "T" road.
Vegetation: Soybeans.
Slope and Land Form: Nearly level (less than 1 percent).
Drainage and Permeability: Imperfectly drained with slow runoff; permeability is slow.
Parent Material: Slack water deposits of silty clay loam and silt loam with minor amounts of clay and fine sand; upper part of profile probably developed in loess; neutral to calcareous at depths of 50 inches or less.
Collected by: F. J. Carlisle and M. W. Meyer, July 11, 1960.
Described by: F. W. Sanders, July 11, 1960.

Horizon and Lincoln Lab. No.	
Ap 13484	0 to 8 inches. Grayish brown (10YR 5/2) silt loam; moderate fine granular structure; friable; slightly acid; abrupt smooth boundary.
A2 13485	8 to 11 inches. Light gray (10YR 7/2) silt loam with common fine distinct light yellowish brown (10YR 6/4) mottles; wormhole or root zone fillings of grayish brown "Ap" material extend vertically through horizon (1/8 to 1/4 inch in diameter and 6 to 8 inches apart); moderate thin platy structure; friable; slightly acid; clear smooth boundary.
B1t 13486	11 to 14 inches. Light brownish gray (10YR 6/2) light silty clay loam with many medium faint light yellowish brown (10YR 6/4) mottles; dark gray (10YR 4/1) thin silty films on ped faces; weak medium prismatic structure breaking into moderate medium subangular blocky structure; firm; medium acid; clear smooth boundary.
B21t 13487	14 to 18 inches. Gray (10YR 6/1) to light brownish gray (10YR 6/2) silty clay loam with many medium faint light yellowish brown (10YR 6/4) mottles; thin gray (10YR 5/1) clay films on ped faces; weak medium prismatic structure breaking into moderate to strong medium angular blocky structure; firm; strongly acid; clear smooth boundary.
B22t 13488	18 to 25 inches. Yellowish brown (10YR 5/4) silty clay loam with many fine faint grayish brown (10YR 5/2) mottles; thin gray (10YR 5/1) clay films on ped faces; weak medium prismatic breaking into moderate fine to medium angular blocky structure; firm; medium acid; gradual smooth boundary.
B23t 13489	25 to 35 inches. Grayish brown (10YR 5/2) silty clay loam with many fine distinct yellowish brown (10YR 5/4) to light yellowish brown (10YR 6/4) mottles; thin gray (10YR 5/1) clay films on prismatic faces; fine, black, soft manganese and iron concretions common; weak medium prismatic breaking into moderate medium to coarse angular blocky structure; firm; medium acid; gradual smoooth boundary.
B3Ct 13490	35 to 44 inches. Light yellowish brown (10YR 6/4) silty clay loam with many medium faint yellowish brown (10YR 5/4) mottles; thin gray (10YR 5/1) clay films on prismatic faces; weak medium prismatic breaking into moderate to weak coarse subangular blocky structure; slightly calcareous; gradual wavy boundary. (An intermittent pocket of yellowish brown (10YR 5/6) fine sandy loam occurred between 42 and 44 inches; common fine distinct grayish brown mottles; massive; friable; slightly calcareous. This part of the horizon was not sampled.)
IIC 13491	44 to 60 inches. Light brownish gray (10YR 6/2) silt loam with common medium distinct yellowish brown (10YR 5/4) to light yellowish brown (10YR 6/4) mottles; weak coarse prismatic structure with thin gray (10YR 5/1) clay films on prismatic faces; friable; calcareous (soft carbonate concretions present). Underlying stratified material consisted of silty clay loam 60 to 72 inches, silt loam 72 to 78 inches, silty clay loam 78 to 80 inches. These underlying stratified layers were not sampled.

Remarks: Colors given are for moist soil.

The water table stood at a depth of 44 inches on July 11. The water level in the pit was lowered to a depth of 60 inches by bailing before the samples were collected.

The major prism faces in the B horizon extend from the B1t through the B3Ct.

SOIL SURVEY LABORATORY Lincoln, Nebr. 1/23/58

SOIL TYPE Hosmer silt loam **LOCATION** Knox County, Indiana

SOIL NOS. S56Ind-42-2 **LAB. NOS.** 5515-5523

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-7	Ap	-	0.2	0.3a	1.0a	1.9a	80.9	15.7	50.5	32.9	-	sil
7-10	A2	-	0.1	0.2a	0.7a	1.6a	78.8	18.6	38.1	42.7	-	sil
10-15	B1	-	-	0.1a	0.4a	1.4a	71.3	26.8	35.6	37.3	-	sil
15-19	B21	-	-	0.1a	0.3a	1.6a	70.4	27.6	39.2	33.0	-	sicl
19-25	B22	-	0.1	0.1a	0.3a	2.7a	70.8	26.0	42.1	31.6	-	sil
25-31	A2B2x	-	0.2	0.2a	0.5a	2.9a	72.5	23.7	44.2	31.5	-	sil
31-44	B21tx	-	0.1b	0.2b	0.4b	1.5b	70.9	26.9	45.6	27.0	-	sil
44-58	B22x	-	-	-	0.3b	0.8b	80.0	18.9	43.1	37.9	-	sil
58-73+	B3x	0.1	0.4b	0.6b	3.7b	4.2b	74.8	16.2	45.4	36.3	-	sil

pH 8C1a 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC x10³ MILLIMHOS PER CM @25°C.	6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
5.2			0.55	.059	9							4.8
5.0			0.45	.051	9							6.2
4.8			0.24	.035								10.1
5.0			0.21	.033								10.7
4.9			0.15	.027								10.7
5.0			0.10									10.4
5.1			0.08									11.8
5.3			0.07									8.5
5.6			0.06									6.8

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6Q2b Mg	6H1a H	6P2a Na	5B1a 6Q2a K	BASE SAT. % NH_4Ac EXCH. 5C1	5C3 Base Sat. % on Sum Cations	5B1a Sum Bases	5A3a Sum Cations	8D3 Ca/Mg	MOISTURE AT SATURATION %
←	milliequivalents per 100g. soil				→			← me/100g. →			
6.8	2.2	1.0	3.6	-	0.2	50	48	3.4	7.0	2.2	
7.9	2.1	1.4	5.7	-	0.2	47	39	3.7	9.4	1.5	
12.8	3.2	3.1	8.2	-	0.3	52	44	6.6	14.8	1.0	
13.9	2.8	3.3	9.7	0.1	0.3	47	40	6.5	16.2	0.8	
13.7	2.4	3.5	11.7	0.1	0.3	46	35	6.3	18.0	0.7	
13.2	2.4	4.2	8.2	0.1	0.3	53	46	7.0	15.2	0.6	
16.2	3.7	6.0	7.8	0.2	0.3	63	57	10.2	18.0	0.6	
12.0	3.3	4.5	5.3	0.2	0.2	68	61	8.2	13.5	0.7	
9.9	3.6	4.2	2.0	0.2	0.2	83	80	8.2	10.2	0.8	

a. Few smooth dark brown concr. (Mn-Fe?)
b. Common smooth dark brown concr. (Mn-Fe?)

Soil Type: Hosmer silt loam
Soil Nos.: S56Ind-42-2
Location: Knox County, Indiana. SE 1/4 of NW 1/4, Sec. 27, T4N, R8W.
Vegetation: Idle; strip mine cut with numerous weeds.
Drainage: Moderately well drained.
Erosion: Slight.
Relief: 3 to 5 percent slopes. Described by: O. C. Rogers.
Collected by: T. C. Bass, J. K. Ableiter, H. P. Ulrich and J. Fehrenbacher, November 2, 1956.

Horizon and Lincoln Lab. No.	
Ap 5515	0 to 7 inches. Brown (10YR 5/3 moist) silt loam; weak fine granular to moderate medium platy structure; friable when moist; abrupt smooth boundary.
A2 5516	7 to 10 inches. Brown (7.5YR 4/4 moist) to strong brown (7.5YR 5/6 moist) silt loam; infiltration of Ap in cracks and along root channels and worm casts; weak medium platy to moderate fine subangular blocky structure; friable when moist; clear wavy boundary.
B1t 5517	10 to 15 inches. Brown (7.5YR 4/4 moist) to strong brown (7.5YR 5/6 moist) heavy silt loam; a few peds are coated with pale brown (10YR 6/3 moist); moderate fine and medium subangular blocky structure; friable to slightly firm when moist; gradual smooth boundary.
B21t 5518	15 to 19 inches. Brown (7.5YR 4/4 moist) to strong brown (7.5YR 5/6 moist) silty clay loam; numerous dark brown (7.5YR 4/4 moist) to reddish brown (5YR 4/4 moist) clay skins; many peds coated with pale brown to light yellowish brown (10YR 6/3 to 6/4 moist); cracks filled with pale brown silt; moderate to strong medium subangular blocky and angular blocky structure; firm when moist; clear wavy boundary.
B22t 5519	19 to 25 inches. Brown (7.5YR 4/4 moist) silty clay loam; numerous dark reddish brown (5YR 3/4 moist) clay skins; thin coatings and crack filling of pale brown (10YR 6/3 moist); a few small very dark brown (10YR 2/2 moist) coatings and streaks; strong medium and coarse subangular blocky structure with about 1/3 angular blocky; hard when dry and firm when moist; gradual wavy boundary.
A2B2x 5520	25 to 31 inches. Yellowish brown (10YR 5/4 moist) to dark yellowish brown (10YR 4/4 moist) heavy silt loam to light silty clay loam; dark brown (7.5YR 4/4 moist) clay skins are common; thick coatings and numerous vertical crack fillings, up to 1/4-inch thick, of very pale brown to light brownish gray (10YR 7/3 to 6/2 moist); a few thin coatings of very dark brown (10YR 2/2 moist); the very pale brown color represents the A2, and yellowish brown color represents the B2x horizons; moderate coarse subangular and angular blocky structure; B2x portion is firm when moist, and A2 portion is friable; gradual wavy boundary.
B21tx 5521	31 to 44 inches. Yellowish brown (10YR 5/6 moist) to dark yellowish brown (10YR 4/4 moist) silt loam; numerous dark brown (7.5YR 4/2 moist) clay skins; coatings and crack filling of grayish brown (10YR 5/2 moist); cracks are up to 1/4-inch thick and number decreases with depth; very weak very coarse blocky structure to massive; firm when moist and brittle when dry; diffuse wavy boundary.
B22x 5522	44 to 58 inches. Dark yellowish brown (10YR 4/4 moist) to yellowish brown (10YR 5/6 moist) silt loam; a few dark brown (7.5YR 4/4 moist) clay skins; few fine very dark brown (10YR 2/2 moist) coatings and firm concretions; light gray (10YR 7/2 moist) material occurs in gross vertical cracks that are up to 1/2 inch in diameter; massive to gross polygonal structure; firm when moist and hard and brittle when dry; gradual wavy boundary.
B3x 5523	58 to 73 inches plus. Dark yellowish brown (10YR 4/4 moist) to yellowish brown (10YR 5/6 moist) silt loam; light gray (10YR 7/2 moist) occurs largely in vertical cracks; number decreases with depth; massive; friable to slightly firm when moist.

Mineralogy (Method 7A2): X-ray diffraction analyses on the B horizons showed the clay to be dominantly montmorillonite with lesser amounts of illite and some kaolinite.

SOIL SURVEY LABORATORY Lincoln, Nebr. 1/23/58

SOIL TYPE Hosmer silt loam **LOCATION** Warrick County, Indiana

SOIL NOS. S56Ind-87-1 **LAB. NOS.** 5524-5532

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-5	Ap	0.1	0.2a	0.2a	0.3a	0.9a	83.6	14.7	42.0	42.7	-	sil
5-10	A2	0.1a	0.2a	0.2a	0.4a	0.7a	78.3	20.1	35.8	43.4	-	sil
10-14	B1t	-	0.2a	0.2a	0.4a	0.7a	76.9	21.6	35.4	42.4	-	sil
14-22	B21t	-	0.2a	0.2a	0.3a	0.5a	74.5	24.3	35.3	39.9	-	sil
22-34	B22t	-	-	0.1a	0.2a	1.0a	78.0	20.7	39.6	39.5	-	sil
34-46	A2B2x	-	0.2a	0.2a	0.4a	1.1a	82.0	16.1	44.7	38.6	-	sil
46-61	B21tx	-	0.1a	0.1a	0.3a	0.6a	80.9	18.0	44.1	37.6	-	sil
61-79	B22x	0.1	0.1a	0.1a	1.4a	2.1a	78.0	18.2	43.7	37.6	-	sil
79-96	B3x	0.9a	1.4a	0.4a	6.6a	8.7a	61.7	20.3	43.5	32.9	-	sil

pH 8C1a 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM 25°C.	6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
5.5			1.10	.095	12							5.3
5.7			0.34	.044	8							7.0
5.6			0.27	.039	7							8.1
5.2			0.20	.034								9.6
5.1			0.13	.025								9.3
5.1			0.08									7.8
5.3			0.06									9.1
5.7			0.04									8.7
6.4			0.04									8.0

5A1a CATION EXCHANGE CAPACITY ← NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6Q2b Mg	6H1a H	6P2a Na	5B1a 6Q2a K	BASE SAT. % NH_4Ac EXCH. 5C1	5C3 Base Sat. % on Sum Cations	5B1a Sum Bases	5A3a Sum Cations	8D3 Ca/Mg	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →							← me/100g. →			
7.4	2.2	0.6	4.8	-	0.4	43	40	3.2	8.0		
7.4	3.1	1.4	3.6	-	0.2	64	57	4.7	8.3	2.2	
8.2	3.3	1.7	3.7	-	0.3	65	59	5.3	9.0	1.9	
11.0	2.6	3.8	5.3	0.1	0.3	62	56	6.8	12.1	0.7	
11.2	1.5	3.8	7.8	0.1	0.3	51	42	5.7	13.5	0.4	
9.2	1.1	2.3	6.1	0.1	0.3	41	38	3.8	9.9	0.5	
11.7	2.7	4.2	6.1	0.3	0.2	63	55	7.4	13.5	0.6	
12.7	4.9	5.5	2.8	0.5	0.2	87	80	11.1	13.9	0.9	
11.3	5.2	4.4	1.2	0.6	0.1	91	90	10.3	11.5	1.2	

a. Common smooth dark brown concr. (Mn-Fe?)

Soil Type: Hosmer silt loam
Soil Nos.: S56Ind-87-1
Location: Warrick County, Indiana. T6S, R8W, Sec. 25; NW 160, NE 40; 120 feet south of middle of road to west; 20 feet east of center of north-south road.
Vegetation: Idle, containing various kinds of weeds.
Drainage: Moderately well drained.
Erosion: Slight.
Relief: 2 to 3 percent slopes.
Collected by: O. C. Rogers, J. K. Ableiter, November 1, 1956.
Described by: O. C. Rogers.

Horizon and Lincoln Lab. No.	
Ap 5524	0 to 5 inches. Brown to dark grayish brown (10YR 4/3 to 4/2 moist), brown to pale brown (10YR 5/3 to 6/3 dry) silt loam; weak fine granular structure; soft when dry and friable when moist; abrupt smooth boundary.
A2 5525	5 to 10 inches. Dark yellowish brown (10YR 4/4 moist), yellowish brown (10YR 5/4 to 5/6 dry) silt loam; weak fine subangular blocky to very weak medium platy structure; slightly hard when dry and friable when moist; clear wavy boundary.
B1t 5526	10 to 14 inches. Brown (7.5YR 4/4 moist), yellowish brown (10YR 5/4 to 5/6 dry) silt loam; weak fine and medium subangular blocky structure; hard when dry and firm when moist; clear wavy boundary.
B21t 5527	14 to 22 inches. Strong brown (7.5YR 5/6 moist) heavy silt loam; a few clay skins of dark brown (7.5YR 4/4 moist) to reddish brown (5YR 4/3 moist); light brownish gray to pale brown (10YR 6/2 to 6/3 moist) occurs as thin coating on some peds and along vertical cracks; moderate medium and coarse subangular blocky structure; firm when moist; gradual wavy boundary.
B22t 5528	22 to 34 inches. Strong brown (7.5YR 5/6 moist) to yellowish brown (10YR 5/6 moist) silt loam; common clay skins of dark brown (7.5YR 4/4 moist); very few thin coatings and streaks of very dark brown (10YR 2/2 moist); coatings and crack fillings of brown (10YR 5/3 moist); weak coarse subangular blocky structure; firm when moist; clear wavy boundary.
A2B2x 5529	34 to 46 inches. Yellowish brown (10YR 5/6 moist) to strong brown (7.5YR 5/6 moist) silt loam; numerous streaks, thick coatings and both vertical and horizontal crack fillings of grayish brown to light brownish gray (10YR 5/2 to 6/2 moist); the B2x portion is yellowish brown to strong brown, while the A2 portion is grayish brown to light brownish gray; the A2 comprises about 30 to 40 percent of horizon and is friable when moist; massive to very weak very coarse angular blocky structure; B2x is firm when moist; clear smooth boundary.
B21tx 5530	46 to 61 inches. Brown to strong brown (7.5YR 4/4 to 5/6 moist) heavy silt loam; coatings and crack fillings of light brownish gray (10YR 6/2 moist); a few dark brown (7.5YR 4/4 moist) clay skins; massive to weak very coarse angular blocky structure; gross polygonal structure; very hard and brittle when dry and very firm when moist; diffuse irregular boundary.
B22x 5531	61 to 79 inches. Brown to strong brown (7.5YR 4/4 to 5/6 moist) silt loam; coatings and crack filling of light brownish gray (10YR 6/2 moist); cracks become less numerous with depth; massive to gross polygonal structure; very hard and brittle when dry and very firm when moist; diffuse wavy boundary.
B3x 5532	79 to 96 inches. Yellowish brown (10YR 5/6 moist) silt loam; brown to pale brown (10YR 5/3 to 6/3 moist) material occurs as thin coatings and as fillings in very fine cracks throughout horizon; coatings and small concretions of very dark brown (10YR 2/2 moist) are common; massive to very gross polygons; very hard when dry and firm when moist; gradual wavy boundary.
D	96 inches plus. Yellowish brown (10YR 5/6 moist) partially weathered sandstone and shale.

Mineralogy (Method 7A2): X-ray diffraction analyses on the B horizons showed the clay to be dominantly montmorillonite with lesser amounts of illite and some kaolinite. The B3x horizon was also high in montmoillonite but contained a significantly higher proportion of kaolinite than the B horizons.

SOIL SURVEY LABORATORY Mandan, N. D.

SOIL TYPE Heytville silty clay loam **LOCATION** Allen Co., Indiana

MSL NOS: 3842-3846

SOIL NOS. S-55-Ind-2-3 **LAB. NOS.** BSL NOS: 551383-87

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	3A1 2A2 > 2 <19mm	TEXTURAL CLASS
0-7	Ap	0.6	1.7	2.7	6.4	5.4	39.0	44.2	18.8	29.4	—	c
7-15	B_{1g}	0.4	1.2	2.0	5.0	3.3	36.3	51.8	14.8	28.0	—	c
15-25	B_{2g}	0.9	1.5	2.0	4.0	3.6	35.6	52.4	13.5	28.1	—	c
25-38	B_{3g}	0.7	1.3	2.0	4.3	4.1	37.5	50.1	14.4	29.8	—	c
38-41+	C	1.3	2.0	2.3	4.5	4.6	40.8	44.5	16.0	32.2	4	sic

8C1a pH 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6S1a % Total P		6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
7.0			3.08	.279	11	0.079		–				
6.8			1.12	.120	9	0.060		–				
7.1			0.65	.076	9	0.052		–				
7.5			0.40	.044	9	0.052		–				
7.9			0.52	.054	10	0.055		6				

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6Q2b Mg	6H1a H	6P2a Na	6Q2a K	5B1a Base Sat. % NH_4Ac Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Bases	5A3a Sum Cations	8D3 Ca/Mg	MOISTURE AT SATURATION %
←	milliequivalents per 100g. soil				→			← me/100g. →			
29.0	26.0	5.1	5.2	0.1	0.5		86	31.7	36.9	5.1	
27.5	23.6	4.5	4.0	0.1	0.4		88	28.6	32.6	5.2	
24.4	22.6	4.4	2.9	0.1	0.4		90	27.5	30.4	5.1	
24.4	21.3	4.3	1.5	0.2	0.3		94	26.1	27.6	5.0	
19.2		3.3	0.2	0.1	0.2						

Soil Type: Hoytville silty clay loam
Soil Nos.: S55Ind-2-3
Location: 180 feet east of State Highway No. 101, 1,730 feet north of north end of Maumee river bridge, NW 1/4 of SW 1/4, Sec. 4, T31N, R15E, Allen County, Indiana.
Topography: Level, 1 percent slope.
Physiography: Lake plain.
Drainage: Very poor.
Vegetation: Oats.
Field No.: Legend No. 32118.
Beltsville Lab. Nos.: 551383-551287.
Described by: James V. Anderson, October, 1955.

Horizon and Mandan Lab. No.	
Ap 3842	0 to 7 inches. Very dark gray (10YR 3/1 moist) silty clay loam; weak fine crumb structure; firm when moist; pH 7.0.
B1g 3843	7 to 15 inches. Grayish brown (2.5Y 5/2) with common medium distinct mottles of yellowish red (5YR 5/6 moist) silty clay; moderate medium angular blocky structure; firm when moist; pH 7.2.
B2g 3844	15 to 25 inches. Grayish brown (2.5Y 5/2) with many medium distinct mottles of yellowish brown (10YR 5/6 moist) silty clay; strong coarse angular blocky structure; very firm when moist; pH 7.4.
B3g 3845	25 to 38 inches. Grayish brown (2.5Y 5/2) with many medium distinct mottles of yellowish brown (10YR 5/6 moist) silty clay; moderate coarse angular blocky structure; firm when moist; pH 7.4.
C 3846	38 to 41 inches plus. Grayish brown (2.5Y 5/2) with many medium distinct mottles of yellowish brown (10YR 5/6) and white (10YR 8/2 moist) silty clay; weak medium angular blocky structure; firm when moist; strong effervescence with 2N HCl. White mottles are of $CaCO_3$.

Remarks: The pH values are unusually high because field has been limed and because the sample site is near a graveled lane.

SOIL SURVEY LABORATORY Mandan, N. D.

SOIL TYPE Hoytville silty clay **LOCATION** Allen Co., Indiana

SOIL NOS. S-55-Ind-2-5 **LAB. NOS.** MSL NOS: 3853-3858 BSL NOS: 551394-99

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	3A1 0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-6	A_p	0.3	0.8	1.3	3.1	2.6	45.7	46.2	10.6	39.5	-	sic
6-11	B_{1g}	0.1	0.5	1.1	2.6	2.4	44.0	49.3	9.7	38.2	-	sic
11-18	B_{21g}	0.3	0.7	1.4	3.1	1.2	41.0	52.3	8.1	35.7	-	sic
18-34	B_{22g}	0.1	0.6	0.9	2.1	1.7	42.1	52.5	8.1	36.9	-	sic
34-42	B_{3g}	0.4	0.9	1.2	2.5	1.8	45.2	48.0	8.6	39.8	-	sic
42-+	C	0.8	0.8	0.9	1.9	1.6	50.8	43.2	8.0	45.5	-	sic

pH 8C1a 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N			6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
5.8			2.10	.208	10							
5.8			1.09	.120	9							
6.1			0.76	.082	9							
7.0			0.42	.049	9			-				
7.4			0.48	.053	9			-				
7.8			0.56	.054	10			10				

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	5B1a 6Q2a K	5C1 Base Sat. % NH_4Ac Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Bases	5A3a Sum Cations		8D3 Ca/Mg	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil							me/100g.				
25.9	16.9	4.0	9.3	0.1	0.4	83	70	21.4	30.7		4.2	
24.8	16.3	4.5	7.2	0.2	0.3	86	75	21.3	28.5		3.6	
25.6	17.4	5.5	6.2	0.2	0.3	91	79	23.4	29.6		3.2	
23.9	19.2	6.7	3.0	0.2	0.3		90	26.4	29.4		2.9	
20.4	18.7	6.2	2.0	0.2	0.2		93	25.3	27.3		3.0	
25.8		4.9	0.4	0.2	0.2							

Soil Type: Hoytville silty clay
Soil Nos.: S55Ind-2-5
Location: SW 1/4 of SW 1/4, Sec. 28, T31N, R15E, Allen County, Indiana. The site is 2,470 feet west, 180 feet south of southwest corner of Sec. 28.
Topography: Level, 1 percent slope.
Physiography: Lake plain.
Drainage: Very poor.
Vegetation: Corn.
Field No.: Legend No. 12118.
Beltsville Lab. Nos.: 551394-551399.
Described by: James V. Anderson, October, 1955.

Horizon and Mandan Lab. No.	
Ap 3853	0 to 6 inches. Very dark grayish brown (10YR 3/2) with few fine faint mottles of yellowish brown (10YR 5/6 moist) silty clay; cloddy structure; firm when moist; pH 6.6.
B1g 3854	6 to 11 inches. Dark grayish brown (2.5Y 4/2) with common fine distinct mottles of yellowish brown (10YR 5/6 moist) silty clay; moderate fine angular blocky structure; very firm when moist; pH 6.8.
B21g 3855	11 to 18 inches. Dark grayish brown (2.5Y 4/2) with common fine distinct mottles of yellowish brown (10YR 5/6 moist) silty clay; moderate medium angular blocky structure; very firm when moist; pH 7.0.
B22g 3856	18 to 34 inches. Dark grayish brown (2.5Y 4/2) with common medium distinct mottles of yellowish brown (10YR 5/6 moist) silty clay; moderate medium angular blocky structure; very firm when moist; pH 7.4.
B3g 3857	34 to 42 inches. Dark grayish brown (2.5Y 4/2) with common medium distinct mottles of yellowish brown (10YR 5/6 moist) silty clay; moderate coarse angular blocky structure; very firm when moist; pH 7.4.
C 3858	42 inches plus. Yellowish brown (10YR 5/8) with many medium distinct mottles of grayish brown (2.5Y 5/2 moist) silty clay; massive; very firm when moist; strong effervescence with 2N HCl.

Remarks: This profile is representative of the finest-textured soils of the Lake Maumee area of Allen County.

SOIL SURVEY LABORATORY Mandan, N. D.

SOIL TYPE Hoytville silty clay loam **LOCATION** Allen Co., Indiana

MSL NOS: 3859-3864

SOIL NOS. S-55-Ind-2-6 **LAB. NOS.** BSL NOS: 551400-405

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	3A1 0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-9	Ap	1.3	2.4	2.4	6.0	4.8	43.1	40.0	19.5	32.2	-	sic
9-15	$B_{1}g$	1.3	2.2	2.1	6.0	4.8	40.2	43.4	19.3	29.5	-	sic
15-23	$B_{21}g$	1.0	2.0	2.0	6.0	4.7	41.5	42.8	19.7	30.4	-	sic
23-34	$B_{22}g$	1.9	3.1	2.3	6.3	4.9	42.9	38.6	20.4	31.4	-	sicl
34-48	$B_{3}g$	0.7	2.5	2.5	6.8	5.4	43.4	38.7	20.4	32.7	-	sicl
48 +	C	1.6	2.8	2.6	6.2	6.0	45.1	35.7	20.7	34.2	-	sicl

pH 8C1a 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6S1a % Total P.		6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
6.4			3.64	.300	12	0.081		1				
6.5			1.20	.131	9	0.065		-				
6.8			0.76	.088	9	0.056		-				
7.2			0.52	.056	9	0.054		-				
7.4			0.53	.052	10	0.055		-				
7.9			0.64	.058	11	0.059		12				

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	5B1a 6Q2a K	5C1 Base Sat. % NH_4Ac Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Bases	5A3a Sum Cations	8D3 Ca/Mg	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →							me/100g →			
32.3	25.6	4.2	7.2	0.1	0.4	94	81	30.3	37.5	6.1	
27.8	23.3	4.2	4.6	0.1	0.4		86	26.0	32.6	5.5	
26.6	22.2	4.1	3.1	0.1	0.4		90	26.8	29.9	5.4	
23.0	19.0	3.7	2.2	0.2	0.3		91	23.2	25.4	5.1	
19.2	16.7	3.4	2.1	0.2	0.3		91	20.6	22.7	4.9	
13.6		2.4	0.2	0.1	0.2						

Soil Type: Hoytville silty clay
Soil Nos.: S55Ind-2-6
Location: NW 1/4 of NW 1/4 of Sec. 22, T30N, R15E, Allen County, Indiana. Sample site is 65 feet north of bend in drain ditch which is 1/4 mile east of west side of Sec. 22.
Topography: Level, 1 percent slope.
Physiography: Lake plain.
Drainage: Very poor.
Vegetation: Wheat.
Field No.: Legend No. 32118.
Beltsville Lab. Nos.: 551400-551405.
Described by: James V. Anderson, October, 1955.

Horizon and Mandan Lab. No.	
Ap 3859	0 to 9 inches. Very dark gray (10YR 3/1) silty clay loam; moderate medium granular structure breaking to moderate, fine crumb structure; firm when moist; pH 6.6.
B1g 3860	9 to 15 inches. Dark gray (10YR 4/1) with few, medium, distinct mottles of yellowish brown (10YR 5/6 moist) silty clay; strong, fine, angular blocky structure; very firm when moist; pH 6.8.
B21g 3861	15 to 23 inches. Dark gray (10YR 4/1) with many large, distinct mottles of yellowish brown (10YR 5/6 moist) silty clay; strong, medium, angular blocky structure; very firm when moist; pH 7.0.
B22g 3862	23 to 34 inches. Grayish brown (2.5Y 5/2) with many large distinct mottles of yellowish brown (10YR 5/8 moist) silty clay; moderate medium angular blocky structure; very firm when moist; pH 7.4.
B3g 3863	34 to 48 inches. Grayish brown (2.5Y 5/2) with many large distinct mottles of dark yellowish brown (10YR 4/4 moist) silty clay; weak medium angular blocky structure; firm when moist; pH 7.4.
C 3864	48 inches plus. Dark yellowish brown (10YR 4/4) with many large distinct mottles of gray (2.5Y 5/0 moist) silty clay; weak medium angular blocky structure; firm when moist; strong effervescence with 2N HCl.

Remarks: The dark color of the B21g, B22g, and B3g is due to coatings of organic material and clay. Former cracks one inch wide which are now filled with surface soil were found extending into the B3g horizon.

SOIL SURVEY LABORATORY Mandan, N. D.

SOIL TYPE Hoytville silty clay **LOCATION** Allen Co., Indiana

SOIL NOS. S-55-Ind-2-7 **LAB. NOS.** MSL NOS: 3865-3870 BSL NOS: 551406-411

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-7	A_p	1.1	1.4	2.2	5.1	4.3	41.0	44.9	18.2	29.9	-	sic
7-13	B_{1g}	0.6	1.3	2.1	5.1	3.2	39.0	48.7	15.3	29.8	-	c
13-22	B_{21g}	0.7	1.4	2.0	4.7	4.1	38.8	48.3	16.3	29.2	-	c
22-35	B_{22g}	0.8	1.5	2.0	4.8	4.3	39.2	47.4	16.8	29.3	-	c
35-44	B_{3g}	1.3	1.4	1.9	4.6	4.4	41.1	45.3	16.9	31.2	-	sic
44→	C	1.9	2.0	1.8	4.9	4.1	44.7	40.6	16.5	35.2	-	sic

pH 8C1a 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)		6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
6.2			2.51	.244	10							
6.6			1.48	.154	10							
6.9			0.68	.085	8			-				
7.4			0.38	.054	7			-				
7.5			0.43	.054	8			-				
7.9			0.49	.052	9			17				

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K	5B1a	5C1 Base Sat. % NH_4Ac Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Bases	5A3a Sum Cations		8D3 Ca/Mg	MOISTURE AT SATURATION %
←	milliequivalents per 100g. soil					→			← me/100g. →				
27.9	21.9	3.6	7.7	0.1	0.5		94	77	26.1	33.8		6.1	
26.3	20.6	3.9	5.1	0.1	0.4		95	83	25.0	30.1		5.3	
23.6	18.8	4.1	2.7	0.1	0.5			90	23.5	26.2		4.6	
22.2	17.5	4.2	1.7	0.2	0.4			93	22.3	24.0		4.2	
19.9	17.1	3.8	0.1	0.2	0.4			100	21.5	21.6		4.5	
15.0		3.1	-	0.2	0.2								

Soil Type: Hoytville silty clay
Soil Nos.: S55Ind-2-7
Location: NW 1/4 of SW 1/4, Sec. 2, T30N, R14E, Allen County, Indiana. The sample site is 1,980 feet north, 742 feet east of southwest corner of Sec. 2.
Topography: Level, slope 1 percent.
Physiography: Lake plain.
Drainage: Very poor.
Vegetation: Oats.
Field No.: Legend No. 12118.
Beltsville Lab. Nos.: 551406-551411.
Described by: James V. Anderson, October, 1955.

Horizon and Mandan Lab. No.	
Ap 3865	0 to 7 inches. Very dark grayish brown (10YR 3/2 moist) silty clay; weak fine crumb structure; firm when moist; pH 6.4.
B1g 3866	7 to 13 inches. Dark grayish brown (2.5Y 4/2) with common medium distinct mottles of dark yellowish brown (10YR 4/4 moist) silty clay; moderate fine angular blocky structure; firm when moist; pH 6.6.
B21g 3867	13 to 22 inches. Dark grayish brown (2.5Y 4/2) with many large distinct mottles of dark yellowish brown (10YR 4/4 moist) silty clay; moderate fine angular blocky structure; very firm when moist; pH 7.2.
B22g 3868	22 to 35 inches. Dark grayish brown (2.5Y 4/2) with many large faint mottles of dark yellowish brown (10YR 4/4 moist) silty clay; weak fine angular blocky structure; firm when moist; pH 7.4.
B3g 3869	35 to 44 inches. Dark yellowish brown (10YR 4/4) with many large prominent mottles of gray (2.5Y 5/0 moist) silty clay; massive structure; firm when moist; pH 7.4.
C 3870	44 inches plus. Dark yellowish brown (10YR 4/4) with many large prominent mottles of gray (2.5Y 5/0 moist) silty clay; massive structure; firm when moist; slight effervescence with 2N HCl.

Remarks: A former crack, now filled with surface soil, was observed to be continuous from the surface to the C horizon.

SOIL SURVEY LABORATORY Mandan, N. D.

SOIL TYPE Hoytville silty clay loam **LOCATION** Allen Co., Indiana

MSL NOS: 3907-3911

SOIL NOS. S-55-Ind-2-15 **LAB. NOS.** ~~BSL NOS: 551448-452~~

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	3A1 0.02-0.002	2A2 > 2 (<19mm.)	TEXTURAL CLASS
0-6	A_p	1.7	0.6	0.7	3.2	4.6	44.4	44.8	21.1	30.0	-	sic
6-14	B_{1g}	0.3	0.7	0.8	3.3	4.6	43.0	47.3	20.9	28.8	-	sic
14-28	B_{2g}	0.3	0.8	0.9	3.5	4.6	45.3	44.6	22.0	30.1	-	sic
28-41	B_{3g}	0.2	0.7	0.7	3.1	4.4	48.5	42.4	22.6	32.3	-	sic
41-+	C	1.4	2.0	1.7	5.1	5.2	44.1	40.5	20.4	31.9	4	sic

pH 8C1a 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	ORGANIC MATTER 6B1a NITROGEN %	ORGANIC MATTER C/N	6S1a % Total P		6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	MOISTURE TENSIONS 1/3 ATMOS. %	MOISTURE TENSIONS 15 ATMOS. %
6.3			3.53	.280	13	0.085		-				
6.7			1.13	.115	10	0.042		-				
7.3			0.51	.062	8	0.041		-				
7.5			0.37	.045	8	0.041		-				
7.9			0.59	.053	11	0.046		12				

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6Q2b Mg	6H1a H	6P2a Na	6Q2a K	Base Sat. % NH_4Ac Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum %Bases	5A3a Sum Cations	8D3 Ca/Mg	MOISTURE AT SATURATION %
	← milliequivalents per 100g. soil →						← me/100g. →				
32.5	25.8	6.5	8.5	0.1	0.5		79	32.9	41.4	4.0	
28.5	24.1	6.9	4.6	0.2	0.4		87	31.6	36.2	3.5	
26.5	22.6	6.9	2.4	0.2	0.4		93	30.1	32.5	3.3	
25.5	21.7	6.8	1.2	0.2	0.3		96	29.0	30.2	3.2	
20.1		5.1	-	0.1	0.2						

Soil Type: Hoytville silty clay loam
Soil Nos.: S55Ind-2-15
Location: NW 1/4 of NE 1/4 of Sec. 20, T29N, R14E, Allen County, Indiana. The sample site is 250 feet east, 295 feet south of center of north side of Sec. 20.
Topography: Level, less than 1 percent slope.
Physiography: Upland till plain or shallow edge of lake plain.
Drainage: Very poor.
Vegetation: Oats.
Field No.: Legend No. 3118.
Beltsville Lab. Nos.: 551448-551452.
Described by: James V. Anderson, October, 1955.

Horizon and Mandan Lab. No.	
Ap 3907	0 to 6 inches. Very dark brown (10YR 2/2) with few small faint mottles of dark grayish brown (10YR 4/2 moist) silty clay loam; weak fine granular structure; firm when moist; pH 6.8.
B1g 3908	6 to 14 inches. Very dark grayish brown (10YR 3/2) with many large distinct mottles of dark yellowish brown (10YR 4/4 moist) silty clay; moderate fine angular blocky structure; very firm when moist; pH 6.9.
B2g 3909	14 to 28 inches. Dark grayish brown (10YR 4/2) with many medium mottles of dark yellowish brown (10YR 4/4 moist) silty clay; moderate very fine angular blocky structure; firm when moist; pH 6.9.
B3g 3910	28 to 41 inches. Grayish brown (2.5Y 5/2) with many medium distinct mottles of yellowish brown (10YR 5/8 moist) silty clay; moderate fine angular blocky structure; firm when moist; pH 7.4.
C 3911	41 inches plus. Grayish brown (2.5Y 5/2) with many large distinct mottles of yellowish brown (10YR 5/8 moist) silty clay; massive structure; firm when moist; strong effervescence with 2N HCl.

SOIL SURVEY LABORATORY Mandan, N. D.

SOIL TYPE Hoytville silty clay loam **LOCATION** Allen Co., Indiana

MSL NOS: 3929-3933

SOIL NOS. S55Ind-2-19 **LAB. NOS.** BSL NOS: 551470-474

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-9	AB_p	0.6	1.9	2.3	6.5	5.5	42.7	40.5	21.0	31.0	-	sic
9-21	B_{21g}	0.6	1.5	1.8	5.6	5.2	39.4	45.9	18.6	29.3	-	c
21-36	B_{22g}	0.6	1.4	1.7	5.6	5.1	36.8	48.8	19.3	25.9	-	c
36-50	B_{3g}	0.3	1.4	1.9	6.8	4.0	35.9	49.7	17.3	26.8	-	c
50-+	C	0.7	1.4	1.4	5.0	5.4	40.9	45.2	18.2	31.2	-	sic

8C1a pH 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6S1a % Total P		6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
5.9			1.99	.186	11	0.081						
5.7			1.30	.138	9	0.069						
5.6			0.71	.084	9	0.046						
6.6			0.41	.053	8	0.039		-				
7 7			0.48	.053	9	0.050		3				

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	5B1a 6Q2a K	5C1 Base Sat. % NH_4Ac Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Bases	5A3a Sum Cations		8D3 Ca/Mg	MOISTURE AT SATURATION %
←	milliequivalents per 100g. soil →							← me/100g. →				
22.2	13.1	3.0	10.3	0.1	0.4	75	62	16.6	26.9		4.4	
21.3	12.2	2.2	9.6	0.1	0.4	70	61	14.9	24.5		5.5	
20.7	12.7	4.1	6.9	0.1	0.5	84	72	17.4	24.3		3.1	
21.9	15.4	5.4	4.2	0.2	0.4	98	84	21.4	25.6		2.9	
18.6		4.5	0.8	0.2	0.3							

Soil Type: Hoytville silty clay loam
Soil Nos.: S55Ind-2-19
Location: SW 1/4 of SW 1/4 of Sec. 1, T31N, R13E, Allen County, Indiana. The sample site is 133 feet north, 200 feet east of southwest corner of Sec. 1.
Topography: Shallow depression, 1 percent slope.
Physiography: Upland till plain.
Drainage: Very poor.
Vegetation: Corn.
Field No.: Legend No. 3118.
Beltsville Lab. Nos.: 551470-551474.
Described by: James V. Anderson, October, 1955.

Horizon and Mandan Lab. No.	
ABp 3929	0 to 9 inches. Dark grayish brown (10YR 4/2 moist) silty clay loam; weak very fine crumb structure; firm when moist; pH 6.2.
B21g 3930	9 to 21 inches. Dark gray (10YR 4/1) with many large prominent mottles of dark yellowish brown (10YR 4/4 moist) silty clay; weak medium angular blocky structure; firm when moist; pH 6.0.
B22g 3931	21 to 36 inches. Dark gray (10YR 4/1) with many large prominent mottles of dark yellowish brown (10YR 4/4 moist) silty clay; strong fine angular blocky structure; plastic when wet; pH 6.0.
B3g 3932	36 to 50 inches. Dark gray (10YR 4/1) with many large prominent mottles of dark yellowish brown (10YR 4/4 moist) silty clay; strong fine angular blocky structure; plastic when wet; pH 7.0.
C 3933	50 inches plus. Dark gray (10YR 4/1) with many large distinct mottles of dark grayish brown (10YR 4/2) and common small distinct mottles of light gray (10YR 7/2 moist) silty clay; weak fine angular blocky structure; plastic when wet; strong effervescence with 2N HCl.

Remarks: This profile was dry when it was being described, and cracks one inch wide were numerous at the soil surface.

SCS-421
10-64 (Rev. 9-66)

U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Iona silt loam SOIL Nos. 30 LOCATION Knox County, Indiana

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 55955 - 55963

Depth (In.)	Horizon	1B1b Total Sand (2-0.05)	Silt (0.05-0.002)	Clay (< 0.002)	Size class and particle diameter (mm) 3A1 Sand: Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Silt: 0.05-0.02	Int. III (0.02-0.002)	Int. II (0.2-0.02)	(2-0.1)		3B2 Cm	Coarse fragments 3B1: 2A2 ≥ 2 Pct.	2-19	19-76
		Pct. of < 2 mm															Pct of < 76mm	
0-4	A1		74.6	14.8	2.4	2.4	1.2	1.8	2.8		34.8	43.5				-		
4-8	A2		74.3	15.1	2.0	2.8	1.3	1.9	2.6		35.0	42.9				-		
8-14	B1		77.9	17.0	0.9	1.0	0.3	0.5	2.4		35.6	44.9				-		
14-21	B21t		71.2	25.7	0.2	0.5	0.3	0.4	1.7		30.7	42.5				-		
21-28	B22t		68.1	29.3	-	0.1	0.2	0.3	2.0		24.1	46.2				-		
28-36	B23t		69.9	27.1	-	0.1	0.2	0.3	2.4		24.2	48.3				-		
36-42	B31		73.5	23.2	-	0.2	0.2	0.4	2.5		23.1	53.2				-		
42-53	B32		79.8	18.2	-	0.1	0.1	0.2	1.6		22.0	59.4				-		
53-62	C1		91.3	5.8	-	-	0.1	0.3	2.5		21.6	72.3				-		
62-140	C2		88.9	6.9	-	0.2	0.2	0.3	3.5		29.7	66.9				-		
140-168	C3		89.0	7.4	-	0.3	0.2	0.4	2.7		28.9	63.0				-		
168-240	C4		92.1	6.3	-	0.1	-	0.1	1.4		29.4	64.1				-		

Depth (In.)	6A1a Organic carbon Pct.	Nitrogen Pct	C/N		Carbonate as $CaCO_3$ Pct.	Ext. iron as Fe Pct.	Bulk density: g/cc	4A1e ⅓ bar g/cc	4A1h Oven dry g/cc	4D1 COLE	Water content: Pct.	4B1c ⅓ bar Pct.	4B2 15 bar Pct.		4C1 WRD In/in	pH:	8C1c (1:1) KCl	8C1e (1:1) H_2O
0-4	2.35																	6.9
4-8	2.00																	7.0
8-14	0.93																	6.8
14-21	0.42																	6.5
21-28	0.34																	5.9
28-36	0.29																	5.6
36-42	0.25																	5.6
42-53	0.24																	5.9
53-62	0.22																	8.0
62-140	0.26																	8.1
140-168	0.36																	7.9
168-240	0.30																	8.1

Depth (In.)	Extractable bases 5B1a: 6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum	6H1a Ext. acidity	CEC: 5A3a Sum cations		6G1d Ext. Al			Ratios to clay: CEC Sum	Ext. iron	15-bar water	8D3 Ca/Mg		Base saturation: 5C3 Sum cations Pct	5C1 NH_4OAc Pct.
	meq/100 g																	
0-4	11.5	2.6	0.1	0.3		3.4	17.9										81	
4-8	12.5	2.4	0.1	0.2		3.4	18.6										82	
8-14	9.4	1.5	0.1	0.1		3.6	14.7										76	
14-21	11.8	2.2	0.1	0.3		4.1	18.5										78	
21-28	12.0	3.0	0.1	0.3		5.2	20.6										75	
28-36	10.6	3.3	0.2	0.3		6.0	20.4										70	
36-42	9.6	3.2	0.1	0.3		5.2	18.4										72	
42-53	8.7	2.8	0.2	0.2		4.2	16.1										74	
53-62	a																	
62-140	a																	
140-168	a																	
168-240	a																	

Depth (In.)	Clay Fraction Analysis 7A1b-d: Mt	Chl	Vm	Mi	Int	Qtz.	Kl.	Gibbsite
	7A2 X-ray						7A3	

a Calcareous

Mt. = Montmorillonite, Chl. = chlorite, Vm. = Vermiculite, mi = mica, Int. = Interstratified layer, Qtz. = quartz, Kl. = Kaolinite

Relative amounts: blank = not determined, dash = not detected, tr. = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant.

Soil Type: Iona silt loam
Soil No.: 30
Location: Knox County, Indiana. Survey 50, T. 3 N., R 10 W., 0.2 miles from the Wabash River, along the southern traverse.
Physiography: 35 foot loess (layers sand and silt lower 15 feet) over Illinoian till.

Horizon and Beltsville Lab. No.	
A1 55955	0 to 4 inches. Dark grayish brown (10YR 4/2) silt loam, smooth except for iron concretions and a few pebbles which apparently came from nearby gravel road.
A2 55956	4 to 8 inches. Grayish brown (10YR 5/2) silt loam, smooth except for iron concretions and small amount of grit which was probably from road.
B1 55957	8 to 14 inches. Mottled dark brown (10YR 3/3), pale brown (10YR 6/3), and brown (10YR 5/3) heavy silt loam, smooth, containing numerous iron concretions.
B21t 55958	14 to 21 inches. Mottled light gray (10YR 6/1), grayish brown (10YR 5/2), and strong brown (7.5YR 5/8) silty clay loam, smooth, containing iron concretions.
B22t 55959	21 to 28 inches. Mottled strong brown (7.5YR 5/8), grayish brown (10YR 5/2), and yellowish brown (10YR 5/6), heavy silt loam to light silty clay loam, smooth, containing iron concretions.
B23t 55960	28 to 36 inches. Mottled strong brown (7.5YR 5/8), reddish brown (5YR 4/4), smooth, containing iron concretions.
B31 55961	36 to 42 inches. Strong brown (7.5YR 5/8) heavy silt loam, smooth, containing iron concretions.
B32 55962	42 to 53 inches. Mostly strong brown (7.5YR 5/7) silt loam with some mottles of light gray (10YR 7/1) and reddish brown (5YR 4/4), smooth, containing iron concretions.
C1 55963	53 to 62 inches. Splotched and mottled reddish yellow (7.5YR 6/8), light gray (10YR 7/1), and very dark brown (10YR 2/2), coarse silty loam (or very fine sand?), containing iron concretions.
C2 55964	62 to 140 inches. Yellowish brown (10YR 5/6) coarse silty loam splotched with light gray (10YR 7/1) and reddish yellow (7.5YR 6/8).
C3 55965	140 to 168 inches. Yellowish brown (10YR 5/4) coarse silty loam mottled and splotched with light gray (10YR 7/1) and brownish yellow (10YR 6/6).
C4 55966	168 to 240 inches. Mottled light gray (N 6/) and brownish yellow (10YR 6/8), coarse silt loam.

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Iva silt loam SOIL Nos. 40A LOCATION Daviess County, Indiana

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 55988 - 55994

Depth (in.)	Horizon	1B1b Total Sand (2-0.05)	Total Silt (0.05-0.002)	Total Clay (< 0.002)	Sand Very coarse (2-1)	Sand Coarse (1-0.5)	Sand Medium (0.5-0.25)	Sand Fine (0.25-0.1)	Sand Very fine (0.1-0.05)	Silt (0.05-0.02)	Silt Int. III (0.02-0.002)	Int. II (0.2-0.02)	(2-0.1)		3B2 Cm	Coarse fragments 3B1: 2A2 ≥ 2 Pct.	2-19	19-76
		Pct. of < 2 mm															Pct. of < 76mm	
0-6	Ap		73.9	17.4	0.4	1.9	1.7	2.4	2.3		40.2	37.4				-		
6-11	A2		71.0	21.4	0.6	1.5	1.4	2.1	2.0		42.0	31.9				-		
11-17	B1		71.2	23.4	0.3	1.4	0.8	1.1	1.8		38.7	34.9				-		
17-33	B2t		67.5	28.0	0.2	0.7	0.7	1.2	1.7		36.0	33.9				-		
33-40	B3		68.0	24.8	0.3	1.0	1.2	2.2	2.5		38.0	33.8				-		
40-72	C1		67.7	20.5	0.1	0.7	0.6	4.3	6.1		33.5	43.5				-		
72-144	C2		66.8	18.9	0.2	0.5	0.4	5.4	7.8		35.9	42.8				-		

Depth (in.)	6A1a Organic carbon Pct	Nitrogen Pct.	C/N		Carbonate as $CaCO_3$ Pct.	Ext. iron as Fe Pct.	Bulk density: g/cc	4A1e ⅓ bar g/cc	4A1h Oven dry g/cc	4D1 COLE	Water content: Pct.	4B1c ⅓ bar Pct.	4B2 15 bar Pct.		4C1 WRD in/in	pH	8C1c (1:1) KCl	8C1a (1:1) H_2O
0-6	0.79																	4.8
6-11	0.29																	4.7
11-17	0.16																	4.7
17-33	0.12																	4.7
33-40	0.11																	4.8
40-72	0.13																	5.1
72-144	0.11																	6.1

Depth (in.)	Extractable bases 5B1a: 6N2d Ca	6Q2b Mg	6P2a Na	6Q2a K	Sum	6H1a Ext. acidity	CEC: 5A3a Sum cations		6G1d Ext. Al			Ratios to clay: CEC Sum	Ext. iron	15-bar water	8D3 Ca/Mg		Base saturation: 5C3 Sum cations Pct.	5C1 NH_4OAc Pct
	meq/100 g																	
0-6	2.8	1.1	0.2	0.1		9.2	13.4										31	
6-11	2.1	1.4	0.1	0.1		9.8	13.5										27	
11-17	1.7	2.1	0.2	0.1		12.5	16.6										25	
17-33	2.2	4.2	0.4	0.1		13.4	20.3										34	
33-40	3.1	5.1	0.4	0.1		9.9	18.6										47	
40-72	3.2	4.2	0.3	0.2		3.8	11.8										68	
72-144	7.0	6.5	0.5	0.1		2.8	16.9										83	

Depth (in.)	Clay Fraction Analysis 7A1b-d: Mt	Chl.	Vm.	Mi	Int.	Qtz	Kl.	Gibbsite	
	7A2 X-ray						7A3		

Mt. = Montmorillonite, Chl. = chlorite, Vm = Vermiculite, mi = mica, Int. = interstratified layer, Qtz. = quartz, Kl. = Kaolinite

Relative amounts blank = not determined, dash = not detected, tr. = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant.

Soil Type: Iva silt loam
Soil No.: 40A
Location: Daviess County, Indiana. Center of SE 1/4, sec. 28, T. 2 N., R. 5 W., 29.6 miles from the Wabash River, along southern traverse.
Physiography: 40 inch loess over leached Illinoian till.

Horizon and Beltsville Lab. No.	
Ap 55988	0 to 6 inches. Yellowish brown (10YR 5/4) silt loam, smooth (although a few sand grains detected with hand lens), containing appreciable iron concretions.
A2 55989	6 to 11 inches. Light yellowish brown (10YR 6/4), silt loam, mostly smooth (about 2 percent very fine to medium sand), containing iron concretions.
B1 55990	11 to 17 inches. Mottled very pale brown (10YR 7/3) and brownish yellow (10YR 6/6), heavy silt loam, mostly smooth (< 5 percent grit, mostly of very fine sand size), containing iron concretions.
B2t 55991	17 to 33 inches. Mottled very pale brown (10YR 7/3), light gray (10YR 7/1), and brownish yellow (10YR 6/8), silty clay loam, mostly smooth (< 5 percent grit), containing iron concretions.
B3 55992	33 to 40 inches. Mottled brownish yellow (10YR 6/6), light gray (10YR 7/1), and yellowish red (5YR 5/8), silt loam, mostly smooth (< 5 percent grit), containing iron concretions.
C1 55993	40 to 72 inches. Brownish yellow (10YR 6/8), heavy silt loam, gritty, containing iron concretions.
C2 55994	72 to 144 inches. Mottled very pale brown (10YR 7/3) and brownish yellow (10YR 6/8), silty clay loam, very gritty.

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL: Iva silt loam SOIL Nos.: 34A LOCATION: Knox County, Indiana

SOIL SURVEY LABORATORY: Beltsville, Maryland LAB. Nos.: 55967 - 55975

Depth (in.)	Horizon	1B1b Total Sand (2-0.05)	Total Silt (0.05-0.002)	Total Clay (< 0.002)	Sand: Very coarse (2-1)	Sand: Coarse (1-0.5)	Sand: Medium (0.5-0.25)	Sand: Fine (0.25-0.1)	Sand: Very fine (0.1-0.05)	Silt: Int. III (0.05-0.02)	Silt: Int. III (0.02-0.002)	Int. II (0.2-0.02)	(2-0.1)		3B2 Cm	Coarse fragments 3B1: 2A2 ≥ 2 Pct	2-19 (Pct. of < 76mm)	19-76 (Pct. of < 76mm)
		Pct of < 2 mm																
0-7	A1		80.1	11.2	0.7	1.9	1.2	2.2	2.7		39.6	44.6				-		
7-12	A2		72.7	18.6	0.8	2.2	1.4	2.0	2.3		38.0	38.1				-		
12-16	B1t		66.3	27.0	0.5	1.7	1.1	1.6	1.8		35.7	33.3				-		
16-20	B21t		62.7	32.0	0.3	0.9	0.8	1.4	1.9		34.1	31.3				-		
20-24	B22t		64.0	32.0	-	0.6	0.7	1.2	1.5		33.1	33.1				-		
24-30	B3		67.3	28.5	0.4	0.6	0.6	1.0	1.6		33.6	35.9				-		
30-54	C1		73.1	22.3	0.4	1.0	0.7	1.0	1.5		35.6	39.5				-		
54-64	C2		74.4	20.4	0.2	1.0	0.8	1.3	1.9		35.4	41.6				-		
64-72	IIC3		68.0	19.8	0.7	2.1	2.0	3.7	3.7		32.4	41.4				-		
72-114	IIIC4		49.3	28.1	1.2	4.0	3.8	7.2	6.4		26.4	33.4				-		
114-132+	IIIC5		39.1	39.3	1.6	3.4	3.6	7.1	5.9		24.1	25.1				-		

Depth (in.)	6A1a Organic carbon Pct.	Nitrogen Pct.	C/N		Carbonate as $CaCO_3$ Pct.	Ext. iron as Fe Pct.	Bulk density: g/cc	Bulk density: 4A1e ⅓ bar g/cc	Bulk density: 4A1h Oven dry g/cc	4D1 COLE	Water content: Pct.	Water content: 4B1c ⅓ bar Pct.	Water content: 4B2 15 bar Pct.		4C1 WRD in/in		pH: 8C1c (1:1) KCl	pH: 8C1a (1:1) H_2O
0-7	1.03																	5.7
7-12	0.29																	5.5
12-16	0.27																	5.3
16-20	0.24																	5.4
20-24	0.29																	5.7
24-30	0.19																	6.0
30-54	0.10																	6.5
54-64	0.10																	6.8
64-72	0.07																	6.8
72-114	0.08																	7.0
114-132+	0.05																	7.1

Depth (in.)	Extractable bases 5B1a: 6N2d Ca (meq/100 g)	6O2b Mg	6P2a Na	6Q2a K	Sum	6H1a Ext. acidity	CEC: 5A3a Sum cations	CEC	6G1d Ext. Al		Ratios to clay: CEC Sum	Ext. iron	15-bar water	8D3 Ca/Mg		Base saturation: 5C3 Sum cations Pct.	5C1 NH_4OAc Pct
0-7	4.1	1.0	0.1	0.1		5.4	11.3									52	
7-12	6.3	3.0	0.2	0.2		5.4	15.1									64	
12-16	10.6	6.9	0.2	0.3		6.6	24.6									73	
16-20	13.7	9.5	0.2	0.4		6.6	30.4									78	
20-24	10.7	8.5	0.3	0.4		5.6	25.5									78	
24-30	10.1	7.6	0.4	0.3		4.9	23.3									79	
30-54	8.2	6.4	0.2	0.2		3.2	18.2									83	
54-64	8.0	5.8	0.2	0.2		2.4	16.6									86	
64-72	7.2	5.4	0.2	0.2		2.2	15.2									86	
72-114	10.3	6.7	0.2	0.2		0.6	17.4									97	
114-132+	10.9	10.5	0.2	0.2		2.5	21.8									90	

Depth (in.)	Clay Fraction Analysis 7A1b-d: Mt	Chl.	Vm.	Mi	Int.	Qtz.	Kl.	Gibbsite	
	7A2 X-ray						7A3		

Mt. = Montmorillonite, Chl. = chlorite, Vm. = Vermiculite, mi = mica, Int. = Interstratified layer, Qtz. = quartz, Kl. = Kaolinite

Relative amounts: blank = not determined, dash = not detected, tr. = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant.

Soil Type: Iva silt loam
Soil No.: 34A
Location: Knox County, Indiana. Lower corner of N 1/4 Grant 80, T. 3 N., R 8 W., 9.7 miles from Wabash River along southern traverse.
Physiography: 54 inches of loess over leached Illinoian till.

Horizon and Beltsville Lab. No.	
A1 55967	0 to 7 inches. Light brownish gray (10YR 6/2), silt loam, mostly smooth (a few grit particles detected with hand lens), containing iron concretions.
A2 55968	7 to 12 inches. Very pale brown (10YR 7/3), heavier silt loam, mostly smooth (<3 percent grit), containing iron concretions.
B1t 55969	12 to 16 inches. Mottled light gray (10YR 7/1), brownish yellow (10YR 6/6), yellowish brown (10YR 5/6), and dark grayish brown (10YR 4/2), smooth (<2 percent grit), heavy silt loam, containing iron concretions.
B21t 55970	16 to 20 inches. Mottled pale brown (10YR 6/3), very pale brown (10YR 7/3), and brownish yellow (10YR 6/8) silty clay loam (or light silty clay), mostly smooth (<3 percent grit), containing iron concretions.
B22t 55971	20 to 24 inches. Mottled pale brown (10YR 6/3), brownish yellow (10YR 6/8), and grayish brown (10YR 5/2), silty clay loam, smooth, containing iron concretions.
B3 55972	24 to 30 inches. Mottled light yellowish brown (10YR 6/4), brownish yellow (10YR 6/8), and very dark grayish brown (10YR 3/2) light silty clay loam, mostly smooth, containing iron concretions.
C1 55973	30 to 54 inches. Mottled light gray (10YR 6/1) and brownish yellow (10YR 6/8) heavy silt loam, mostly smooth (an increase in grit but still < 5 percent), containing iron concretions.
C2 55974	54 to 64 inches. Mottled light gray (10YR 6/1), brownish yellow (10YR 6/8), and reddish yellow (7.5YR 6/8) silt loam, gritty, containing iron concretions.
IIC3 55975	64 to 72 inches. Mostly brownish yellow (10YR 6/6) heavy silt loam with some mottles of light gray (10YR 6/1) and brownish yellow (10YR 6/8), very gritty, containing iron concretions.
IIIC4 55976	72 to 114 inches. Yellowish brown (10YR 5/6) silty clay loam, very gritty (a light-textured Illinoian till).
IIIC5 55977	114 to 132 inches plus. Mostly gray (10YR 5/1) with some yellowish brown (10YR 5/6) and strong brown (7.5YR 5/8) silty clay or clay, (a heavy textured Illinoian till.)

SOIL SURVEY LABORATORY Lincoln, Nebr. August 1961

SOIL TYPE Kings silty clay **LOCATION** Daviess County, Indiana

SOIL NOS. S60Ind-14-2 **LAB. NOS.** 13522-13527

General Methods: 1A, 1R1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	3A1 0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-5	A1p	<0.1	<0.1	0.2	0.6	0.9	42.9	55.4	14.0	30.1	-	sic
5-9	A12	<0.1	<0.1	0.1a	0.4	0.8	43.3	55.4	13.8	30.5	-	sic
9-14	B21g	<0.1	<0.1	0.1a	0.4	0.6	51.0	47.9	14.4	37.4	-	sic
14-24	B22g	<0.1	<0.1	0.2	0.5	1.0	43.5	54.8	17.1	27.6	-	sic
24-37	B3g	<0.1	<0.1	0.2	0.7	1.3	52.0	45.8	22.9	30.7	-	sic
37-50+	C1	<0.1	0.1	0.3	0.8	1.4	56.8	40.6	25.2	33.4	-	sic

pH 8C1a 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	Free Iron Fe_2O_3% 6C1a		6E1c $CaCO_3$ equivalent %	Carbonate Clay %	WATER CONTENT 1/3-Bar Pieces %	1/3-Bar to 15-Bar %	4B2 15-Bar %
6.0			2.69	0.214	13	0.8						23.3
6.3			1.84	0.142	13	0.8						24.0
6.6			1.00	0.082	12	0.8						21.5
6.8			0.92	0.071	13	0.8						23.5
7.1			0.38			0.8		<0.1				20.0
7.3			0.45			1.2		<0.1				18.9

5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	5B1a 6Q2a K	BASE SAT. % NH_4OAc EXCH. 5C1	Base Sat. % on Sum Cations 5C3	BULK DENSITY Field State H_2O %	g/cc	30-cm. H_2O %	g/cc	Oven-Dry g/cc
	milliequivalents per 100g. soil											
45.9	33.7	11.5	9.5	0.1	0.5	100	83					
44.9	34.6	13.5	7.2	0.1	0.4	108	87					
38.9	28.6	10.9	4.6	0.1	0.3	102	90					
42.3	33.1	13.1	4.7	0.1	0.3	110	91					
36.2	27.1	12.0	3.3	0.1	0.3	109	92					
31.8	24.6	11.2	2.3	0.1	0.3	114	94					

a. Few Fe-Mn? concr.

Soil Type: Kings silty clay
Soil Nos.: S60Ind-14-2
Location: Daviess County, Indiana, NE 1/4 of Sec. 26, T5N, R6W; south 500 feet from south edge of highway along east field boundary, then 200 feet west into field. Field is bounded by open ditch on west and highway on north side and railroad at northeast corner.
Vegetation: Corn.
Slope: Depressions and broad depressed flats in glacial lakes and slack-water terraces.
Drainage and Permeability: Very poorly drained with runoff very slow to ponded; permeability is very slow.
Parent Material: Stratified calcareous or neutral clays and silty clay with thin layers of silts and fine sand (slack-water lakebed deposits).
Collected by: F. J. Carlisle and M. W. Meyer, July 14, 1960.
Described by: F. W. Sanders, July 14, 1960.

Horizon and Lincoln Lab. No.	
A1p 13522	0 to 5 inches. Black (10YR 2/1) silty clay; fine cloddy; very hard when dry and very sticky when wet; neutral; abrupt smooth boundary.
A12 13523	5 to 9 inches. Black (10YR 2/1) silty clay with few fine distinct dark yellowish brown (10YR 4/4) mottles; weak fine angular blocky structure; very hard when dry, very sticky when wet; neutral; clear smooth boundary.
B21g 13524	9 to 14 inches. Dark gray (N 4/0) to gray (N 5/0) heavy silty clay with few fine distinct dark yellowish brown (10YR 4/4) mottles; moderate coarse angular blocky structure; very sticky when wet; neutral; gradual smooth boundary. Fresh material from the A1 in cracks 1/4 to 1/2 inch thick and 4 to 12 inches apart that extend vertically through horizon.
B22g 13525	14 to 24 inches. Dark gray (N 4/0) heavy silty clay with common fine distinct dark yellowish brown (10YR 4/4) mottles; moderate to strong fine angular blocky structure; very sticky when wet; neutral; gradual wavy boundary; fresh material from A1 in cracks 1/4 to 1/2 inch thick and 4 to 12 inches apart that extend vertically through horizon.
B3g 13526	24 to 37 inches. Gray (N 5/0) heavy silty clay with common fine distinct dark brown (7.5YR 4/4) mottles; mottles are tubular, 1/2 to 1 mm. in diameter; they appear to be old fine root channels; a thin strongly gleyed layer surrounds the mottles; fresh material from A1 in cracks 1/4 to 1/2 inch thick and 4 to 12 inches apart that extend vertically through horizon; distinct tubular tongues of dark gray (10YR 4/1) heavy silty clay 1 1/2 to 2 inches in diameter and 3 to 6 inches apart extend vertically through horizon; moderate fine to medium angular blocky structure; very sticky when wet; weakly effervescent; gradual wavy boundary.
C1 13527	37 to 50 inches plus. Gray (10YR 6/1) light silty clay with common fine distinct dark brown (7.5YR 4/4) mottles; mottles are tubular 1/2 to 1 mm. in diameter; they appear to be old fine root channels; a thin strongly gleyed layer surrounds the mottles; distinct tubular tongues of dark gray (10YR 4/1) heavy silty clay, 1 1/2 to 2 inches in diameter and 3 to 6 inches apart, extend vertically through horizon; weak coarse angular blocky structure; sticky when wet; calcareous.

Remarks: Colors given are for moist soil.

Ground water depth at 36 inches when sampled. Water was bailed from pit before samples were collected.

The tubular tongues in horizon B3g and C1 appear to be old crawfish holes; we assume they extend through the upper horizons but due to color they can hardly be distinguished.

The Kings series are Humic-Gley soils in the region of Gray-Brown Podzolic soils, developed on calcareous lake-deposited clays and silts of Wisconsin age. The Kings soils are the very poorly drained, very dark colored member of the soil catena that also includes the well-drained Markland, imperfectly drained McGary, very poorly drained, moderately dark colored Zipp, and the very poorly drained, dark-colored Montgomery soils. They are usually associated with the Montgomery soils but have surface soils that are darker colored and higher in organic content, and thicker dark-colored subsoils.

SOIL SURVEY LABORATORY Lincoln, Nebr. August 1961

SOIL TYPE Kings silty clay **LOCATION** Daviess County, Indiana

SOIL NOS. S60Ind-14-3 **LAB. NOS.** 13528-13533

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	3A1 0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-5	A1p	<0.1	0.2	1.4	11.6	8.0	28.7	50.1	25.9	17.5	-	c
5-13	A12	<0.1	0.1	1.3	11.8	7.9	27.5	51.4	25.1	17.1	-	c
13-20	B21g	<0.1	0.1	1.5	13.2	8.8	26.8	49.6	26.5	16.7	-	c
20-30	B22g	<0.1	0.1	1.5	11.8	7.9	26.7	52.0	25.1	16.3	-	c
30-42	B3g	<0.1	0.1	1.4	11.5	7.7	27.7	51.6	25.5	16.5	-	c
42-53	C1	<0.1	0.1	1.6	13.7	10.4	37.2	37.0	35.8	20.0	-	cl

DEPTH INCHES	pH 8C1a 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	Free Iron Fe_2O_3% 6C1a		6E1c $CaCO_3$ equivalent %	Carbonate Clay %	WATER CONTENT 4B1b 1/3-Bar Pieces %	4C1 1/3-Bar to 15-Bar %	4B2 15-Bar %
0-5	6.3			2.53	0.200	13	0.6						22.2
5-13	6.6			1.38	0.097	14	0.6				36.2	13.2	23.0
13-20	6.8			1.03	0.075	14	0.9				35.2	13.8	21.4
20-30	7.1			0.56	0.043	13	1.0				35.2	13.3	21.9
30-42	7.2			0.46			0.8		<0.1				22.1
42-53	7.2			0.37			1.2		<0.1				17.5

DEPTH INCHES	5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K	BASE SAT. % NH_4OAc EXCH. 5C1	Base Sat. % on Sum Cations 5C3	BULK DENSITY Field-State 4B4 H_2O %	4A1a g/cc	30-cm. 4B3 H_2O %	4A1c g/cc	Oven-Dry 4A1h g/cc
	←	milliequivalents per 100g. soil				→							
0-5	39.8	32.9	10.3	7.7	0.1	0.5	110	85					
5-13	41.3	33.9	11.2	5.4	0.2	0.4	111	89	30.5	1.36	30.7	1.34	1.86
13-20	37.7	31.2	11.1	4.6	0.2	0.4	114	90	26.5	1.42	27.1	1.40	1.90
20-30	36.9	30.6	11.5	2.8	0.2	0.4	116	94	28.6	1.40	29.6	1.38	1.88
30-42	37.8	30.6	12.0	2.8	0.2	0.4	114	94					
42-53	29.7	23.6	9.2	2.3	0.2	0.4	112	94					

Soil Type: Kings silty clay
Soil Nos.: S60Ind-14-3
Location: Daviess County, Indiana, NW 1/4 of Sec. 3, T4N, R6W; south of gravel road 250 feet along shallow ditch, then 150 feet west.
Vegetation: Soybeans.
Slope: Depressions and broad depressed flats in glacial lakes and slack-water terraces.
Drainage and Permeability: Very poorly drained with runoff very slow to ponded; permeability is very slow.
Parent Material: Stratified calcareous or neutral clays and silty clay with thin layers of silts and fine sand (slack-water lakebed deposits).
Collected by: F. J. Carlisle and M. W. Meyer, July 15, 1960.
Described by: F. W. Sanders, July 15, 1960.

Horizon and Lincoln Lab. No.	
Alp 13528	0 to 5 inches. Black (10YR 2/1) silty clay; weak fine granular to somewhat massive fine clods; very sticky when wet; neutral; abrupt smooth boundary.
A12 13529	5 to 13 inches. Very dark gray (N 3/0) silty clay with few fine distinct dark yellowish brown (10YR 4/4) mottles; moderate fine angular blocky structure; very sticky when wet; neutral; clear smooth boundary; many slickenside faces 1/2 to 1 inch across.
B21g 13530	13 to 20 inches. Dark gray (N 4/0) heavy silty clay with common fine distinct strong brown to dark brown (7.5YR 5/6 to 4/4) mottles; distinct slickenside faces up to 6 inches across are oriented approximately 45 degrees to the horizontal; moderate medium to coarse angular blocky structure; very sticky when wet; diffuse tubular tongues of dark gray heavy silty clay 1 to 2 inches in diameter and 6 to 12 inches apart extend vertically through horizon; neutral; gradual smooth boundary.
B22g 13531	20 to 30 inches. Dark gray (N 4/0) heavy silty clay with common fine distinct strong brown (7.5YR 5/6) mottles; distinct slickenside faces 1/2 to 2 inches across are oriented approximately 30 degrees to the horizontal; weak medium prismatic breaking into moderate to strong coarse angular blocky structure, the coarse peds break down further into fine to medium angular blocky structure; very sticky when wet; diffuse tubular tongues of dark gray heavy silty clay loam, 1 to 2 inches in diameter and 6 to 12 inches apart, extend vertically through horizon; neutral; gradual wavy boundary.
B3g 13532	30 to 42 inches. Gray (N 5/0) heavy silty clay with few fine distinct dark yellowish brown (10YR 4/4) mottles; distinct slickenside faces 1/2 to 2 inches across with orientation ranging from horizontal to vertical; weak medium prismatic breaking into moderate fine angular blocky structure; very sticky; diffuse tubular tongues of dark gray (N 4/0) heavy silty clay, 1 to 2 inches in diameter and 6 to 12 inches apart, extend vertically through horizon; neutral; gradual wavy boundary.
C1 13533	42 to 53 inches. Gray (N 5/0) heavy silty clay loam with common fine distinct dark brown (7.5YR 4/4) mottles inside peds; few fine faint mottles on gray ped faces; weak coarse prismatic breaking into weak coarse angular blocky structure; sticky when wet; calcareous; diffuse tubular tongues of dark gray (N 4/0) silty clay, 1 to 2 inches in diameter and 6 to 12 inches apart, extend vertically into horizon.

Remarks: Colors given are for moist soil.

Water table was 30 inches on July 15. Water was bailed from pit before sampling.

The diffuse dark gray tubular tongues described in the subsoil horizons appear to be old crawfish channels. Crack fillings of black material from the surface horizon extend from the base of the plowed layer to about 42 inches. The crack fillings are 1/8 to 1/4 inch thick, are spaced 6 to 12 inches apart, and the boundaries between the crack fillings and adjacent materials are sharp.

The Kings series are Humic-Gley soils in the region of Gray-Brown Podzolic soils, developed on calcareous lake-deposited clays and silt of Wisconsin age. The Kings soils are the very poorly drained, very dark-colored member of the soil catena that also includes the well-drained Markland, imperfectly drained McGary, very poorly drained, moderately dark colored Zipp, and the very poorly drained, dark-colored Montgomery soils. They are usually associated with the Montgomery soils but have surface soils that are darker colored and higher in organic content, and thicker dark-colored subsoils.

SOIL SURVEY LABORATORY Lincoln, Nebr. August 1961

SOIL TYPE McGary silt loam **LOCATION** Greene County, Indiana

SOIL NOS. 360Ind-28-1 **LAB. NOS.** 13492-13499
General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-11	Ap	0.6a	1.9a	1.3a	1.4a	1.1a	72.3	21.4	21.4	52.6	-	sil
11-15	B21t	<0.1	0.3a	0.4a	0.9a	1.0a	53.7	43.7	14.0	41.2	-	sic
15-20	B22t	<0.1	0.1a	0.1a	0.4a	0.8a	52.6	46.0	13.8	39.8	-	sic
20-27	B23t	<0.1	0.1a	0.1a	0.3a	0.8a	56.8	41.9	12.9	44.9	-	sic
27-32	B31t	<0.1	0.1b	0.1b	0.3b	0.7b	56.5	42.3	10.0	47.4	-	sic
32-47	B32t	0.1b	0.1b	0.2b	0.3b	0.5b	54.5	44.3	11.7	43.5	-	sic
32-47	C1	0.3c	0.6c	0.3d	0.4d	0.7d	64.2	33.5	11.9	53.2	-	sicl
47-59	C2	0.3c	0.3c	0.2d	0.4d	0.7d	61.9	36.2	11.2	51.6	-	sicl

pH 8C1a 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	Free Iron Fe_2O_3% 6C1a		6E1c $CaCO_3$ equivalent %	3A1a Carbonate Clay %	WATER CONTENT 4B1b 1/3-Bar Pieces %	4C1 1/3-Bar to 15-Bar %	4B2 15-Bar %
6.5			0.89	0.089	10	2.2				24.6	16.1	8.5
5.7			0.30	0.043	7	2.4						17.8
6.3			0.37	0.049	8	2.5						19.2
6.9			0.39	0.045	9	2.5				27.2	9.3	17.9
7.7			0.34			2.5		4.2				17.5
7.8			0.29			2.3		2.6	-			18.7
8.0			0.26			2.0		25.3	1	24.1	9.7	14.4
8.0			0.24			2.0		30.7	3			14.9

5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K	5B1a BASE SAT. % NH_4OAc EXCH. 5C1	Base Sat. % on Sum Cations 5C3	BULK DENSITY Field-State 4B4 H_2O %	Field-State 4A1a g/cc	30-cm. 4B3 H_2O %	30-cm. 4A1c g/cc	Oven-Dry 4A1h g/cc
←	milliequivalents per 100g. soil				→							
13.6	9.6	2.6	4.7	<0.1	0.2	91	72	18.0	1.56	21.7	1.53	1.60
24.2	15.3	7.3	6.6	0.1	0.4	95	78					
28.6	19.6	9.9	5.3	0.1	0.4	105	85					
25.3	17.8	8.8	3.6	0.1	0.4	107	88	22.0	1.56	25.0	1.51	1.78
22.4		8.4	1.3	0.1	0.3							
25.4		9.8	1.3	0.1	0.4							
15.4		5.6	<0.1	0.1	0.2			21.9	1.60	23.0	1.57	1.71
14.5		4.9	<0.1	0.1	0.2							

a. Many Fe-Mn? concr.
b. Common Fe-Mn? concr. Few carbonate concretions and limestone fragments.
c. Many carbonate concretions and limestone fragments.
d. Few carbonate concretions and limestone fragments. Few Fe-Mn? concr.

Soil Type: McGary silt loam
Soil Nos.: S60Ind-28-1
Location: Greene County, Indiana, SE 1/4 of SW 1/4 of Sec. 13, T6N, R7W; 350 feet northeast of red barn and 300 feet north of lane.
Vegetation: Red clover field (some sweet clover).
Slope: Nearly level (less than 1 percent).
Drainage and Permeability: Imperfectly drained with slow runoff; permeability very slow.
Parent Material: Stratified calcareous or neutral clay and silty clay with thin layers or lenses of silts and fine sand (slack-water lakebed deposits).
Collected by: F. J. Carlisle and M. W. Meyer, July 12, 1960.
Described by: F. W. Sanders, July 12, 1960.

Horizon and Lincoln Lab. No.	
Ap 13492	0 to 11 inches. Gray (10YR 5/1) silt loam; moderate medium granular structure; friable; neutral; abrupt smooth boundary.
B21t 13493	11 to 15 inches. Grayish brown (10YR 5/2) silty clay loam with many medium faint brown (10YR 5/3) mottles; few fine, soft, black manganese and iron concretions; gray (10YR 5/1) thin clay films on ped faces; weak fine prismatic breaking into moderate medium angular blocky structure; firm; medium acid; clear smooth boundary.
B22t 13494	15 to 20 inches. Grayish brown (10YR 5/2) to gray (10YR 5/1) silty clay with common fine distinct brownish yellow (10YR 6/6) to light yellowish brown (10YR 6/4) mottles; gray (10YR 5/1) thin clay films on ped faces; weak medium to coarse prismatic breaking into moderate medium angular blocky structure; firm; slightly acid; clear smooth boundary.
B23t 13495	20 to 27 inches. Grayish brown (10YR 5/2) silty clay with common fine distinct light yellowish brown (10YR 6/4) to brownish yellow (10YR 6/6) mottles; gray (10YR 5/1) thin clay films on ped faces; weak coarse prismatic breaking into moderate medium to coarse angular blocky structure; firm; neutral; clear wavy boundary.
B31t 13496	27 to 32 inches. Gray (10YR 5/1 to 6/1) silty clay with many fine distinct yellowish brown (10YR 5/6) mottles; gray (10YR 5/1) thin clay films on ped faces; moderate medium to coarse prismatic breaking into weak coarse angular blocky structure; firm; weakly effervescent; clear irregular boundary.
B32t & C1	32 to 47 inches. This horizon consisted of two distinct materials which were sampled separately. The area described as B32t are tongues 8 to 10 inches wide and 12 to 18 inches apart and extend into C1 material which predominates.
B32t 13497	Gray (10YR 6/1) heavy silty clay loam with common fine distinct yellowish brown (10YR 5/6) mottles; thin gray clay films; moderate fine to medium prismatic breaking into moderate fine to medium angular blocky structure; firm; weakly effervescent; gradual irregular boundary.
C1 13498	Gray (10YR 6/1) silty clay loam with common fine distinct yellowish brown (10YR 5/6) mottles; thin gray (10YR 5/1) clay films on ped faces; moderate medium prismatic breaking into weak coarse subangular blocky structure; friable; calcareous; bands of soft carbonate concretions about 1 inch thick at 32 and 44 inches.
C2 13499	47 to 59 inches. Gray (10YR 6/1 to 5/1) silty clay loam with common fine distinct yellowish brown (10YR 5/6) mottles; thin gray (10YR 5/1) clay films on ped faces; weak coarse prismatic breaking into moderate coarse angular blocky structure; friable; calcareous; tongues of fine silty clay loam (B3 material) 2 to 4 inches thick and 12 to 18 inches apart, extend into this horizon. These areas were separated out and not included in sample taken.

Remarks: The colors given are for moist soil.

Depth to the water table was greater than 59 inches on July 12.

The McGary series consists of Gray-Brown Podzolic soils intergrading to Planosols developed on highly calcareous water-deposited silts and clays. The McGary soils are the imperfectly drained member of the soil catena that also includes the well-drained Markland, very poorly drained, moderately dark colored Zipp, very poorly drained, dark-colored Montgomery, and very poorly drained, very dark colored Kings soils. The Henshaw soils differ from the McGary in being developed in lighter-textured material, predominantly silty clay loam and silt loam with minor amounts of clay and fine sand. The major part of the solum is thought to be developed in material of loessial origin.

SOIL SURVEY LABORATORY Lincoln, Nebr. August 1961

SOIL TYPE McGary silt loam **LOCATION** Greene County, Indiana

SOIL NOS. S60Ind-28-2 **LAB. NOS.** 13500-13506

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	3A1 0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-11	Ap	0.4a	1.6a	0.9a	0.8a	0.8a	72.1	23.4	20.6	52.6	-	sil
11-15	B21t	<0.1	0.2a	0.2a	0.4a	0.9a	48.1	50.2	14.2	35.0	-	sic
15-22	B22t	<0.1	0.1b	0.1c	0.3c	0.7c	51.6	47.2	10.1	42.4	-	sic
22-27	B31t	0.1b	0.2b	0.1c	0.3c	0.4c	50.7	48.2	6.9	44.4	-	sic
27-39	B32t	0.2b	0.2b	0.2c	0.3c	0.5c	54.3	44.3	9.5	45.5	-	sic
27-39	C1	0.4b	0.7b	0.2b	0.4b	0.5c	58.9	38.9	8.0	51.6	-	sicl/sic
39-50	C2	1.3b	0.8b	0.3b	0.4b	0.3b	52.8	44.1	6.4	46.9	-	sic

pH 8C1a 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	ORGANIC MATTER 6B1a NITROGEN %	ORGANIC MATTER C/N	Free Iron Fe_2O_3% 6C1a		6E1c $CaCO_3$ equivalent %	3A1a Carbonate Clay %	WATER CONTENT 4B1b 1/3-Bar Pieces %	WATER CONTENT 4C1 1/3-Bar to 15-Bar %	WATER CONTENT 4B2 15-Bar %
6.8			0.94	0.096	10	2.3				22.1	12.6	9.5
5.9			0.42	0.049	8	2.7						20.6
7.4			0.50	0.057	9	2.7		1.8	-	27.3	8.1	19.2
7.8			0.41	0.051	8	2.4		13.8	1			19.2
7.8			0.36			2.2		12.2	-			18.0
8.0			0.32			2.0		28.2	4	21.4	13.3	15.4
7.9			0.29			1.8		30.2	6			16.7

5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	5B1a 6Q2a K	BASE SAT. % NH_4OAc EXCH. 5C1	Base Sat. % on Sum Cations 5C3	BULK DENSITY Field-State 4B4 H_2O %	Field-State 4A1a g/cc	30-cm. 4B3 H_2O %	30-cm. 4A1c g/cc	Oven-Dry 4A1h g/cc
← milliequivalents per 100g. soil →												
14.8	10.2	3.3	4.7	<0.1	0.3	93	74	19.4	1.64	21.4	1.61	1.70
29.4	18.2	10.0	6.9	0.1	0.5	98	81					
24.7		9.5	3.6	0.1	0.4			25.3	1.49	24.6	1.50	1.76
22.3		8.0	<0.1	0.1	0.3							
20.5		7.5	<0.1	0.1	0.4							
14.8		5.2	<0.1	0.1	0.2			19.8	1.69	20.3	1.67	1.76
15.4		5.2	<0.1	0.1	0.2							

a. Many Fe-Mn? concr.
b. Many carbonate concretions and limestone fragments.
c. Common Fe-Mn? concr. Few carbonate concretions and limestone fragments.

Soil Type: McGary silt loam
Soil Nos.: S60Ind-28-2
Location: Greene County, Indiana, SW 1/4 of Sec. 24, T6N, R7W; 300 feet west of Highway No. 67 and 400 feet south of north field boundary.
Vegetation: Soybeans.
Slope: Nearly level (less than 1 percent).
Drainage and Permeability: Imperfectly drained with slow runoff; permeability is very slow.
Parent Material: Stratified calcareous or neutral clay and silty clay with thin layers or lenses of silts and fine sand (slack-water lakebed deposits).
Collected by: F. J. Carlisle and M. W. Meyer, July 13, 1960.
Described by: F. W. Sanders, July 13, 1960.

Horizon and Lincoln Lab. No.	
Ap 13500	0 to 11 inches. Gray (10YR 5/1 to 6/1) silt loam; fine cloddy, somewhat compacted and massive; friable; neutral; abrupt smooth boundary.
B21t 13501	11 to 15 inches. Grayish brown (10YR 5/2) to brown (10YR 5/3) heavy silty clay loam to light silty clay with common fine faint gray (10YR 6/1) mottles; moderate medium subangular blocky structure; firm; medium acid; clear smooth boundary.
B22t 13502	15 to 22 inches. Grayish brown (10YR 5/2) silty clay with common fine faint yellowish brown (10YR 5/4) mottles; few, fine, soft, black manganese and iron concretions; gray (10YR 5/1) thin clay films on ped faces; weak fine to medium prismatic breaking into moderate medium angular blocky structure; firm; neutral; clear smooth boundary.
B31t 13503	22 to 27 inches. Grayish brown (10YR 5/2) silty clay with common fine faint yellowish brown (10YR 5/4) mottles; gray (10YR 5/1) thin clay films on ped faces; tongues of gray (10YR 5/1) silty clay, 1 to 2 inches thick and 6 to 10 inches apart, extend through this horizon; moderate medium prismatic breaking into moderate to strong medium angular blocky structure; firm; weakly effervescent; gradual irregular boundary.
B32t & C1	27 to 39 inches. This horizon consisted of two distinct materials which were sampled separately; the area described as B32t are tongues, 2 to 4 inches in diameter and 8 to 11 inches apart, which extend into the C1 and C2 horizons.
B32t 13504	Gray (10YR 5/1) light silty clay with common fine distinct light yellowish brown (10YR 6/4) mottles; thin gray clay films on peds; moderate to strong, fine to medium prismatic breaking into moderate to strong medium angular blocky structure; firm; weakly effervescent; clear irregular boundary.
C1 13505	Gray (10YR 6/1) silty clay loam with common fine distinct light yellowish brown (10YR 6/4) mottles; thin gray (10YR 5/1) clay films on ped faces; moderate medium prismatic breaking into moderate medium angular blocky structure; firm; calcareous (soft carbonate concretions present); clear irregular boundary.
C2 13506	39 to 50 inches. Gray (10YR 6/1) silty clay loam with common fine distinct yellowish brown (10YR 5/6) mottles; thin gray (10YR 5/1) clay films on ped faces; moderate coarse angular blocky structure; firm; calcarous. Projecting into this horizon are tongues of gray (10YR 5/1) silty clay, 2 to 4 inches in diameter and 8 to 11 inches apart, with clay films on ped faces. (This part of the horizon was separated from the rest of the horizon and not included in the sample taken to laboratory.)

Remarks: Colors given are for moist soil.

Ground water depth at 50 inches when sampled.

The McGary series consists of Gray-Brown Podzolic soils intergrading to Planosols developed on highly calcareous water-deposited silts and clays. The McGary soils are the imperfectly drained member of the soil catena that also includes the well-drained Markland, very poorly drained, moderately dark colored Zipp, very poorly drained, dark-colored Montgomery, and very poorly drained, very dark colored Kings soils. The Henshaw soils differ from the McGary in being developed in lighter material, predominantly silty clay loam and silt loam with minor amounts of clay and fine sand. The major part of the solum is thought to be developed in material of loessial origin.

SCS-421
10-64 (Rev. 9-66)

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Miami silt loam SOIL Nos. WW-2 LOCATION Wayne County, Indiana

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 531562 - 531569

Depth (in.)	Horizon	1B1b Total: Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Size class and particle diameter (mm) 3A1 Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: (0.05–0.02)	Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)		3B2 Cm	Coarse fragments 3B1: 2A2 > 2 Pct.	2 – 19	19 – 76
		Pct. of < 2 mm															Pct. of < 76mm	
0-3	A1		52.2	16.6	1.8	4.0	6.2	12.1	7.1		36.8	29.2				4		
3-8	A2		52.6	16.3	1.4	3.9	6.2	12.0	7.6		35.2	31.7				3		
8-12	A3-B1		47.4	21.9	1.4	3.9	5.9	11.9	7.6		33.9	27.8				5		
12-19	B21t		32.3	39.5	1.5	3.6	5.3	10.8	7.0		21.3	24.0				3		
19-23	B22t		26.6	41.8	1.9	4.2	6.1	11.9	7.5		18.0	22.8				6		
23-26	B22t		26.5	33.0	2.4	5.0	7.2	15.7	10.2		15.4	30.1				7		
26-31	B3-C1		24.3	31.4	1.5	4.7	7.6	18.5	12.0		14.7	32.3				5		
31+	C2		41.1	17.0	4.4	6.0	6.0	13.6	11.9		22.0	39.1				12		

Depth (in.)	6A1a Organic carbon Pct.	Nitrogen Pct.	C/N		Carbonate as $CaCO_3$ Pct.	Ext. iron as Fe Pct.	Bulk density:	4A1e ⅓ bar g/cc	4A1h Oven dry g/cc	4D1 COLE	Water content:	4B1c ⅓ bar Pct.	4B2 15 bar Pct.		4C1 WRD in/in	pH:	8C1c (1:1) KCl	8C1a (1:1) H_2O
0-3	3.58																	6.6
3-8	0.82																	5.0
8-12	0.58																	4.8
12-19	0.40																	5.1
19-23	0.34																	5.4
23-26	0.44																	6.8
26-31	0.33																	6.0
31+	0.20																	7.7

Depth (in.)	Extractable bases 5B1a: 6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum	6H1a Ext. acidity	CEC: 5A3a Sum cations		6G1d Ext. Al			Ratios to clay: CEC Sum	Ext. iron	15-bar water	8D3 Ca/Mg		Base saturation: 5C3 Sum cations Pct.	5C1 NH_4OAc Pct.
	meq/100 g																	
0-3	17.4	2.9	tr.	0.3		5.2	25.8										80	
3-8	13.8	1.1	0.1	0.1		9.8	24.9										61	
8-12	3.1	1.7	tr.	0.2		10.2	15.2										33	
12-19	7.4	5.0	0.1	0.4		10.8	23.7										54	
19-23	10.1	6.4	0.1	0.4		8.0	25.0										68	
23-26	11.8	7.1	0.1	0.3		3.4	22.7										85	
26-31	7.7	5.8	0.1	0.3		4.8	18.7										74	
31+	17.4	3.1	0.1	0.1		0.6	21.3										97	

Depth (in.)	Clay Fraction Analysis 7A1b-d: Mt.	Chl.	Vm	Mi	Int	Qtz.	Kl.	Gibbsite	
	7A2 X-ray						7A3		

Mt. = Montmorillonite, Chl. = chlorite, Vm. = Vermiculite, mi = mica, Int. = Interstratified layer, Qtz. = quartz, Kl. = Kaolinite

Relative amounts: blank = not determined, dash = not detected, tr. = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant.

Soil Type: Miami silt loam
Soil No.: WW-2
Location: Wayne County, Indiana. Taken from Lewis woods about 3/16 mile NE of the S W corner of Section 8, T 15 N. R 14 E, and about 1 mile S S E of Williamsburg.
Vegetation and land use: Near-virgin forest of oak, beach, and sugar maple.

Horizon and Beltsville Lab. No.	
A1 531562	0 to 3 inches. Very dark gray to dark grayish brown (10YR 3/1 to 4/2) silt loam; moderate fine crumb structure; friable when moist; soft when dry; boundary gradual and wavy; pH 6.3
A2 531563	3 to 8 inches. Very pale brown (10YR 7/3, dry) to brown (10YR 5/3) silt loam; weak thin platy structure; friable when moist; slightly hard when dry and slightly sticky when wet; porous; lower boundary gradual; pH 5.8.
A3-B1 531564	8 to 12 inches. Light yellowish brown to brown (10YR 6/4, 5/4) heavy silt loam; weak to moderate fine subangular blocky structure with higher clay content and stronger structure in lower part; boundary irregular with intertonguing; pH 4.9.
B21t 531565	12 to 19 inches. Brown (10YR 5/3, 4/3) silty clay loam; strong medium to coarse subangular blocky structure with thin streaks of pale brown heavy silt loam on upper block surfaces; firm when moist, hard when dry, sticky when wet; rock fragments present; lower boundary wavy; pH 5.5.
B22t 531566	19 to 23 inches. Dark brown (7.5YR 3/2 to 10YR 3/4) clay loam; coarse prismatic breaking to strong coarse to very coarse subangular blocky structure; firm when moist, hard when dry, sticky when wet; clay skins on surfaces of blocks are darker than interiors and they thicken toward lower part of horizon; lower boundary rather abrupt but irregular with tongues extending into horizon below pH 6.1.
B22t 531567	23 to 26 inches. Same as horizon above.
B3-C1 531568	26 to 31 inches. Light yellowish brown (2.5Y 6/4 to 10YR 6/4) with dark brown (7.5YR 3/2) clay fillings and films on joints and on root and wormholes; clay loam till partially leached of lime carbonate; neutral to mildly alkaline.
C2 531569	31 inches plus. Strongly calcareous pale brown to grayish brown (10YR 6/3 to 10YR 5/3) loam till; about 40 percent limestone fragments. A few dark brown clay films in vertical cracks; pH 7.7.

Notes: Colors are for moist soil unless otherwise indicated.

SOIL SURVEY LABORATORY Lincoln, Nebr. August 1961

SOIL TYPE Montgomery silty clay loam **LOCATION** Greene County, Indiana

SOIL NOS. S60Ind-28-3 **LAB. NOS.** 13507-13514

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-9	Ap	0.2a	0.6a	0.8a	1.7a	1.6a	61.4	33.7	17.9	46.0	-	sicl
9-15	A12	0.1a	0.2a	0.5a	1.6a	1.7a	54.6	41.3	15.0	42.2	-	sic
15-21	B1g	0.1a	0.2a	0.4a	1.4a	1.6a	54.3	42.0	15.0	41.7	-	sic
21-26	B21g	<0.1	0.2a	0.3a	0.8a	1.2a	55.3	42.2	14.9	42.0	-	sic
26-33	B22g	0.1a	0.2a	0.2a	0.4a	1.0a	56.1	42.0	11.8	45.5	-	sic
33-39	B3g	0.1a	0.3a	0.2a	0.4a	0.9a	57.5	40.6	12.9	45.7	-	sic
39-50	C1	0.3b	0.5b	0.3b	0.5b	0.8b	62.7	34.9	10.6	53.2	-	sicl
50-60	C2	0.1b	0.3b	0.2b	0.4b	0.8b	60.6	37.6	10.9	50.7	-	sicl

pH 8C1a 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	Free Iron Fe_2O_3% 6C1a		6E1c $CaCO_3$ equivalent %	3A1a Carbonate Clay %	WATER CONTENT 4B1b 1/3-Bar Pieces %	4C1 1/3-Bar to 15-Bar %	4B2 15-Bar %
6.7			2.33	0.193	12	2.2				24.0	9.6	14.4
6.9			1.51	0.130	12	2.2						17.9
7.0			1.09	0.098	11	2.2				24.4	7.0	17.4
7.1			0.76	0.075	10	2.3		0.1				17.5
7.4			0.53			2.4		<0.1		24.0	6.2	17.8
7.6			0.45			2.5		0.9	-			16.8
7.9			0.34			2.4		18.6	-	24.0	8.9	15.1
7.9			0.32			2.3		20.9	1			15.6

5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 5B1a 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K	BASE SAT. % NH_4OAc EXCH. 5C1	Base Sat. % on Sum Cations 5C3	BULK DENSITY Field State 4B4 H_2O %	4A1a g/cc	30-cm. 4B3 H_2O %	4A1c g/cc	Oven-Dry 4A1h g/cc
←	milliequivalents per 100g. soil				→							
24.6	21.0	3.7	6.5	<0.1	0.4	102	79	18.7	1.54	23.5	1.48	1.64
27.6	23.2	5.0	6.3	<0.1	0.5	104	82					
26.2	21.0	5.4	4.3	0.1	0.4	103	86	20.9	1.57	22.3	1.54	1.78
25.4	20.2	6.3	4.1	0.1	0.4	106	87					
24.3	19.7	6.3	2.8	0.1	0.4	109	90	20.5	1.60	21.4	1.60	1.80
21.5	18.4	6.2	1.8	0.1	0.4	117	93					
14.5		3.9	<0.1	0.1	0.2			19.5	1.68	19.6	1.67	1.78
14.0		4.0	<0.1	<0.1	0.3							

a. Many Fe-Mn? concr.

b. Common Fe-Mn? concr. Few carbonate concretions and limestone fragments.

Soil Type: Montgomery silty clay loam
Soil Nos.: S60Ind-28-3
Location: Greene County, Indiana, SW 1/4 of Sec. 13, T6N, R7W, 156 feet west of concrete corner post along field road, then north 180 feet.
Vegetation: Red clover and sweet clover.
Slope: Level to slightly depressional.
Drainage and Permeability: Very poorly drained with runoff very slow to ponded; permeability is very slow.
Parent Material: Stratified calcareous or neutral clay and silty clay with thin layers or lenses of silts and fine sand (slack-water lakebed deposits).
Collected by: F. J. Carlisle and M. W. Meyer, July 13, 1960.
Described by: F. W. Sanders, July 13, 1960.

Horizon and Lincoln Lab. No.	
Ap 13507	0 to 9 inches. Very dark gray (10YR 3/1) silty clay loam; weak medium to coarse subangular blocky structure; friable; neutral; abrupt smooth boundary.
A12 13508	9 to 15 inches. Black (10YR 2/1) heavy silty clay loam; weak fine prismatic breaking into strong medium angular blocky structure; firm; neutral; clear smooth boundary.
B1g 13509	15 to 21 inches. Dark gray (10YR 4/1) heavy silty clay loam; weak medium prismatic breaking into moderate fine to medium angular blocky structure; firm; neutral; gradual smooth boundary.
B21g 13510	21 to 26 inches. Dark gray (10YR 4/1) light silty clay; dark gray (10YR 4/1) clay films on ped faces; very dark gray (10YR 3/1) tubular areas extend vertically through horizon, 1/8 to 1/4 inch in diameter, appear to be wormholes or root holes filled with material from upper horizons; weak medium prismatic breaking into moderate medium angular blocky structure; firm; weakly effervescent; clear smooth boundary.
B22g 13511	26 to 33 inches. Gray (10YR 5/1) light silty clay with common fine distinct yellowish brown (10YR 5/4) mottles; distinct tubular tongues of dark gray (10YR 4/1) silty clay, 2 to 3 inches in diameter and 8 to 12 inches apart extend vertically through horizon and appear to be old crawfish holes; very dark gray (10YR 3/1) tubular areas extending vertically through horizon, 1/8 to 1/4 inch in diameter, appear to be wormholes or root holes filled with material from upper horizons; weak medium prismatic breaking into moderate medium angular blocky structure; firm; weakly effervescent; clear smooth boundary.
B3g 13512	33 to 39 inches. Grayish brown (2.5Y 5/2) heavy silty clay loam with many fine distinct yellowish brown (10YR 5/4) mottles; distinct tubular tongues of dark gray (10YR 4/1) light silty clay, 2 to 3 inches in diameter and 8 to 12 inches apart, extend vertically through horizon (they appear to be old crawfish holes); very dark gray (10YR 3/1) tubular areas extending vertically through horizon, 1/8 to 1/4 inch in diameter, appear to be wormholes or root holes filled with material from upper horizons; weak medium prismatic breaking into moderate fine to medium angular blocky structure; firm; calcareous; clear irregular boundary.
C1 13513	39 to 50 inches. Light brownish gray (2.5Y 6/2) heavy silty clay loam with moderate medium distinct light yellowish brown (10YR 6/4) mottles; thin gray (10YR 5/1) clay films on ped faces; distinct tubular tongues of dark gray (10YR 4/1) 2 to 3 inches in diameter and 8 to 12 inches apart, extend vertically through horizon (they appear to be old crawfish holes); very dark gray (10YR 3/1) tubular areas extending vertically through horizon, 1/8 to 1/4 inch in diameter, appear to be wormholes or root holes filled with material from upper horizons; weak medium prismatic breaking into weak fine to medium angular blocky structure; firm; calcareous; gradual irregular boundary.
C2 13514	50 to 60 inches. Gray (10YR 6/1) light silty clay loam with many fine distinct yellowish brown (10YR 5/4) mottles; thin gray (10YR 5/1) clay films on ped faces; distinct tubular tongues of dark gray (10YR 4/1) silty clay, 2 to 3 inches in diameter and 8 to 12 inches apart, extend vertically through horizon (they appear to be old crawfish holes); very dark gray (10YR 3/1) tubular areas extending vertically through horizon, 1/8 to 1/4 inch in diameter, appear to be worm or root holes filled with material from upper horizons; weak medium to coarse angular blocky structure; sticky; calcareous.

Remarks: Colors given are for moist soil.

Ground water depth at 50 inches when sampled.

The Montgomery series consists of Humic-Gley soils of the region of Gray-Brown Podzolic soils developed on calcareous water-deposited clays and silts of Wisconsin glacial age. The Montgomery soils are the very poorly drained, dark-colored member of the soil catena that also includes the well to moderately well drained Markland, imperfectly drained McGary, very poorly drained, moderately dark colored Zipp, and the very poorly drained, very dark colored Kings soils. Patton soils differ from the Montgomery in having lighter-textured subsoils and underlying strata.

SOIL SURVEY LABORATORY Lincoln, Nebr. August, 1961

SOIL TYPE Montgomery silty clay loam **LOCATION** Greene County, Indiana

SOIL NOS. S60Ind-28-4 **LAB. NOS.** 13515-13521

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-11	Ap	0.1a	0.1a	0.2a	0.7a	1.1a	58.4	39.4	15.0	44.9	-	sicl
11-17	A12	<0.1	<0.1	0.2a	0.7a	1.2a	52.1	45.8	13.1	40.6	-	sic
17-24	B21g	<0.1	<0.1	0.2a	0.7a	0.9a	52.8	45.4	12.3	41.8	-	sic
24-29	B22g	0.1a	0.2a	0.3a	0.6b	0.6b	55.5	42.7	8.6	47.8	-	sic
29-38	B3g	0.2c	0.4b	0.3b	0.6b	0.5b	59.6	38.4	7.3	53.1	-	sicl
38-48	C1	0.6c	0.6b	0.2b	0.4b	0.8b	60.3	37.1	14.4	46.9	-	sicl
48-58+	C2	0.1c	0.4c	0.4b	0.6b	1.3b	69.3	27.9	18.2	52.7	-	sicl

pH 8C1a 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	Free Iron Fe_2O_3% 6C1a		6E1c $CaCO_3$ equivalent %	3A1a Carbonate Clay %	WATER CONTENT 4B1b 1/3-Bar Pieces %	4C1 1/3-Bar to 15-Bar %	4B2 15-Bar %
6.1			2.14	0.194	11	1.9				23.9	7.8	16.1
6.7			1.28	0.120	11	2.0						18.8
6.9			1.03	0.095	11	2.0		<0.1		25.7	7.0	18.7
7.7			0.57			2.8		3.8	-			18.3
7.9			0.42			2.3		20.7	1	21.9	5.6	16.3
8.0			0.32			2.0		30.6	3			15.5
8.0			0.31			2.1		36.7	3			12.6

5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K	5B1a BASE SAT. % NH_4OAc EXCH. 5C1	Base Sat. % on Sum Cations 5C3	BULK DENSITY Field-State 4B4 H_2O %	4A1a g/cc	30-cm. 4B3 H_2O %	4A1c g/cc	Oven-Dry 4A1h g/cc
←	milliequivalents per 100g. soil				→							
25.4	19.1	5.2	7.8	<0.1	0.4	97	76	24.7	1.47	22.9	1.49	1.69
26.0	21.2	6.4	5.1	0.1	0.4	108	85					
26.5	21.2	6.8	4.6	0.1	0.4	108	86	23.8	1.52	22.9	1.54	1.82
21.9		6.8	1.5	0.1	0.3							
16.9		4.5	<0.1	0.1	0.2			19.5	1.67	20.5	1.65	1.78
13.6		3.7	<0.1	<0.1	0.2							
9.6		2.7	<0.1	<0.1	0.2							

a. Many Fe-Mn? concr.
b. Common Fe-Mn? concr. Few carbonate concretions and limestone fragments.
c. Many carbonate concretions and limestone fragments.

Soil Type: Montgomery silty clay loam
Soil Nos.: S60Ind-28-4
Location: Greene County, Indiana, SE 1/4 of Sec. 26, T6N, R7W, 810 feet west of concrete bridge along gravel road, then 380 feet straight north.
Vegetation: Cornfield.
Slope: Level to slightly depressional.
Drainage and Permeability: Very poorly drained with runoff very slow to ponded; permeability is very slow.
Parent Material: Stratified calcareous or neutral clay and silty clay with thin lenses or layers of silts and fine sand (slack-water lakebed deposits).
Collected by: F. J. Carlisle and M. W. Meyer, July 14, 1960.
Described by: F. W. Sanders, July 14, 1960.

Horizon and Lincoln Lab. No.	
Ap 13515	0 to 11 inches. Black (10YR 2/1) to very dark gray (10YR 3/1) silty clay loam; weak medium to coarse subangular blocky, fine cloddy; friable; slightly acid; abrupt smooth boundary.
A3 or B1g 13516	11 to 17 inches. Black to very dark gray (10YR 2/1 to 3/1) heavy silty clay loam; moderate to strong medium angular blocky structure; firm; slightly acid becoming neutral in lower part; clear wavy boundary.
B21g 13517	17 to 24 inches. Dark gray (10YR 4/1) silty clay with common fine distinct brown (10YR 5/3) mottles; thin dark gray (10YR 4/1) clay films on ped faces; frequent soft black manganese and iron concretions less than 1 mm.; diffused tubular tongues of dark gray (10YR 4/1) silty clay, 1 to 2 inches in diameter and 8 to 12 inches apart, extend vertically through horizon; weak coarse prismatic breaking into moderate coarse angular blocky structure; firm when moist, sticky when wet; neutral becoming weakly effervescent in lower part; gradual irregular boundary.
B22g 13518	24 to 29 inches. Grayish brown (2.5Y 5/2) light silty clay with common fine distinct yellowish brown (10YR 5/4) mottles; thin gray (10YR 5/1) clay films on ped faces; frequent soft, black manganese and iron concretions less than 1 mm.; distinct tubular tongues of gray (10YR 5/1) silty clay, 1 to 2 inches in diameter and 8 to 12 inches apart, extend vertically through horizon; weak coarse prismatic breaking into moderate medium to coarse angular blocky structure; firm when moist; sticky when wet; calcareous; gradual irregular boundary.
B3g 13519	29 to 38 inches. Gray (10YR 6/1) heavy silty clay loam with many fine distinct yellowish brown (10YR 5/4) mottles; thin gray (10YR 5/1) clay films on ped faces; frequent soft, black manganese and iron concretions less than 1 mm.; distinct tubular tongues of gray (10YR 5/1) silty clay, 1 to 2 inches in diameter and 8 to 12 inches apart, extend vertically through horizon; weak coarse prismatic breaking into weak coarse angular blocky structure; firm when moist, sticky when wet; calcareous; gradual smooth boundary.
C1 13520	38 to 48 inches. Gray (10YR 6/1) heavy silty clay loam with many medium distinct yellowish brown (10YR 5/4) mottles; thin gray (10YR 5/1) clay films on ped faces; distinct tubular tongues of gray (10YR 5/1) silty clay, 1 to 2 inches in diameter and 8 to 12 inches apart, extend vertically through horizon; weak coarse prismatic breaking into weak coarse angular blocky structure; firm when moist, sticky when wet; calcareous; gradual smooth boundary.
C2 13521	48 to 58 inches plus. Gray (10YR 5/1 to 6/1) light silty clay loam with many medium distinct yellowish brown (10YR 5/8) mottles; thin gray (10YR 5/1) clay films on ped faces; distinct tubular tongues of gray (10YR 5/1) to dark gray (10YR 4/1) silty clay, 1 to 2 inches in diameter and 8 to 12 inches apart, extend vertically through horizon; weak medium to coarse angular blocky structure; friable when moist, sticky when wet; calcareous.

Remarks: Colors given are for moist soil.

Ground water depth at 40 inches when sampled.

The krotovinas or tongues, which extend vertically downward, appear to be old crawfish holes. They look darker than the surrounding soil and appear to have thicker clay films on ped faces.

The Montgomery series consists of Humic-Gleys in the region of Gray-Brown Podzolic soils developed on calcareous water-deposited clays and silts of Wisconsin glacial age. The Montgomery soils are the very poorly drained, dark-colored member of the soil catena that also includes the well to moderately well drained Markland, imperfectly drained McGary, very poorly drained, moderately dark colored Zipp, and the very poorly drained, very dark colored Kings soils. Patton soils differ from the Montgomery in having lighter-textured subsoils and underlying strata.

SOIL SURVEY LABORATORY Mandan, N. D.

SOIL TYPE Morley silt loam **LOCATION** Allen Co., Indiana

MSL NOS: 3918-3922

SOIL NOS. S55Ind-2-17 **LAB. NOS.** BSL NOS: 551459-463

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	3A1 0.02-0.002	2A2 > 2 (2mm.)	TEXTURAL CLASS
0-5	A_p	1.5	2.9	2.9	8.5	8.2	54.9	21.1	31.3	36.7	2	sil
5-7	B_1	1.2	1.6	1.9	6.4	6.5	54.7	27.7	25.1	39.9	3	sicl
7-14	B_{21t}	1.2	1.8	1.6	4.9	5.1	41.5	43.9	18.5	30.9	-	sic
14-24	B_{22t}	0.9	1.6	1.6	4.9	4.9	37.6	48.5	17.7	27.7	-	c
24-+	C	2.8	3.4	2.3	5.8	5.3	42.1	38.3	20.2	30.5	3	sicl

8C1a pH 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6S1a % Total P		6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
6.6			1.57	.124	13	0.041						
5.6			1.05	.087	12	0.032						
4.7			0.79	.078	10	0.035						
5.3			0.67	.061	11	0.054						
7.9			0.49	.048	10	0.054		13				

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6C2b Mg	6H1a H	6P2a Na	5B1a 6Q2a K	5C1 Base Sat. % NH_4Ac Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Bases	5A3a Sum Cations		8D3 Ca/Mg	MOISTURE AT SATURATION %
←	milliequivalents per 100g. soil				→			← me/100g.				
14.1	9.8	2.3	4.4	0.1	0.2	88	74	12.4	16.8		4.3	
14.2	7.9	2.1	6.1	0.1	0.2	72	63	10.3	16.4		3.8	
20.0	6.7	2.6	15.7	0.1	0.3	48	38	9.7	25.4		2.6	
21.3	12.0	4.5	9.4	0.1	0.3	79	64	16.9	26.3		2.7	
16.2		4.8	0.6	0.1	0.2							

Soil Type: Morley silt loam
Soil Nos.: S55Ind-2-17
Location: SW 1/4 of SW 1/4 of Sec. 3, T29N, R13E, Allen County, Indiana. The sample site is 990 feet north, 125 feet east of southwest corner of Sec. 3.
Topography: Gently undulating, 3 percent slope.
Physiography: Upland till plain.
Drainage: Moderately well to well drained.
Vegetation: Alfalfa and lespedeza.
Field No.: Legend No. 734.
Beltsville Lab. Nos.: 551459-551463.
Described by: James V. Anderson, October, 1955.

Horizon and Mandan Lab. No.	
Ap 3918	0 to 5 inches. Dark grayish brown (10YR 4/2 moist) silt loam; weak fine crumb structure; slightly hard when dry; pH 6.6.
B1 3919	5 to 7 inches. Brown (10YR 5/3) with few fine faint mottles of dark yellowish brown (10YR 4/4 moist) silty clay loam; moderate fine subangular blocky structure; hard when dry; pH 5.7.
B21t 3920	7 to 14 inches. Brown (10YR 5/3 moist) silty clay; weak medium prismatic structure which breaks to strong medium angular blocky structure; extremely firm when moist; pH 4.8.
B22t 3921	14 to 24 inches. Brown (10YR 5/3) with few fine faint mottles of yellowish brown (10YR 5/8 moist) silty clay; weak medium prismatic structure which breaks to moderate coarse angular blocky structure; extremely firm when moist; pH 7.0.
C 3922	24 inches plus. Dark grayish brown (10YR 4/2) with common medium prominent mottles of light gray (10YR 7/2 moist) silty clay loam; weak medium angular blocky structure; very firm when moist; violent effervescence with 2N HCl.

Remarks: The gray mottles in the C horizon are coatings of $CaCO_3$.

SOIL SURVEY LABORATORY Mandan, N. D.

SOIL TYPE Morley silt loam **LOCATION** Allen Co., Indiana

MSL NOS: 3923-3928

SOIL NOS. S55Ind-2-18 **LAB. NOS.** BSL NOS: 551464-469

General Methods: 1A, 1E1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	3A1 2A2 > 2 (<19mm.)	TEXTURAL CLASS
0-3	A_1	1.6	3.2	4.0	11.0	8.4	52.8	19.0	29.8	37.3	2	sil
3-6	A_2	2.1	3.3	4.0	11.3	8.6	52.5	18.2	30.1	37.1	2	sil
6-9	B_1	2.1	2.8	3.7	10.9	8.6	52.6	19.3	31.0	36.1	2	sil
9-16	B_{21t}	0.7	1.8	2.1	7.2	6.6	38.1	43.5	21.4	27.5	-	c
16-24	B_{22t}	1.3	1.9	1.9	6.5	6.1	35.8	46.5	19.3	26.4	-	c
24-+	C	3.1	2.3	2.0	6.6	6.1	42.7	37.2	21.1	31.6	8	cl

8C1a pH 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6S1a % Total P		6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
5.7			3.80	.262	15	0.041						
5.1			1.86	.156	12	0.032						
5.1			0.58	.057	10	0.019						
5.3			0.67	.072	9	0.025						
6.3			0.55	.059	9	0.050		-				
8.1			0.35	.041	9	0.050		19				

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	5B1a 6Q2a K	5C1 Base Sat. % NH_4Ac Exch.	5C3 Base Sat. % on Sum Cations	5R1a Sum Bases	5A3a Sum Cations	8D3 Ca/Mg	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil							me/100g.			
19.2	9.9	2.0	10.3	0.1	0.3	64	54	12.3	22.6	4.9	
12.7	4.0	1.1	10.2	0.1	0.1	42	34	5.3	15.5	3.6	
8.9	2.0	0.8	8.3	0.1	0.1	34	26	3.0	11.3		
19.5	9.7	3.0	9.8	0.1	0.4	68	57	13.2	23.0	3.2	
20.6	14.2	4.5	6.1	0.1	0.4	93	76	19.2	25.3	3.2	
13.4		5.8	0.6	0.2	0.2						

Soil Type: Morley silt loam
Soil Nos.: S55Ind-2-18
Location: NW 1/4 of NW 1/4 of Sec. 5, T32N, R15E, Allen County, Indiana. The sample site is 742 feet south, 990 feet east of the northwest corner of Sec. 5.
Topography: Undulating, 4 percent slope.
Physiography: Upland till plain.
Drainage: Well to moderately well drained.
Vegetation: Oak-hickory woods pasture with ground covered by bluegrass.
Field No.: Legend No. 734.
Beltsville Lab. Nos.: 551464-551469.
Described by: James V. Anderson, October, 1955.

Horizon and Mandan Lab. No.	
A1 3923	0 to 3 inches. Very dark grayish brown (10YR 3/2 moist) silt loam; strong fine crumb structure; soft when dry; pH 6.2.
A2 3924	3 to 6 inches. Grayish brown (10YR 5/2 moist) silt loam; weak medium platy structure; soft when dry; pH 5.2.
B1 3925	6 to 9 inches. Yellowish brown (10YR 5/4 moist) silty clay loam; moderate fine subangular blocky structure; slightly hard when dry; pH 5.0.
B21t 3926	9 to 16 inches. Dark brown (10YR 4/3) with few medium faint mottles of dark yellowish brown (10YR 4/4 moist) silty clay; moderate medium prismatic structure which breaks to moderate medium angular blocky structure; very firm when moist; pH 5.6.
B22t 3927	16 to 24 inches. Dark grayish brown (10YR 4/2) with few medium faint mottles of dark yellowish brown (10YR 4/4 moist) silty clay; moderate medium prismatic structure which breaks to moderate fine subangular blocky structure; firm when moist; pH 6.8.
C 3928	24 inches plus. Dark grayish brown (10YR 4/2) with few medium faint mottles of dark yellowish brown (10YR 4/4 moist) silty clay loam; moderate medium angular blocky structure; firm when moist; strong effervescence with 2N HCl.

Remarks: The B and C horizons of this profile appear to be almost heavy enough to justify classification as St. Clair.

SOIL SURVEY LABORATORY Lincoln, Nebr. December 1959

SOIL TYPE Morley silt loam **LOCATION** Huntington County, Indiana

SOIL NOS. S59Ind-35-1 **LAB. NOS.** 11751-11757

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	3A1 0.02-0.002	2A2 > 2 (<19mm.)	TEXTURAL CLASS
0-6	Ap	0.5	1.2	2.4	6.5	11.8	61.6	16.0	44.1	32.9	Tr.	sil
6-12	A2	0.4	1.3	2.6	7.3	12.6	60.8	15.0	45.7	31.7	Tr.	sil
12-17	B1	1.3	1.8	2.6	7.5	10.6	53.8	22.4	37.8	30.8	4	sil
17-21	B21t	1.4	2.3	2.7	8.0	8.0	42.6	35.0	27.2	28.0	3	cl
21-25	B22t	1.6	2.6	2.9	8.0	6.7	38.6	39.6	22.2	27.7	2	cl/c
25-33	C1	3.2a	3.1a	3.0a	8.2a	6.9a	43.1	32.5	24.2	30.6	7	cl
33-40+	C2	2.8a	3.4a	3.1a	8.3a	6.7a	46.1	29.6	24.3	33.3	6	cl

8C1a pH 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6C1a Free Iron % Fe_2O_3		6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
7.0			2.44	0.202	12	1.1		<1				8.2
5.0			0.64	0.064	10	1.2						6.0
5.1			0.34	0.050	7	1.9						8.3
5.4			0.40	0.060	7	2.8						13.6
7.1			0.50	0.056	9	2.6		<1				15.6
8.0			0.32	0.043	7	2.0		17				12.8
8.1			0.30	0.037	8	1.7		24				11.8

5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	5B1a 6Q2a K	5C1 Base Sat. % NH_4OAc Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Ext. Bases	5A3a Sum Ext. Cations	8D3 Ca/Mg		MOISTURE AT SATURATION %
←	milliequivalents per 100g. soil →							← me/100g. →				
14.8	11.0	3.3	4.4	0.1	0.3	99	77	14.7	19.1	3.3		
8.1	2.1	0.9	8.1	0.1	0.1	40	28	3.2	11.3			
10.1	4.1	1.5	7.6	0.1	0.1	57	43	5.8	13.4	2.7		
15.7	9.4	3.1	7.4	0.1	0.2	82	63	12.8	20.2	3.0		
16.2		3.5	3.2	0.1	0.3							
11.4		2.7	<0.1	0.1	0.2							
8.8		2.3	<0.1	<0.1	0.2							

a. Few carbonates. Limestone fragments?

Soil Type: Morley silt loam
Soil Nos.: S59Ind-35-1
Location: SE 1/4 of SW 1/4, Sec. 19, T23N, R4W, cut on north side of road and west side of valley of Clear Creek, Huntington County, Indiana, State Highway No. 16.
Vegetation and Use: Mixed deciduous hardwood timber cover.
Slope and Land Form: Moderately sloping area above escarpment of Clear Creek Valley. Adjoining till plain ranges from undulating to nearly level.
Drainage and Permeability: Moderately well to well drained. Surface runoff ranges from rapid on the steeper slopes to medium on gentler slopes. Internal drainage is medium to slow.
Parent Material: Silty clay loam to clay loam till containing from 28 to 38 percent clay less than 2 microns and 15 to 30 percent calcium carbonate equivalent. The solum may be developed in a thin mantle of loess less than about 10 to 12 inches thick.
Collected by: A. L. Post, D. F. Post, and H. P. Ulrich, August 3, 1959.
Described by: H. P. Ulrich, August 3, 1959.

Horizon and Lincoln Lab. No.	
Ap 11751	0 to 6 inches. Very dark grayish brown (10YR 3/2) silt loam; moderate fine granular structure; friable; slightly acid to neutral; abrupt smooth to clear wavy boundary 5 to 7 inches thick; numerous fibrous roots. Colors for moist conditions here and below.
A2 11752	6 to 12 inches. Pale brown to light yellowish brown (10YR 6/4) silt loam; weak thin to medium platy structure; friable; medium acid; clear wavy boundary 3 to 5 inches thick.
B1 11753	12 to 17 inches. Grayish brown to yellowish brown (10YR 5/2 to 5/4) fine silt loam to coarse silty clay loam; moderate, medium platy to fine subangular blocky structure; very firm when moist, plastic and sticky when wet; strongly acid; clear wavy boundary 3 to 6 inches thick. Ped faces are coated and cracks filled with silt that is light brownish gray to pale brown (10YR 6/2 to 6/3) when dry.
B21t 11754	17 to 21 inches. Grayish brown to brown (10YR 5/2 to 5/3) silty clay loam that is light brownish gray (10YR 6/2) when dry; strong medium to coarse subangular to angular blocky structure; firm, plastic and sticky when wet; medium acid; clear wavy boundary 3 to 5 inches thick.
B22t 11755	21 to 25 inches. Dark brown to dark grayish brown (10YR 3/3 to 4/2) silty clay loam with thick clay coatings on ped faces; ped interiors are brown (10YR 5/3); strong medium to coarse angular blocky structure; firm; slightly acid; abrupt irregular boundary.
C1 11756	25 to 33 inches. Grayish brown (10YR 5/2) silty clay loam with some channels and ped faces clay coated, 1 to 2 mm. thick and black to very dark gray (10YR 2/1 to 3/1); strong coarse angular blocky structure; very firm; calcareous.
C2 11757	33 to 40 inches plus. Grayish brown (10YR 5/2) silty clay loam; strong coarse angular blocky structure; very firm; calcareous.

SCS-421
10-64 (Rev. 9-65)

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Muren silt loam SOIL Nos. 36A LOCATION Daviess County, Indiana

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 55978 - 55986

Depth (in.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Size class and particle diameter (mm) 3A1 Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt (0.05–0.02)	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)		3B2 Cm	Coarse fragments 3B1: 2A2 > 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76mm	
0-10	Ap		80.1	13.6	0.9	1.3	0.8	1.1	2.2		39.5	43.4				-		
10-15	B21t		69.7	27.9	-	0.2	0.2	0.4	1.6		35.0	36.6				-		
15-28	B22t		68.1	29.3	-	0.1	0.1	0.4	2.0		31.5	38.8				-		
28-36	B31		72.9	24.6	-	0.1	0.1	0.3	2.0		30.0	45.1				-		
36-46	B32		76.7	21.3	-	0.1	0.1	0.2	1.6		34.9	43.5				-		
46-66	C1		80.3	17.9	-	0.1	0.1	0.3	1.3		37.4	44.4				-		
66-84	IIC2		71.5	17.2	0.2	1.6	2.5	3.7	3.3		35.0	41.6				-		
84-96	IIC3		62.9	16.1	0.7	3.7	4.8	7.0	4.8		33.8	37.6				-		
96-108	IIC4		55.2	17.6	1.6	4.4	6.1	9.5	5.6		29.8	35.8				-		
108+	IIIC5		37.7	30.2	1.6	4.0	7.8	12.1	6.6		21.3	29.1				-		

Depth (in.)	6A1a Organic carbon Pct	Nitrogen Pct.	C/N		Carbonate as $CaCO_3$ Pct.	Ext. iron as Fe Pct.	Bulk density: g/cc	4A1e ⅓ bar g/cc	4A1h Oven dry g/cc	4D1 COLE	Water content: Pct.	4B1c ⅓ bar Pct.	4B2 15 bar Pct.		4C1 WRD in/in	pH	8C1c (1:1) KCl	8C1a (1.1) H_2O
0-10	1.29																	5.9
10-15	0.20																	5.4
15-28	0.20																	5.2
28-36	0.12																	4.9
36-46	0.20																	5.4
46-66	0.16																	6.1
66-84	0.15																	6.8
84-96	0.12																	6.7
96-108	0.11																	6.7
108+	0.11																	6.7

Depth (in.)	Extractable bases 5B1a: 6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum	6H1a Ext. acidity	CEC: 5A3a Sum cations		6R1d Ext Al			Ratios to clay: CEC Sum	Ext. iron	15-bar water	8D3 Ca/Mg		Base saturation: 5C3 Sum cations Pct	5C1 NH_4OAc Pct.
	meq/100 g																	
0-10	5.3	1.0	0.2	0.2		5.1	11.8										57	
10-15	8.2	3.7	0.2	0.2		6.6	18.9										65	
15-28	7.6	4.7	0.1	0.2		8.3	20.9										60	
28-36	5.9	5.3	0.1	0.2		8.3	19.8										58	
36-46	6.2	5.1	0.1	0.1		5.5	17.0										68	
46-66	6.1	4.5	0.1	0.1		3.6	14.4										75	
66-84	5.9	4.4	0.1	tr.		2.2	12.6										82	
84-96	6.6	4.7	0.1	tr.		2.0	13.4										85	
96-108	5.5	4.0	0.1	tr.		2.4	12.0										80	
108+	9.0	6.4	0.1	0.1		3.3	18.9										82	

Depth (in.)	Clay Fraction Analysis 7A1b-d: Mt.	Chl.	Vm.	Mi.	Int.	Qtz.	Kl.	Gibbsite	
	7A2 X-ray						7A3		

Mt. = Montmorillonite, Chl = chlorite, Vm. = Vermiculite, mi = mica, Int. = Interstratified layer, Qtz. = quartz, Kl. = Kaolinite

Relative amounts: blank = not determined, dash = not detected, tr. = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant.

Soil Type: Muren silt loam
Soil No.: 36A
Location: Daviess County, Indiana. SE 1/4 NE 1/4 SE 1/4 sec. 9, T. 2 N., R. 7 W., 17.7 miles from the Wabash River, along the southern traverse.
Physiography: 66 inches loess over leached Illinoian till.

Horizon and Beltsville Lab. No.	
Ap 55978	0 to 10 inches. Brown (10YR 5/3), smooth, silt loam, containing iron concretions.
B21t 55979	10 to 15 inches. Yellowish brown (10YR 5/6) slightly mottled with light yellowish brown (10YR 6/4), heavy silt loam, mostly smooth (< 3 percent sands), containing iron concretions.
B22t 55980	15 to 28 inches. Mottled pale brown (10YR 6/3) and yellowish brown (10YR 5/6), heavy silt loam to light silty clay loam, smooth, containing iron concretions.
B31 55981	28 to 36 inches. Yellow brown (10YR 5/8), silt loam, smooth, containing iron concretions.
B32 55982	36 to 46 inches. Brownish yellow (10YR 6/8) mottled with light brownish gray (10YR 6/2), heavy silt loam, smooth, containing iron concretions.
C1 55983	46 to 66 inches. Mottled brownish yellow (10YR 6/8), light gray (10YR 6/1), and very dark grayish brown (10YR 3/2), heavy silt loam, mostly smooth (< 3 percent sands) containing iron concretions.
IIC2 55984	66 to 84 inches. Yellowish brown (10YR 5/6), gritty, heavy silt loam, iron concretions.
IIC3 55985	84 to 96 inches. Light yellowish brown (10YR 6/4), very gritty, silty clay loam, containing iron concretions.
IIC4 55986	96 to 108 inches. Similar in color and texture to IIC3 horizon above. (Separated at this deeper depth for soil formation studies).
IIIC5 55987	108 inches plus. Mottled pale brown (10YR 6/3), strong brown (7.5YR 5/8), yellowish brown (10YR 5/6), and very dark brown (10YR 2/2), very gritty, light silty clay loam.

OIL SURVEY LABORATORY Mandan, N. D.

SOIL TYPE Nappanee silty clay loam **LOCATION** Allen Co., Indiana

MSL NOS: 3836-3841
BSL NOS: 551377-82

SOIL NOS. S55-Ind-2-2 **LAB. NOS.**

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	3A1 2A2 > 2	TEXTURAL CLASS
0-3	A_1	1.2	2.4	3.8	8.5	6.7	50.6	26.8	22.7	39.3	-	sil
3-6	A_2	0.5	1.9	3.6	7.9	6.3	52.4	27.4	20.8	42.3	-	sicl
6-8	B_{1t}	0.6	1.4	2.4	5.8	5.3	47.1	37.4	17.0	38.8	-	sicl
8-27	B_{21t}	0.5	0.8	1.4	3.3	3.5	38.9	51.6	11.9	32.5	-	c
27-33	B_{22t}	0.5	0.9	1.6	3.5	3.4	39.3	50.8	12.5	32.3	-	c
33-+	C	0.8	0.9	1.1	2.6	2.9	46.2	45.5	10.0	40.7	-	sic

pH 8C1a 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)		6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
5.8			4.00	.286	14							
5.3			1.26	.104	12							
4.8			0.88	.080	11							
4.9			0.47	.055	9							
5.7			0.49	.046	11			-				
7.5			0.48	.051	9			9				

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	5B1a 6Q2a K	5C1 Base Sat. % NH_4Ac Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Bases	5A3a Sum Cations	8D3 Ca/Mg	MOISTURE AT SATURATION %
←	milliequivalents per 100g. soil				→			← me/100g. →			
20.3	12.2	2.6	10.3	0.1	0.4	75	60	15.3	25.6	4.7	
13.9	5.9	1.5	9.5	0.1	0.2	55	45	7.7	17.2	3.9	
17.0	5.0	2.1	13.3	0.1	0.2	44	36	7.4	20.7	2.4	
24.8	10.8	7.1	11.5	0.3	0.4	75	62	18.6	30.1	1.5	
24.6	13.8	9.3	4.5	0.3	0.3	96	84	23.7	28.2	1.5	
18.6		7.9	0.4	0.3	0.3						

Soil Type: Nappanee silty clay loam
Soil Nos.: S55Ind-2-2
Location: 60 feet north of pasture fence, 1,402 feet east of State Highway No. 101, NE 1/4 of SW 1/4, Sec. 4, T31N, R15E, Allen County, Indiana.
Topography: Level, 1 percent slope.
Physiography: Lake plain.
Drainage: Imperfect.
Vegetation: Woods pasture with bluegrass and oak and hickory trees.
Field No.: Legend No. 32112.
Beltsville Lab. Nos.: 551377-551382. Described by: James V. Anderson, October, 1955.

Horizon and Mandan Lab. No.	
A1 3836	0 to 3 inches. Very dark gray (10YR 3/1 moist) silty clay loam; strong fine crumb structure; friable when moist; pH 5.9.
A2 3837	3 to 6 inches. Grayish brown (2.5Y 5/2 moist) silt loam; strong medium platy structure; friable when moist; pH 5.7.
B1t 3838	6 to 8 inches. Grayish brown (2.5Y 5/2) with few medium, faint mottles of yellowish brown (10YR 5/6 moist) silty clay loam; strong fine subangular blocky structure; firm when moist; pH 5.3.
B21t 3839	8 to 27 inches. Grayish brown (2.5Y 5/2) with few medium faint mottles of yellowish brown (10YR 5/6 moist) silty clay; moderate medium prismatic breaking to strong medium angular blocky structure; very firm when moist; pH 5.4.
B22t 3840	27 to 33 inches. Grayish brown (2.5Y 5/2) with few medium faint mottles of yellowish brown (10YR 5/6 moist) silty clay; strong fine angular blocky structure; very firm when moist; pH 6.9.
C 3841	33 inches plus. Grayish brown (2.5Y 5/2) with common medium distinct mottles of yellowish brown (10YR 5/6) and white (10YR 8/2 moist) silty clay; moderate medium angular blocky structure; very firm when moist; strong effervescence with 2N HCl. White mottles are of $CaCO_3$.

Remarks: This site appears never to have been cultivated.

SOIL SURVEY LABORATORY Mandan, N. D.

SOIL TYPE Nappanee silty clay loam **LOCATION** Allen Co., Indiana

MSL NOS: 3847-3852
BSL NOS: 551388-93

SOIL NOS. S-55-Ind-2-4 **LAB. NOS.**

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	3A1 0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-7	Ap	1.7	2.4	3.0	6.6	5.4	42.4	38.5	20.4	31.1	-	sicl
7-13	B_{21g}	1.9	2.2	2.4	5.6	4.5	37.7	45.7	16.5	28.8	-	c
13-21	B_{22g}	1.8	1.9	2.0	5.0	4.1	39.2	46.0	15.7	30.4	-	c
21-32	B_{3g}	1.6	2.5	2.7	6.2	4.9	40.3	41.8	18.1	30.7	-	sic
32-38	C_1	2.6	2.6	2.2	5.0	4.8	42.7	40.1	17.0	33.5	-	sic
38-+	C_2	2.1	2.2	2.0	5.1	5.0	43.8	39.8	17.9	34.0	-	sicl

pH 8C1a 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6H1a NITROGEN %	C/N			6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
6.2			3.20	.278	12							
6.6			0.71	.074	10							
7.0			0.43	.049	9			-				
7.7			0.39	.048	8			-				
7.9			0.47	.047	10			13				
7.9			0.51	.051	10			17				

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K	5B1a	5C1 Base Sat. % NH_4Ac Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Bases	5A3a Sum Cations		8D3 Ca/Mg	MOISTURE AT SATURATION %
←	milliequivalents per 100g. soil					→			← me/100g.	→			
27.8	21.6	4.2	8.1	0.1	0.4		95	76	26.3	34.4		5.1	
27.0	21.1	4.9	4.3	0.1	0.3		98	86	26.4	30.7		4.3	
25.2	19.7	4.9	2.6	0.2	0.3		100	91	25.1	27.7		4.0	
20.4		4.0	1.2	0.2	0.2				26.6	27.8		5.6	
15.2		3.6	-	0.2	0.2								
13.6		3.1	-	0.2	0.1								

Soil Type: Nappanee silty clay loam
Soil Nos.: S55Ind-2-4
Location: SW 1/4 of SW 1/4, Sec. 28, T31N, R15E, Allen County, Indiana. The site is 1,320 feet east, 730 feet north of the southwest corner of Sec. 28.
Topography: Level, 1 percent slope.
Physiography: Lake plain.
Drainage: Imperfect.
Vegetation: Corn.
Field No.: Legend No. 32112.
Beltsville Lab. Nos.: 551388-551393.
Described by: James V. Anderson, October 1955.

Horizon and Mandan Lab. No.	
Ap 3847	0 to 7 inches. Very dark grayish brown (10YR 3/2 moist) silty clay loam; weak fine crumb structure; friable when moist; pH 6.5.
B21g 3848	7 to 13 inches. Dark grayish brown (2.5Y 4/2) with many medium distinct mottles of yellowish brown (10YR 5/6 moist) silty clay; strong, fine, angular blocky structure; very firm when moist; pH 7.4.
B22g 3849	13 to 21 inches. Dark grayish brown (2.5Y 4/2) with common medium distinct mottles of yellowish brown (10YR 5/6 moist) silty clay; strong medium angular blocky structure; very firm when moist; pH 7.4.
B3g 3850	21 to 32 inches. Dark grayish brown (2.5Y 4/2) with many medium distinct mottles of dark yellowish brown (10YR 4/4 moist) silty clay; weak coarse angular blocky structure; very firm when moist; pH 7.4.
C1 3851	32 to 38 inches. Grayish brown (2.5Y 5/2) with many medium distinct mottles of dark yellowish brown (10YR 4/4) and light gray (10YR 7/1 moist) silty clay; weak medium angular blocky structure; firm when moist; strong effervescence with 2N HCl.
C2 3852	38 inches plus. Grayish brown (2.5Y 5/2) with many large distinct mottles of dark yellowish brown (10YR 4/4 moist) silty clay; weak medium angular blocky structure; firm when moist; slight effervescence with 2N HCl.

SOIL SURVEY LABORATORY Lincoln, Nebr. October 1961

SOIL TYPE Ockley silt loam **LOCATION** Carroll County, Indiana

SOIL NOS. S60Ind-8-1 **LAB. NOS.** 14024-14033

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1: VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 (<19mm.)	TEXTURAL CLASS
0-8	Ap	0.4	2.0	3.8	9.1	7.4	64.3	13.0	43.4	32.1	-	sil
8-12	A2	0.2	1.6	3.0	6.9	5.7	64.0	18.6	33.1	39.5	Tr.	sil
12-17	B1t	0.4	1.5	3.2	8.2	6.3	56.4	24.0	33.7	32.4	-	sil
17-26	B21t	1.0	3.0	4.9	9.8	10.3	42.4	28.6	38.6	18.3	4	cl
26-31	IIB22t	6.6	9.8	7.2	11.2	7.6	29.5	28.1	27.5	14.4	29	cl
31-40	IIB23t	11.5	19.0	15.1	10.0	3.9	15.9	24.6	13.3	10.0	36	scl
40-50	IIB31t	14.5	39.3	11.4	3.7	1.2	7.0	22.9	4.1	5.1	26	scl
50-57	IIB32t	18.8	32.0	10.0	4.4	1.8	8.1	24.9	6.1	5.2	41	scl
57-65	IIIC1	17.4a	44.4a	13.9a	5.3a	3.5a	12.3	3.2	12.1	5.7	37	lcos
65-73	IIIC2	18.5a	22.0a	27.1a	20.9a	2.5a	6.6	2.4	12.0	3.2	22	cos

8C1a pH 1:1	pH 1:5	8A1a Elect. Cond. mmhos/cm.	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6C1a Free Iron % Fe_2O_3	BULK DENSITY 4A1a Field-State g/cc	4A1c 30-cm. g/cc	4A1h Oven-Dry g/cc	WATER CONTENT 4B4 Field-State %	4B3 30-cm. %	4B2 15-Bar %
5.0			1.08	0.104	10	1.2	1.52	1.48	1.52	10.8	21.2	5.9
4.8		0.36	0.57	0.077	7	1.4						7.6
4.7			0.34	0.054	6	1.7						9.8
4.6		0.20	0.24	0.036		2.3	1.68	1.60	1.69	11.8	20.3	11.9
4.7			0.21			3.2	1.69	1.56	1.67	10.8	22.1	11.6
4.8		0.24	0.25			2.5						9.9
5.4			0.27			2.4						9.2
5.9		0.41	0.43			2.0						10.6
8.0		0.66	0.21			1.2						2.3
8.2			0.20			1.0						1.7

5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 6N2b Ca	6Q2b Mg	6H1a H	6P2a Na	6Q2a K	BASE SAT. % NH_4OAc EXCH. 5C1	5C3 Base Sat. % on Sum Cations	5B1a Sum Ext. Bases	5A3a Sum Ext. Cations	8D3 Ca/Mg	6E1a $CaCO_3$ Equivalent %	8D1 CEC me per 100 g. Clay
	milliequivalents per 100g. soil							← me/100g →				
8.9	4.7	1.0	7.2	<0.1	0.1	65	45	5.8	13.0	4.7		68
9.7	3.6	1.1	8.9	<0.1	0.1	49	35	4.8	13.7	3.3		52
11.9	4.8	1.4	9.7	<0.1	0.2	54	40	6.4	16.1	3.4		50
15.3	7.1	2.9	10.5	<0.1	0.3	67	50	10.3	20.8	2.4		53
15.9	7.3	3.3	10.5	0.1	0.3	69	51	11.0	21.5	2.2		56
13.4	6.0	2.6	9.0	0.1	0.2	66	50	8.9	17.9	2.3		54
13.0	7.2	3.2	7.0	0.1	0.2	82	60	10.7	17.7	2.2		57
14.1	8.5	3.7	5.5	0.1	0.3	89	70	12.6	18.1	2.3		57
2.5		0.9	0.2	<0.1	<0.1						24	78
1.6		0.4	<0.1	<0.1	<0.1						28	67

a. Few carbonates. Limestone fragments?

Soil Type: Ockley silt loam
Soil Nos.: S60Ind-8-1
Location: Carroll County, Indiana. SW 1/4 of SE 1/4 of NE 1/4, Sec. 31, T25N, R2W. 230 feet east of angling road and 330 feet north of fence line.
Vegetation: Ladina clover, red clover, alfalfa.
Parent Material: Silty and loamy outwash over calcareous sand and gravel. Probability of thin loess mantle.
Slope: 1 percent.
Physiography: High valley train.
Drainage: Well drained.
Collected by: F. J. Carlisle, J. D. Dixon, H. P. Ulrich, F. Sanders, R. Sturm, and O. C. Rogers, September 19, 1960.
Described by: O. C. Rogers.

Horizon and Lincoln Lab. No.	
Ap 14024	0 to 8 inches. Very dark grayish brown (10YR 3/2, 5/3 dry) silt loam; weak coarse granular structure to cloddy; friable; abrupt smooth boundary.
A2 14025	8 to 12 inches. Dark brown (10YR 4/3) to dark grayish brown (10YR 4/2, 6/4 dry) silt loam; moderate medium platy structure; friable; very thin gray coatings on a few plates; clear smooth boundary.
B1t 14026	12 to 17 inches. Dark grayish brown (10YR 4/2) to dark brown (7.5YR 4/4, 5/4 dry) light silty clay loam; when dry many natural surfaces have thin coatings of blanched silt grains and these surfaces are 10YR 6/3 dry; weak fine and medium subangular blocky structure; firm; very thin gray coatings on a few ped faces; clear smooth boundary.
B21t 14027	17 to 26 inches. Dark brown (7.5YR 4/4 moist and dry) silty clay loam; thin patches of blanched silt and fine sand grains are scattered on ped faces, these patches have dry colors ranging from 7.5YR 5/4 to 10YR 6/3; moderate coarse subangular blocky structure; firm; thin nearly continuous dark brown (7.5YR 4/2) clay films; a few root channels, 1/8 to 1/4 inch in diameter, filled with yellowish red (5YR 4/8) material; slight increase in fine gravel in lower 2 to 3 inches; clear wavy boundary.
IIB22t 14028	26 to 31 inches. Dark brown (7.5YR 4/4 moist and dry) gravelly clay loam; some ped faces have thin patches of blanched silt and sand that are 10YR 5/4 when dry; weak coarse subangular blocky structure; firm; plastic; hard; nearly continuous thin dark brown (7.5YR 3/2) clay films; about 5 percent gravel between 3/4 and 2 1/2 inches in diameter; gradual wavy boundary.
IIB23t 14029	31 to 40 inches. Dark brown (7.5YR 4/4) gravelly clay loam; a few small patches of low-contrast blanched silt and fine sand are evident when dry; massive to very weak coarse angular blocky structure; firm; sticky and plastic; very few thin discontinuous clay flows; gradual wavy boundary.
IIB31t 14030	40 to 50 inches. Dark reddish brown (5YR 3/2) gravelly sandy clay loam; massive; firm; sticky and plastic; hard; clear wavy boundary.
IIB32t 14031	50 to 57 inches. Dark reddish brown (5YR 2/2) gravelly sandy clay loam; massive; firm; plastic; hard; about 3 percent gravel from 3/4 to 2 inches in diameter (estimate); abrupt wavy boundary.
IIIC1 14032	57 to 65 inches. Dark reddish brown (5YR 3/4) gravel and sand; single grain; loose; about 15 percent gravel between 3/4 and 3 inches in diameter (estimate); calcareous; clear smooth boundary.
IIIC2 140233	65 to 73 inches. Brown (10YR 5/3) gravel and coarse sand; single grain; loose; calcareous; about 15 percent gravel from 3/4 to 3 inches in diameter (estimate).

Remarks: Colors refer to very moist conditions unless otherwise stated.

Mineralogy (Method 7B1). Observations pertain to the very fine sand from the particle-size analysis. The profile contains about 50 percent feldspar in the surface 40 inches tapering off to 20 percent in the bottom horizons. Quartz content is also quite constant below about 18 inches (40 percent tapering off to 10 percent in bottom horizons). The number of unidentified weathered grains and aggregates increase from 5 percent in the surface horizons to 25 percent at about 40 inches. Trace amounts of white to light brown pyroxene occur in the B31t horizon. Plant opal is present in trace amounts in the Ap, A2, and B1t horizons, although there is a marked increase in the B1t horizon. Trace minerals present throughout are epidote-zoisite, pleochroic green amphibole (hornblende?), zircon, garnet and opaques.

SOIL SURVEY LABORATORY Lincoln, Nebr. October 1961

SOIL TYPE Ockley silt loam **LOCATION** Carroll County, Indiana

SOIL NOS. S60Ind-8-2 **LAB. NOS.** 14034-14042

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	3A1 0.02-0.002	2A2 > 2 (<19mm.)	TEXTURAL CLASS
0-8	Ap	0.7	2.7	5.8	11.2	8.4	58.3	12.9	40.5	30.4	-	sil
8-14	B21t	0.4	3.2	7.1	12.5	5.3	45.5	26.0	29.7	25.8	Tr.	l
14-21	IIB22t	1.3	5.8	11.1	18.6	7.0	30.1	26.1	29.2	14.2	Tr.	l
21-28	IIB23t	2.5	8.0	13.8	24.7	8.0	20.6	22.4	28.0	9.8	12	scl
28-36	IIB24t	5.6	12.1	12.4	28.8	9.4	13.3	18.4	29.3	7.4	24	sl
36-43	IIB25t	5.4	18.0	14.6	25.9	6.4	11.9	17.8	22.1	6.3	43	sl
43-51	IIB31t	14.5	31.4	13.5	17.2	2.6	8.5	12.3	12.0	5.3	33	cosl
51-54	IIB32t	9.8	30.5	20.2	16.2	2.2	7.4	13.7	10.1	4.9	36	cosl
54-64	IIIC1	17.0a	29.7a	30.1a	12.1a	1.3a	7.6	2.2	5.8	5.0	54	cos

8C1a pH 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6C1a Free Iron % Fe_2O_3	BULK DENSITY Field-State ← g/cc	30-cm.	Oven-Dry →	WATER CONTENT Field-State %	30-cm. %	4B2 15-Bar %
6.4			0.92	0.091	10	1.1						5.6
6.2			0.42	0.056	8	1.8						10.8
5.6			0.35	0.042	8	1.8						10.8
5.2			0.26	0.036	7	1.7						8.9
5.1			0.29			1.6						8.1
5.5			0.30			1.9						7.5
6.0			0.30			1.7						6.0
6.9			0.42			1.6						6.9
8.3			0.20			0.9						1.6

5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	5B1a 6Q2a K	BASE SAT. % NH_4OAc EXCH. 5C1	5C3 Base Sat. % on Sum Cations	5B1a Sum Ext. Bases ← me/100g.	5A3a Sum Ext. Cations →	8D3 Ca/Mg	6E1a $CaCO_3$ Equivalent %	8D1 CEC me per 100 g. Clay
←	milliequivalents per 100g. soil				→							
9.2	6.5	1.5	4.0	<0.1	0.1	88	67	8.1	12.1	4.3		71
15.1	11.8	2.0	5.5	<0.1	0.2	93	72	14.0	19.5	5.9		58
14.7	10.3	2.0	6.5	<0.1	0.3	86	66	12.6	19.1	5.2		56
12.2	7.4	1.8	7.0	<0.1	0.2	77	57	9.4	16.4	4.1		54
11.1	6.2	1.6	6.2	<0.1	0.2	72	56	8.0	14.2	3.9		60
9.9	6.0	1.9	5.7	<0.1	0.2	82	59	8.1	13.8	3.2		56
7.9	5.0	2.0	4.5	<0.1	0.1	90	61	7.1	11.6	2.5		64
9.0		2.4	2.7	<0.1	0.2						1	66
1.7		0.6	<0.1	<0.1	<0.1						33	77

a. Few carbonates. Limestone fragments?

Soil Type: Ockley silt loam
Soil Nos.: S60Ind-8-2
Location: Carroll County, Indiana. NW 1/4 of SW 1/4 of NW 1/4, Sec. 11, T25N, R2W. 2 miles south of "T" road east, and 200 feet east of north-south road.
Vegetation: Clover.
Parent Material: Silty and loamy outwash over calcareous gravel and sand.
Slope: 1 percent.
Physiography: Valley train.
Drainage: Well drained.
Collected by: F. J. Carlisle, J. D. Dixon, H. P. Ulrich, F. Sanders, R. Sturm, and O. C. Rogers, September 19, 1960.
Described by: O. C. Rogers.

Horizon and Lincoln Lab. No.	
Ap 14034	0 to 8 inches. Very dark grayish brown (10YR 3/2, 6/3 dry) silt loam; weak coarse granular structure to cloddy; friable; abrupt smooth boundary.
B21t 14035	8 to 14 inches. Dark brown (7.5YR 4/4, 5/4 dry) silty clay loam, approaching clay loam; dry peds have thin discontinuous blanched silt coats of about 10YR 6/3 color; moderate medium subangular blocky structure; firm; slightly plastic; hard; nearly continuous dark brown (7.5YR 4/2) thin clay films; small worm and root channels filled with Ap material; clear wavy boundary.
IIB22t 14036	14 to 21 inches. Dark brown (7.5YR 4/2, 5/4 dry) clay loam; moderate medium angular blocky structure; firm; plastic; hard, nearly continous dark reddish brown (5YR 2/2) thin clay films; a few worm and root channels filled with Ap material; gradual wavy boundary.
IIB23t 14037	21 to 28 inches. Dark brown (7.5YR 4/4, 4/4 to 5/4 dry) gravelly clay loam to sandy clay loam; occasional patches of blanched silt and fine sand (approximately 10YR 6/2) are evident on ped surfaces when dry; moderate coarse angular blocky structure; very firm; plastic; hard; thin dark reddish brown (5YR 2/2) clay films on most ped faces; gradual wavy boundary.
IIB24t 14038	28 to 36 inches. Dark reddish brown (5YR 3/4, 7.5YR 4/4 to 5/4 dry) gravelly sandy clay loam; weak coarse angular blocky structure; firm; slightly sticky; hard; thin dark reddish brown (5YR 2/2 moist and dry) clay films on numerous peds; gradual wavy boundary.
IIB25t 14039	36 to 43 inches. Dark reddish brown (5YR 3/4, 5YR 3/4 to 7.5YR 5/4 dry) gravelly sandy loam to light gravelly clay loam; very weak coarse angular blocky structure; friable to firm; slightly sticky; a few thin dark reddish brown (5YR 2/2) clay films on peds, on sand grains, and on gravel, also coat or line root and worm channels; clay films are very dark (2/2) when dry; a number of patches of blanched silt, 1 to 2 mm. in diameter, are evident in the dry samples; 5 percent gravel between 3/4 and 2 inches in diameter (estimate); gradual smooth boundary.
IIB31t 14040	43 to 51 inches. Dark reddish brown (5YR 3/3 moist and dry with small spots of 5YR 4/4 when dry) gravelly sandy loam; massive; slightly sticky; 5 to 7 percent gravel between 3/4 and 2 1/2 inches in diameter (estimate); clear wavy boundary.
IIB32t 14041	51 to 54 inches. Dark reddish brown (5YR 2/2 moist and dry) gravelly sandy clay loam to gravelly sandy loam; massive; sticky; this horizon is discontinuous ranging from 0 to 3 inches thick; abrupt irregular boundary.
IIIC1 14042	54 to 64 inches. Brown (10YR 5/3 moist and dry) gravel and sand; single grain; loose; calcareous; 15 to 20 percent gravel between 3/4 and 3 inches in diameter (estimate).

Remarks: Colors refer to very moist conditions unless otherwise stated.

Mineralogy (Method 781). Observations pertain to the very fine sand from the particle-size analysis. The profile contains about 50 percent feldspar in the surface 40 inches tapering off to 20 percent in the bottom horizons. Quartz content is also quite constant below about 18 inches (40 percent tapering off to 10 percent in bottom horizons). The number of unidentified weathered grains and aggregates increases from 5 percent in the surface horizons to 25 percent at about 40 inches. The B25t horizon contains up to 10 percent brownish micaceous flakes. Trace amounts of white to light brown pyroxene occur in the upper 14 inches; hypersthene appears in the B25t horizon. Plant opal is present in trace amounts in the surface horizon. Trace minerals present throughout are epidote-zoisite, pleochroic green amphibole (hornblende?), zircon, garnet, and opaques.

SOIL SURVEY LABORATORY Mandan, N. D.

SOIL TYPE Pewamo silty clay loam **LOCATION** Allen Co., Indiana

SOIL NOS. 355Ind-2-10 **LAB. NOS.** MSL NOS: 3883-3887 BSL NOS: 551424-428

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	3A1 0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-7	A_p	0.7	1.3	2.1	5.3	5.3	52.3	33.0	19.0	41.8	-	sicl
7-13	B_{1g}	0.5	1.4	2.0	4.9	4.2	50.0	37.0	15.3	41.8	-	sicl
13-28	B_{2g}	1.0	2.1	2.7	6.5	4.4	48.7	34.6	15.0	41.7	-	sicl
28-38	B_{3g}	0.5	1.7	2.0	4.7	3.6	46.9	40.6	13.5	39.7	-	sic
38→	C	0.9	1.4	1.3	3.2	5.2	58.9	29.1	17.9	48.2	-	sicl

8C1a pH 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6S1a % Total P		6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
6.5			2.39	.211	11	0.065						
6.7			0.77	.086	9	0.035		-				
7.7			0.41	.048	9	0.054		1				
6.9			0.45	.057	8	0.050		-				
7.8			0.46	.044	10	0.057		11				

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	5B1a 6Q2a K	5C1 base Sat. % NH_4Ac Exch.	5C3 Base Sat. % on Sum Cations	5R1a Sum Bases	5A3a Sum Cations		8D3 Ca/Mg	MOISTURE AT SATURATION %
←	milliequivalents per 100g. soil				→			← me/100g.	→			
24.5	19.4	3.0	5.6	0.2	0.3	93	80	22.9	28.5		6.5	
20.8	16.3	3.4	5.0	0.1	0.3	97	80	20.1	25.1		4.8	
19.1		3.9	2.6	0.1	0.2							
22.4	17.2	4.2	5.7	0.2	0.3	98	79	21.9	27.6		4.1	
16.2		3.5	1.2	0.1	0.1							

Soil Type: Pewamo silty clay
Soil Nos.: S55Ind-2-10
Location: NW 1/4 of NW 1/4 of Sec. 21, T32N, R15E, Allen County, Indiana. The sample site is 212 feet west of Ohio Line, 1/4 mile south of north edge of Sec. 21.
Topography: Level, 1 percent slope.
Physiography: Lake plain.
Drainage: Very poor.
Vegetation: Wheat.
Field No.: Legend No. 32738.
Beltsville Lab. Nos.: 551424-551428.
Described by: James V. Anderson, October 1955.

Horizon and Mandan Lab. No.	
Ap 3883	0 to 7 inches. Very dark grayish brown (10YR 3/2 moist) silty clay loam; moderate medium crumb structure; firm when moist; pH 6.6.
B1g 3884	7 to 13 inches. Dark grayish brown (2.5Y 4/2) with many medium distinct mottles of yellowish brown (10YR 5/4 moist) silty clay; strong coarse angular blocky structure; very firm when moist; pH 7.0.
B2g 3885	13 to 28 inches. Dark grayish brown (2.5Y 4/2) with many medium distinct mottles of yellowish brown (10YR 5/4 moist) silty clay; weak medium prismatic structure which breaks to moderate coarse angular blocky structure; very firm when moist; pH 7.4.
B3g 3886	28 to 38 inches. Dark grayish brown (2.5Y 4/2) with many medium distinct mottles of yellowish brown (10YR 5/4 moist) silty clay; weak medium angular blocky structure; firm when moist; pH 7.4.
C 3887	38 inches plus. Grayish brown (2.5Y 5/2) with many medium distinct mottles of yellowish brown (10YR 5/6 moist) silty clay loam; weak fine angular blocky structure; firm when moist, strong effervescence with 2N HCl.

SOIL SURVEY LABORATORY Mandan, N. D.

SOIL TYPE Pewamo silty clay loam **LOCATION** Allen Co., Indiana

SOIL NOS. S-55-Ind-2-13 **LAB. NOS.** MSL NOS: 3897-3901 BSL NOS: 551438-442

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-5	A_1	0.5	0.7	0.8	4.1	6.4	50.3	37.2	26.4	33.0	-	sicl
5-11	B_{1g}	0.4	0.6	0.7	4.0	6.2	49.1	39.0	25.2	32.8	-	sicl
11-22	B_{2g}	0.3	0.5	0.6	3.3	5.6	48.1	41.6	23.6	32.4	-	sic
22-34	B_{3g}	0.2	0.7	0.5	2.8	4.6	50.2	41.0	22.7	34.0	-	sic
34-+	C	1.2	0.7	0.3	1.9	6.2	57.2	32.5	28.0	36.8	-	sicl

pH 8C1a 1:1	1:5	1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6S1a % Total P		6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
6.6			5.65	.408	14	0.082		-				
6.7			1.34	.122	11	0.053		-				
7.2			0.63	.070	9	0.054						
7.5			0.41	.047	9	0.054		1				
7.9			0.46	.042	11	0.054		15				

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6Q2b Mg	6H1a H	6P2a Na	5B1a 6Q2a K	Base Sat. % NH_4Ac Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Bases	5A3a Sum Cations	8D3 Ca/Mg	MOISTURE AT SATURATION %
←	milliequivalents per 100g. soil				→			← me/100g. →			
36.3	34.8	5.2	6.8	0.1	0.4		86	40.5	47.3	6.7	
27.5	24.0	4.1	4.2	0.1	0.3		87	28.5	32.7	5.9	
26.4	22.8	4.6	3.0	0.1	0.3		90	27.8	30.8	5.0	
25.4	23.4	5.8	2.1	0.1	0.2		93	29.5	31.6	4.0	
14.1		3.8	0.6	0.1	0.2						

Soil Type: Pewamo silty clay loam
Soil Nos.: S55Ind-2-13
Location: SW 1/4 of NE 1/4 of Sec. 29, T30N, R14E, Allen County, Indiana. The sample site is 495 feet east, 2,390 feet south of center of north side of Sec. 29.
Topography: Level, 1 percent slope.
Physiography: Lake plain.
Drainage: Very poor.
Vegetation: Bluegrass in area from which oak-hickory timber had recently been removed.
Field No.: Legend No. 32738.
Beltsville Lab. Nos.: 551438-551442.
Described by: James V. Anderson, October 1955.

Horizon and Mandan Lab. No.	
A1 3897	0 to 5 inches. Very dark brown (10YR 2/2 moist) silty clay loam; strong fine angular blocky structure which breaks to strong fine granular structure; firm when moist; pH 6.8.
B1g 3898	5 to 11 inches. Dark grayish brown (2.5Y 4/2) with many medium distinct mottles of dark yellowish brown (10YR 4/4 moist) silty clay; strong fine angular blocky structure; firm when moist; pH 6.8.
B2g 3899	11 to 22 inches. Grayish brown (2.5Y 5/2) with many medium distinct mottles of yellowish brown (10YR 5/8 moist) silty clay; strong medium angular blocky structure; firm when moist; pH 7.1.
B3g 3900	22 to 34 inches. Grayish brown (2.5Y 5/2) with many medium distinct mottles of yellowish brown (10YR 5/8 moist) silty clay; moderate fine angular blocky structure; firm when moist; pH 7.4.
C 3901	34 inches plus. Grayish brown (2.5Y 5/2) with many large distinct mottles of dark yellowish brown (10YR 4/4) and common distinct mottles of light gray (10YR 7/1 moist) silty clay loam; weak fine angular blocky structure; firm when moist; strong effervescence with 2N HCl.

Remarks: This profile appears to be nearly fine enough in texture to be classified as Hoytville silty clay loam. It joins an area mapped Blount silt loam where medium silty clay loam calcareous glacial till was found. The gray mottles in the C horizon consist of $CaCO_3$.

SOIL SURVEY LABORATORY Mandan, North Dakota

SOIL TYPE Pewamo silty clay loam **LOCATION** Allen Co., Indiana

NSL NOS: 3912-3917

SOIL NOS. S55Ind-2-16 **LAB. NOS.** BSL NOS: 551453 - 458

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 (<19mm.)	TEXTURAL CLASS
0-9	Ap	0.3	1.1	1.2	3.9	3.9	55.1	34.5	23.4	37.8	-	sicl
9-20	B1g	0.7	1.0	1.1	4.2	4.3	46.9	41.8	21.0	32.7	-	sic
20-29	B21g	0.5	1.2	1.0	3.7	3.8	46.7	43.1	20.5	32.1	-	sic
29-38	$B_{22}g$	0.9	1.2	1.1	3.8	4.0	49.2	39.8	21.8	33.6	-	sicl
38-58	B_3g	0.8	1.0	1.1	4.1	4.5	50.3	38.2	24.0	33.3	-	sicl
58-+	C	3.4	2.5	2.2	7.1	6.6	43.3	34.9	23.9	30.1	2	cl

pH 8C1a 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6S1a % Total P		6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
6.2			2.15	.199	11	0.069						
6.4			0.91	.096	10	0.060		-				
7.2			0.44	.054	8	0.044		-				
7.2			0.40	.049	8	0.040		-				
7.3			0.31	.042	7	0.046		-				
7.8			0.42	.047	9	0.054		5				

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6Q2b Mg	6H1a H	6P2a Na	5B1a 6Q2a K	5C1 Base Sat. % NH_4Ac Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Bases	5A3a Sum Cations		8D3 Ca/Mg	MOISTURE AT SATURATION %
←	milliequivalents per 100g. soil				→			← me/100g. →				
24.3	18.0	4.0	7.8	0.1	0.4	92	74	22.5	30.3		4.5	
25.6	19.5	5.0	4.8	0.1	0.5	98	84	25.1	29.9		3.9	
25.4	20.5	6.2	2.6	0.1	0.5	100	91	27.3	29.9		3.3	
24.7	19.5	5.8	2.2	0.1	0.5	100	92	25.9	28.1		3.4	
23.3	18.4	5.6	2.4	0.1	0.5	100	91	24.6	27.0		3.3	
15.3		3.8	0.2	0.1	0.3							

Soil Type: Pewamo silty clay loam
Soil Nos.: S55Ind-2-16
Location: SE 1/4 of SW 1/4 of Sec. 33, T29N, R13E, Allen County, Indiana. The sample site is 1,340 feet east, 412 feet south of southwest corner of Sec. 33.
Topography: Level, less than 1 percent slope.
Physiography: Upland till plain.
Drainage: Very poor.
Vegetation: Soybeans.
Field No.: Legend No. 3738.
Beltsville Lab. Nos.: 551453-551458.
Described by: James V. Anderson, October, 1955.

Horizon and Mandan Lab. No.	
Ap 3912	0 to 9 inches. Very dark grayish brown (10YR 3/2 moist) silty clay loam; weak fine granular structure; firm when moist; pH 6.2.
B1g 3913	9 to 20 inches. Very dark grayish brown (2.5Y 3/2) with common fine distinct mottles of yellowish brown (10YR 5/6 moist) silty clay loam; moderate medium angular blocky structure; very firm when moist; pH 6.8.
B21g 3914	20 to 29 inches. Very dark grayish brown (2.5Y 3/2) with common fine distinct mottles of yellowish brown (10YR 5/6 moist) silty clay; strong medium angular blocky structure; very firm when moist; pH 7.4.
B22g 3915	29 to 38 inches. Grayish brown (2.5Y 5/2) with common medium distinct mottles of yellowish brown (10YR 5/8 moist) silty clay; strong fine angular blocky structure; very plastic when wet; pH 7.4.
B3g 3916	38 to 58 inches. Grayish brown (2.5Y 5/2) with many medium distinct mottles of yellowish brown (10YR 5/8 moist) silty clay loam; moderate medium angular blocky structure; very plastic when wet; pH 7.4.
C 3917	58 inches plus. Grayish brown (2.5Y 5/2) with many large distinct mottles of dark yellowish brown (10YR 4/4 moist) silty clay loam; weak fine angular blocky structure; very plastic when wet; strong effervescence with 2N HCl.

Remarks: The B and C horizons of this profile are less compact, and the depth to lime is somewhat greater than in many areas of this soil type. It is, however, representative of many areas.

SOIL SURVEY LABORATORY Mandan, N. D.

SOIL TYPE Pewamo silty clay loam **LOCATION** Allen Co., Indiana

MSL NOS: 3940-3944

SOIL NOS. S55Ind-2-21 **LAB. NOS.** BSL NOS: 551481-485

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-6	A_p	1.6	4.6	5.7	12.3	5.4	41.7	28.7	23.2	30.1	-	cl
6-23	B_{2g}	1.9	3.3	5.1	11.5	7.7	37.0	33.5	25.4	25.2	-	cl
23-42	B_{31g}	1.3	3.3	4.5	9.6	7.0	38.5	35.8	23.9	26.3	-	cl
42-75	B_{32g}	1.2	2.3	2.8	7.2	6.3	41.9	38.3	22.5	29.7	-	cl
75- +	C	1.8	2.6	2.2	7.1	6.6	44.4	35.3	22.7	32.5	-	cl

pH 8C1a 1:1	1:5	1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6S1a % Total P		6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
6.2			2.13	.192	11	0.088						
5.3			1.06	.104	10	0.079						
7.0			0.46	.053	9	0.060		-				
6.9			0.52	.055	9	0.069		-				
7.8			0.67	.052	13	0.056		12				

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K	5B1a	5C1 Base Sat. % NH_4Ac Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Bases	5A3a Sum Cations		8D3 Ca/Mg	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →								← me/100g. →				
20.4	13.3	2.7	8.6	0.1	0.3		80	66	16.4	25.0		4.9	
20.5	14.7	2.7	6.1	0.3	0.3		86	75	18.0	24.1		5.4	
17.3	13.3	2.9	3.8	0.1	0.5		97	82	16.8	20.6		4.6	
15.6	11.7	2.7	2.5	0.6	0.3		98	86	15.3	17.8		4.3	
11.2		2.5	-	0.1	0.3								

Soil Type: Pewamo silty clay loam
Soil Nos.: S55Ind-2-21
Location: SE 1/4 of SE 1/4 of Sec. 21, T32N, R14E, Allen County, Indiana. The sample site is 140 feet west of the southeast corner of Sec. 21.
Topography: Shallow depression, less than 1 percent slope.
Physiography: Upland till plain.
Drainage: Very poor.
Vegetation: Corn.
Field No.: Legend No. 3738.
Beltsville Lab. Nos.: 551481-551485.
Described by: James V. Anderson, October, 1955.

Horizon and Mandan Lab. No.	
Ap 3940	0 to 6 inches. Very dark grayish brown (10YR 3/2 moist) silty clay loam; weak very fine crumb structure; firm when moist; pH 6.4.
B2g 3941	6 to 23 inches. Dark grayish brown (2.5Y 4/2) with common medium distinct mottles of dark yellowish brown (10YR 4/4 moist) silty clay; weak medium prismatic structure which breaks into moderate coarse angular blocky structure; very firm when moist; pH 6.6.
B31g 3942	23 to 42 inches. Dark grayish brown (2.5Y 4/2) with many large distinct mottles of yellowish brown (10YR 5/8 moist) silty clay; moderate coarse angular blocky structure; very plastic when wet; pH 6.8.
B32g 3943	42 to 75 inches. Dark grayish brown (2.5Y 4/2) with many large distinct mottles of dark yellowish brown (10YR 4/4 moist) silty clay; weak fine angular blocky structure; very plastic when wet; pH 7.4.
C 3944	75 inches plus. Dark grayish brown (2.5Y 4/2) with many large distinct mottles of yellowish brown (10YR 5/4 moist) silty clay loam; massive structure; very plastic when wet; effervesces strongly with 2N HCl.

Remarks: This profile is representative of the more deeply leached profiles of this soil type.

SOIL SURVEY LABORATORY Lincoln, Nebr. July 1961

SOIL TYPE Reesville silt loam **LOCATION** Fountain County, Indiana

SOIL NOS. S59-Ind-23-1 **LAB. NOS.** 12414-12422

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 (<19mm)	TEXTURAL CLASS
0-7	Ap	0.7a	1.3a	1.1b	1.6c	0.9c	78.2	16.2	31.3	48.4	-	sil
7-11	B21t	0.1a	0.3a	0.3a	0.4a	0.5a	64.2	34.2	21.4	43.5	-	sicl
11-16	B22t	<0.1	0.1a	0.1a	0.2a	0.7b	59.4	39.5	20.0	40.2	-	sicl/sic
16-23	B23t	<0.1	0.1a	0.2b	0.3b	0.9c	64.9	33.6	26.9	39.0	-	sicl
23-32	B3t	<0.1	0.1a	0.5c	1.0c	2.1	73.7	22.6	44.4	31.8	-	sil
32-36	C1	0.1	2.4	14.4	28.8	5.8	36.7	11.8	40.7	10.9	-	l
36-44	C2	<0.1	0.2b	1.5c	3.2d	2.6d	78.6	13.9	52.7	29.5	-	sil
44-57	C3	0.4e	0.2e	0.1e	0.3d	2.1d	86.8	10.1	54.3	34.8	Tr.	si
57-68	C4	0.2e	0.4e	0.4e	0.8d	2.0d	84.2	12.0	48.8	37.8	6	si/sil

8C1a pH 1:1	6E1a Carbonate as $CaCO_3$ %	3A1a Carbonate Clay %	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6C1a Free Iron % Fe_2O_3	BULK DENSITY 4A1c 30-cm. g/cc	4A1h Oven-Dry g/cc	WATER CONTENT 4C1 1/3-Bar to 15-Bar %	4B3 30-cm. %	4B1b 1/3-Bar pieces %	4B2 15-Bar %
7.1	<1		1.09	0.102	11	1.6						7.4
5.5			0.32	0.044	7	1.9	1.56	1.64	11.6	23.6	26.1	14.5
5.1			0.26	0.035	7	1.9	1.51	1.66	9.5	20.4	27.5	18.0
5.9			0.24	0.032		1.8	1.52	1.70	9.0	23.1	25.6	16.6
6.9	<1		0.25	0.027		2.0	1.43	1.54	8.5	28.0	19.7	11.2
7.3	<1		0.10			1.3						5.5
7.9	17	<1	0.10			1.4						6.9
8.2	27	<1	0.10			1.4	1.65	1.69	14.3	22.2	20.0	5.7
8.1	26	1	0.09			1.4						5.0

5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 6N2b Ca	6Q2b Mg	6H1a H	6P2a Na	5B1a 6Q2a K	5C1 Base Sat. % NH_4OAc Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Ext. Bases	5A3a Sum Ext. Cations	8D3 Ca/Mg	6G2a KCl-Ext. Al	8D1 CEC me per 100g. Clay
←	milliequivalents per 100g. soil				→			← me/100g. →			me/100g.	
12.2	11.0	2.0	3.2	< 0.1	0.2	108	80	13.2	16.4	5.5		75
20.9	12.0	6.2	7.9	0.1	0.4	89	70	18.7	26.6	1.9	1	61
27.2	12.3	9.6	10.2	0.1	0.5	83	69	22.5	32.7	1.3	2	69
25.5	13.3	10.9	5.2	0.1	0.5	97	83	24.8	30.0	1.2		76
17.3	10.2	8.0	3.4	0.1	0.3	108	84	18.6	22.0	1.3		76
8.6	5.4	3.9	1.2	0.1	0.2	112	89	9.6	10.8	1.4		73
10.4		7.2	1.0	0.1	0.2							75
7.6		4.0	<0.1	0.1	0.2							75
7.7		3.8	<0.1	0.1	0.2							64

a. Many Fe-Mn.
b. Common Fe-Mn
c. Few Fe-Mn.
d. Few carbonates.
e. Many carbonates.

Soil Type: Reesville silt loam
Soil Nos.: S59Ind-23-1
Location: Fountain County, Indiana, NW 1/4 of NW 1/4, Sec. 31, T18N, R7W, 550 feet south of fence along Indiana Highway 234, 1/2 mile east of Kingman, and 245 feet east of fence along north-south road.
Vegetation: Corn.
Slope: Nearly level, aspect northeast, one percent slope.
Drainage and Permeability: Somewhat poorly (imperfectly) drained; slow permeability.
Parent Material: Loess.
Collected by: Robert B. Grossman and A. R. Grunewald, November 9, 1959.
Described by: T. C. Bass, A. R. Grunewald and C. W. Guernsey, November 9, 1959.

Horizon and Lincoln Lab. No.	
Ap 12414	0 to 7 inches. Dark grayish brown (10YR 4/2) silt loam; massive; friable; neutral (pH 6.6); roots common with concentration at lower boundary; boundary abrupt and smooth.
B21t 12415	7 to 11 inches. Gray (10YR 5/1) silty clay loam mottled with yellowish brown (10YR 5/8); mottles are common fine and distinct; yellowish brown (10YR 5/8) more common in ped interiors; ped surfaces largely gray (10YR 5/1); moderate fine angular blocky structure; plastic and slightly sticky; medium acid (pH 5.6); few to common, soft Fe-Mn accumulations; few roots; boundary clear and wavy.
B22t 12416	11 to 16 inches. Grayish brown (10YR 5/2) heavy silty clay loam mottled with yellowish brown (10YR 5/6); ped surfaces are gray (10YR 5/1) and the yellowish brown (10YR 5/8) mottling largely occurs in the ped interiors; moderate fine angular blocky structure; plastic and slightly sticky; strongly acid (pH 5.4); few clay films on voids in ped interiors; few soft Fe-Mn aggregates and films; few roots; boundary clear and wavy.
B23t 12417	16 to 23 inches. Yellowish brown (10YR 5/4) silty clay loam mottled with yellowish brown (10YR 5/8), grayish brown (10YR 5/2) and brown (10YR 5/3); mottles are common fine and distinct and faint; moderate to weak medium and fine angular blocky structure; few observable voids in ped interiors; distinct broken dark grayish brown (10YR 4/2) clay films on ped surfaces and on voids in the ped interior; plastic and slightly sticky to firm; slightly acid (pH 6.2); numerous soft Fe-Mn aggregates and films; few roots; boundary clear to gradual and smooth.
B3t 12418	23 to 32 inches. Brown (10YR 5/3) to yellowish brown (10YR 5/4) silt loam mottled with yellowish brown (10YR 5/8) and grayish brown (10YR 5/2); mottles are common medium distinct to faint; very weak coarse prismatic structure to massive; many very fine vesicular voids and common fine tubular voids; tubular voids have distinct very dark grayish brown (10YR 3/2) clay films; faint clay films on a few vertical cleavage planes; many of the larger voids have grayish brown (10YR 5/2) borders; slightly plastic to slightly sticky; mildly alkaline (pH 7.5); common soft Fe-Mn aggregates, 2 to 5 mm. diameter; boundary clear and wavy.
C1 12419	32 to 36 inches. Yellowish brown (10YR 5/4) sandy loam to sandy clay loam mottled with yellowish brown (10YR 5/8) and brown (10YR 5/3); mottles are common fine distinct and faint; massive; friable; calcareous; no roots; common very fine voids with dark brown (7.5YR 4/2) coatings on voids; common 2 to 5 mm. diameter Fe-Mn aggregates; very few carbonate aggregates; boundary abrupt and wavy.
C2 12420	36 to 44 inches. Yellowish brown (10YR 5/4) silt loam mottled with yellowish brown (10YR 5/8) and grayish brown (10YR 5/2); mottles are common medium distinct and faint; massive; friable; calcareous; common to many fine voids coated with very dark grayish brown (10YR 3/2) and commonly surrounded with gray (10YR 6/1); common soft Fe-Mn aggregates 1 to 3 mm. diameter; few sandy lenses; few carbonate aggregates; no roots; boundary abrupt and wavy.
C3 12421	44 to 57 inches. Mottled light yellowish brown (10YR 6/4) 40 percent, yellowish brown (10YR 5/8) 20 percent, and gray (10YR 6/1) 40 percent, silt loam; massive; friable; calcareous; common very fine to fine tubular voids coated with very dark grayish brown (10YR 3/2) and commonly surrounded by gray (10YR 6/1); scattered cemented carbonate aggregates up to 1 inch, aggregates are maximum in this horizon; common soft Fe-Mn aggregates 1 to 3 mm. diameter, less than the number in the above horizon; boundary gradual and wavy.
C4 12422	57 to 68 inches. Brownish yellow (10YR 6/6 to 6/8) and gray (10YR 6/1) silts; few to common very fine voids with very dark grayish brown (10YR 3/2) clay films; gray (10YR 6/1) surrounds some of the voids; massive; friable; calcareous; few carbonate aggregates 1 to 2 mm. diameter, small streaks and parts of dark reddish brown (5YR 3/4).
C5	68 to 87 inches. Brownish yellow (10YR 6/6 to 6/8) calcareous silts; massive; friable.
IIC6	87 inches. Calcareous loam to clay loam till.

Remarks: All colors based on field moisture conditions.

Soil voids are described according to following classes:

Abundance classes:

Few	1 to 3 per square inch
Common	4 to 7 per square inch
Many	7 to 14 per square inch

Diameter classes:

Very fine	< 1 mm.
Fine	1 to 2 mm.
Medium	2 to 5 mm.
Coarse	5 to 10 mm.
Very Coarse	> 10 mm.

SOIL SURVEY LABORATORY Lincoln, Nebr. July 1961

SOIL TYPE Reesville silt loam **LOCATION** Fountain County, Indiana

SOIL NOS. S59-Ind-23-8 **LAB. NOS.** 12474-12482

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 (<19mm.)	TEXTURAL CLASS
0-7	Ap	0.8a	1.9a	2.8a	4.9	7.4	70.8	11.4	47.4	33.4	Tr.	sil
7-10	A2	0.3a	1.2a	1.6a	2.7	6.0	68.5	19.7	43.7	32.3	-	sil
10-13	B1t	0.2a	0.6a	1.0	1.8	4.9	65.1	26.4	41.2	29.8	-	sil
13-19	B21t	<0.1	0.3a	0.6	1.2	4.3	61.7	31.9	39.8	26.8	-	sicl
19-24	B22t	0.1a	0.5a	0.8	1.3	6.1	64.4	26.8	46.9	24.2	Tr.	sil/sicl
24-29	B3t	0.3b	1.2b	1.3b	1.9b	7.1b	68.0	20.2	52.8	23.1	Tr.	sil
29-37	C1	0.8b	1.8b	1.9b	2.5b	8.6b	70.6	13.8	57.5	22.7	Tr.	sil
37-49	C2	3.8b	5.5b	8.2b	11.2b	5.2b	54.8	11.3	39.8	24.1	5	sil
49-62	IIC3	3.9b	9.1b	15.0b	21.1b	5.0b	31.6	14.3	23.8	20.2	13	fsl

8C1a pH 1:1	6E1a Carbonate as $CaCO_3$ %	3A1a Carbonate Clay %	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6C1a Free Iron % Fe_2O_3	BULK DENSITY 4A1c 30-cm. g/cc	4A1h Oven-Dry g/cc	WATER CONTENT 4C1 1/3-Bar to 15-Bar %	4B3 30-cm. %	4B1b 1/3-Bar pieces %	4B2 15-Bar %
6.3			0.88	0.081	11	0.9	1.50	1.53	15.4	23.3	20.2	4.8
5.9			0.30	0.039	8	1.0	1.58	1.67	15.6	22.3	23.6	8.0
5.8			0.35	0.044	8	1.3	1.47	1.61	14.0	25.6	25.2	11.2
6.1			0.34	0.046	7	1.7	1.47	1.64	12.1	26.0	26.7	14.6
6.7	< 1		0.32	0.040	8	1.9	1.48	1.63	13.1	26.0	25.8	12.7
7.7	1		0.21			1.9	1.48	1.59	14.2	25.8	24.1	9.9
7.9	25	< 1	0.16			1.7	1.57	1.63	13.6	22.6	20.6	7.0
8.0	20	1	0.13			1.5	1.76	1.81	8.6	15.2	14.2	5.6
8.1	15	< 1	0.12			1.6						6.2

5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 6N2b Ca	6Q2b Mg	6H1a H	6P2a Na	6Q2a K	5B1a	5C1 Base Sat. % NH_4OAc Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Ext. Bases	5A3a Sum Ext. Cations	8D3 Ca/Mg	6G2a KCl-Ext. Al	8D1 CEC me per 100g. Clay
	← milliequivalents per 100g. soil →								← me/100g. →			me/100g.	
8.1	5.8	1.1	3.4	0.1	0.2		89	68	7.2	10.6	5.3		71
12.0	7.6	2.7	4.2	0.1	0.2		88	72	10.6	14.8	2.8		61
17.0	10.6	4.4	4.7	0.1	0.3		90	77	15.4	20.1	2.4	< 1	64
21.9	13.5	7.1	5.0	0.1	0.4		96	81	21.1	26.1	1.9	< 1	69
19.8	12.8	6.7	3.2	0.1	0.4		101	86	20.0	23.2	1.9		74
15.7		5.8	1.2	0.1	0.3								78
10.5		4.9	0.5	<0.1	0.2								76
7.7		3.2	<0.1	<0.1	0.1								68
5.8		2.5	<0.1	<0.1	0.1								40

a. Few Fe-Mn.
b. Few carbonates.

Soil Type: Reesville silt loam
Soil Nos.: S59Ind-23-8
Location: Fountain County, Indiana, NE 1/4 of SW 1/4 of Sec. 9, T20N, R8W, 150 feet north of east-west fence and 325 feet west of north-south fence along gravel road, 4 1/2 miles west of Hwy. U. S. 41, 5 miles north of Hwy. U. S. 136.
Vegetation: Grass-legume meadow.
Slope: Level; slight slope to narrow drainage way.
Drainage and Permeability: Somewhat poorly (imperfectly) drained; slow permeability.
Parent Material: Loess.
Collected by: Robert B. Grossman, Keith Young and Keith Huffman, November 13, 1959.
Described by: Robert B. Grossman and Jack Deal, November 13, 1959.

Horizon and Lincoln Lab. No.	
Ap 12474	0 to 7 inches. Dark gray (10YR 4/1) silt loam; nonsticky and nonplastic; some gray (10YR 5/1) and dark brown (7.5YR 4/4) coatings on surface of voids, the gray and dark brown coatings increase with depth; roots common; neutral (pH 6.8); abrupt boundary.
A2 12475	7 to 10 inches. Gray (10YR 5/1) silt loam with many medium distinct yellowish brown (10YR 5/8) mottles; weak medium platy structure to massive; nonsticky and nonplastic; dark brown (7.5YR 4/4) occurs discontinuously; medium acid (pH 6.0); few roots; abrupt boundary.
B1t 12476	10 to 13 inches. Grayish brown (2.5Y 5/2) light silty clay loam with many medium distinct yellowish brown (10YR 5/6) and faint gray (10YR 5/1) mottles; moderate fine subangular blocky structure; slightly sticky and slightly plastic; many ped surfaces are gray (10YR 5/1), probably high in silt; common very fine voids in ped interiors; no clay films on most ped faces, few patchy clay films on surfaces of some smaller peds; few large voids have clay films on the walls; very few, if any, Fe-Mn aggregates; few roots; medium acid (pH 5.6); clear to abrupt boundary.
B21t 12477	13 to 19 inches. Brown (10YR 5/3) silty clay loam with many fine distinct mottles of yellowish brown (10YR 5/6) and faint mottles of grayish brown (2.5Y 5/2); moderate medium and fine blocky structure; slightly sticky and slightly plastic; slightly acid (pH 6.2); common very fine voids in ped interiors; few fine voids in ped interiors; distinct to prominent continuous very dark grayish brown (10YR 3/2) to very dark brown (10YR 2/2) clay films on ped surfaces and prominent clay films on pore walls in ped interiors; few soft 1-to 2-mm. Fe-Mn aggregates; few roots; clear boundary.
B22t 12478	19 to 24 inches. Brown (10YR 5/3) silty clay loam with many fine distinct yellowish brown (10YR 5/6) and faint grayish brown (2.5Y 5/2) mottles; moderate to weak medium blocky structure with a tendency for weak prismatic; common fine voids and common very fine pores; distinct broken to complete very dark grayish brown (10YR 3/2) clay films on ped surfaces; distinct very dark grayish brown (10YR 3/2) clay films on void walls in ped interiors; few soft Fe-Mn aggregates; few roots; slightly acid (pH 6.5); clear and smooth boundary.
B3t 12479	24 to 29 inches. Light olive brown (2.5Y 5/4) heavy silt loam with common fine distinct yellowish brown (10YR 5/6) and faint grayish brown (2.5Y 5/2) mottles; weak to very weak medium blocky structure with a tendency to medium prismatic; firm; common fine voids, many very fine voids; prominent very dark grayish brown (10YR 3/2) clay films on pore walls; faint broken clay films on ped surfaces; many soft 2-to 5-mm. Fe-Mn aggregates; few roots; neutral pH (weakly effervescent) to slightly alkaline; abrupt and wavy to clear boundary.
C1 12480	29 to 37 inches. Light olive brown (2.5Y 5/4) silt loam with many medium and distinct gray (10YR 5/1) and yellowish brown (10YR 5/6) mottles; massive with a few weak vertical planes delineating very coarse prismatic units; firm; many very fine voids and common fine voids; fine voids have prominent very dark grayish brown (10YR 3/2) clay films; faint clay films on scattered vertical planes; gray (10YR 5/1) surrounds many of the fine pores; common soft 2-to 5-mm. Fe-Mn aggregates; very few roots; weakly effervescent with some parts noncalcareous; some suggestion that larger void surfaces are calcareous; clear smooth boundary.
C2 12481	37 to 49 inches. Light olive brown (2.5Y 5/4) silt loam to loam with many medium distinct yellowish brown (10YR 5/8) and gray (10YR 5/1) mottles; massive; firm; common fine voids, many very fine voids; fine pores have very dark grayish brown (10YR 3/2) clay films; no roots; strongly effervescent; clear boundary.
IIC3 12482	49 to 62 inches. Light olive brown (2.5Y 5/4) loam with common medium distinct yellowish brown (10YR 5/8) and gray (10YR 5/1) mottles; mottling is variable, some fabric not mottled; massive; firm; fine voids are common, many very fine voids; fine voids have distinct very dark grayish brown (10YR 3/2) clay films; strongly effervescent.

Remarks: All colors based on field moisture conditions. This site has not been plowed for 3 years.

Soil voids are described according to following classes:

Abundance classes:		
	Few	1 to 3 per square inch
	Common	4 to 7 per square inch
	Many	7 to 14 per square inch
Diameter classes:		
	Very fine	< 1 mm.
	Fine	1 to 2 mm.
	Medium	2 to 5 mm.
	Coarse	5 to 10 mm.
	Very coarse	> 10 mm.

SCS-421
10-64 (Rev 9-66)

U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Rossmoyne silt loam SOIL Nos. 53 LOCATION Floyd County, Indiana

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 551044 - 551048

Depth (In.)	Horizon a	1B1b Total: Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)		3B2 Cm	Coarse fragments 3B1: 2A2 > 2 Pct.	2 – 19	19 – 76
		Pct. of < 2 mm															Pct of < 76mm	
6-12	A2		67.9	26.0	1.2	1.5	0.8	1.5	1.1		42.5	27.1				-		
12-16	B1		67.0	26.6	1.7	1.3	0.8	1.6	1.0		41.9	26.8				-		
16-21	B2		64.2	24.7	3.8	1.9	1.3	2.5	1.6		40.6	26.3				-		
21-24	Bx1		65.0	25.3	2.4	1.9	1.4	2.5	1.5		42.1	25.5				-		
24-36	Bx2		55.5	34.5	2.6	2.0	1.4	2.4	1.6		35.7	22.5				-		

Depth (In.)	6A1a Organic carbon Pct	Nitrogen Pct.	C/N		Carbonate as $CaCO_3$ Pct	Ext. iron as Fe Pct.	Bulk density: g/cc	4A1e ⅓ bar g/cc	4A1h Oven dry g/cc	4D1 COLE	Water content: Pct.	4B1c ⅓ bar Pct.	4B2 15 bar Pct.		4C1 WRD in/in	pH:	8C1c (1:1) KCl	8C1a (1:1) H_2O
6-12	0.16																	5.3
12-16	0.09																	4.6
16-21	0.06																	4.6
21-24	0.08																	4.6
24-36	0.05																	4.6

Depth (In.)	Extractable bases 5B1a: 6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum	6H1a Ext. acidity	CEC: 5A3a Sum cations		6G1d Ext. Al			Ratios to clay: CEC Sum	Ext. iron	15-bar water	8D3 Ca/Mg		Base saturation: 5C3 Sum cations Pct.	5C1 NH_4OAc Pct.
	meq/100 g																	
6-12	6.2	1.9	0.2	0.2		5.5	14.0										61	
12-16	4.2	2.2	0.2	0.2		9.8	16.6										41	
16-21	2.4	2.7	0.2	0.2		10.2	15.7										35	
21-24	2.5	2.7	0.3	0.2		10.4	16.1										35	
24-36	3.1	4.2	0.4	0.2		13.4	21.3										37	

Depth (In.)	Clay Fraction Analysis 7A1b-d: Mt.	Chl	Vm	Mi.	Int.	Qtz	Kl.	Gibbsite	
	7A2 X-ray						7A3		

a 0 to 6 inch, A1 horizon, not determined.

Mt. = Montmorillonite, Chl. = chlorite, Vm = Vermiculite, mi = mica, Int. = interstratified layer, Qtz. = quartz, Kl. = Kaolinite

Relative amounts blank = not determined, dash = not detected, tr. = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant.

Soil Type: Rossmoyne silt loam
Soil No.: 53
Location: Floyd County, Indiana. NE 1/4 NW 1/4 sec. 23, T. 2 S., R. 6 E., 91.4 miles from the Wabash River, along the southern traverse.
Physiography: Loess, if present, is mixed with underlying leached Illinoian till materials.

Horizon and Beltsville Lab. No.	
A1 551044	0 to 6 inches. Grayish brown (10YR 5/2), gritty, silt loam.
A2 551045	6 to 12 inches. Brownish yellow (10YR 6/8), gritty, heavy silt loam (or light silty clay loam), containing iron concretions.
B1 551046	12 to 16 inches. Mottled brownish yellow (10YR 6/8), very pale brown (10YR 7/3) and reddish yellow (7.5YR 6/8), gritty, heavy silt loam (or light silty clay loam), containing iron concretions.
B2 551047	16 to 21 inches. Mottled brownish yellow (10YR 6/8), very pale brown (10YR 7/3) and reddish yellow (7.5YR 6/8), gritty, silty clay, containing iron concretions.
Bx1 551048	21 to 24 inches. Mottled white (10YR 8/2) and yellow (10YR 7/6), gritty, silt loam, containing iron concretions.
Bx2 551049	24 to 36 inches. Mottled strong brown (7.5YR 5/8), light gray (10YR 7/1), brownish yellow (10YR 6/8), and pale brown (10YR 6/3), gritty, silty clay.

SOIL SURVEY LABORATORY Lincoln, Nebr. July 1961

SOIL TYPE Sleeth silt loam **LOCATION** Fountain County, Indiana

SOIL NOS. S59-Ind-23-6 **LAB. NOS.** 12455-12463
General Methods: 1A, 1H1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 (<19mm.)	TEXTURAL CLASS
0-7	Ap	2.0a	3.7b	3.6c	4.1c	1.9c	70.1	14.6	29.1	44.4	Tr.	sil
7-10	A3	0.5a	2.0b	2.1c	2.3c	1.3c	70.2	21.6	24.4	48.0	Tr.	sil
10-14	B1t	0.5a	1.0b	0.9b	1.0b	1.0c	63.3	32.3	20.4	44.3	-	sicl
14-21	B21t	<0.1	0.2b	0.3b	0.4b	1.2c	59.9	38.0	24.9	36.4	Tr.	sicl
21-29	B22t	0.1a	0.4b	0.4b	0.5b	1.8c	62.3	34.5	28.6	35.7	-	sicl
29-37	B23t	0.3a	1.8b	2.2c	3.2c	3.1c	58.5	30.9	35.0	27.7	-	sicl
37-50	IIB24	5.8	11.0	12.8	17.9	5.1	26.0	21.4	24.7	13.1	12	scl
50-63	IIIB3	9.8	22.2	27.1	19.3	2.2	8.0	11.4	10.0	5.6	21	cosl
63-73	IIIC	13.9d	15.0d	14.5d	37.2d	5.5d	9.7	4.2	25.1	5.5	21	lcos

8C1a pH 1:1	6E1a Carbonate as $CaCO_3$ %	Carbonate Clay %	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6C1a Free Iron % Fe_2O_3	BULK DENSITY 4A1c 30-cm. g/cc	4A1h Oven-Dry g/cc	WATER CONTENT 4C1 1/3-Bar to 15-Bar %	4B3 30-cm. %	4B1b 1/3-Bar pieces %	4B2 15-Bar %
5.9			1.08	0.107	10	1.6	1.42	1.46	13.2	23.5	19.8	6.6
4.6			0.32	0.045	7	1.6	1.53	1.56	14.3	23.3	22.8	8.5
4.5			0.27	0.041	7	1.7	1.46	1.51	12.0	24.0	24.6	12.6
4.5			0.26	0.037	7	1.8			14.8		31.0	16.2
4.6			0.24	0.033		2.2	1.48	1.64	12.8	25.9	28.2	15.4
5.3			0.20			2.0	1.45	1.62	11.8	25.1	25.9	14.1
6.3			0.10			1.5	1.55	1.73	7.9	22.2	17.9	10.1
6.9	< 1		0.16			1.4						4.8
8.3	23		0.21			1.0						1.3

5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K	5C1 Base Sat. % NH_4OAc Exch.	5C3 Base Sat. % on Sum Cations	5E1a Sum Ext. Bases	5A3a Sum Ext. Cations	8D3 Ca/Mg	6G2a KCl-Ext. Al	8D1 CEC me per 100g. Clay
	← milliequivalents per 100g. soil →							← me/100g. →				
10.1	6.2	1.4	6.1	< 0.1	0.3	78	56	7.9	14.0	4.4	< 1	69
10.7	3.9	1.2	9.3	< 0.1	0.2	50	36	5.3	14.6	3.2	3	50
16.7	6.0	2.9	13.2	0.1	0.3	56	41	9.3	22.5	2.1	6	52
23.1	8.7	5.5	15.4	0.1	0.5	64	49	14.8	30.2	1.6	7	61
21.2	9.1	6.3	12.6	0.1	0.4	75	56	15.9	28.5	1.4	4	61
20.6	11.6	7.4	6.2	0.1	0.5	95	76	19.6	25.8	1.6	1	67
14.8	9.3	5.5	3.2	0.1	0.3	103	83	15.2	18.4	1.7	< 1	69
7.2	4.7	2.3	1.2	0.1	0.2	101	86	7.3	8.5	2.0		68
1.7		0.9	<0.1	< 0.1	<0.1							40

a. Many Fe-Mn.
b. Common Fe-Mn.
c. Few Fe-Mn.
d. Few carbonates.

Soil Type: Sleeth silt loam
Soil Nos.: S59Ind-23-6
Location: Fountain County, Indiana, SE 1/4 of NE 1/4, Sec. 20, T20N, R6W, 365 feet south of east-west fence and 270 feet west of fence on north-south gravel road, 2 miles east of Mellott and 1 mile west of Montgomery County, Indiana line.
Vegetation: Soybeans.
Slope: Level.
Drainage and Permeability: Somewhat poorly (imperfectly) drained; slowly permeable.
Parent Material: Stratified material underlain by strata of fine coarse sand with some gravel.
Collected by: Robert B. Grossman and Jack Deal, November 12, 1959.
Described by: Robert B. Grossman and Keith Huffman, November 12, 1959.

Horizon and Lincoln Lab. No.	
Ap 12455	0 to 7 inches. Dark grayish brown (10YR 4/2) silt loam; weak granular structure to massive; friable to nonsticky and nonplastic; slightly acid (pH 6.2); boundary abrupt and smooth.
A3 12456	7 to 10 inches. Grayish brown (2.5Y 5/2) silt loam with common to many, fine to medium, faint to distinct gray (10YR 5/1) and yellowish brown (10YR 5/4) mottles; weak thin platy structure; firm to friable; medium acid (pH 5.8); boundary clear and smooth.
B1t 12457	10 to 14 inches. Mottled yellowish brown (10YR 5/4) 50 percent and gray (10YR 5/1) 50 percent light silty clay loam; moderate to strong fine and medium subangular blocky structure; firm to slightly plastic; ped interiors mainly yellowish brown (10YR 5/4) with ped surfaces gray (10YR 5/1); common very fine pores in ped interiors and few very fine pores on ped surfaces; ped surfaces high in silt; medium acid (pH 5.6); roots few; boundary clear and smooth.
B21t 12458	14 to 21 inches. Gray (10YR 5/1) silty clay loam; many medium prominent yellowish brown (10YR 5/8) mottles; moderate to strong medium blocky structure with peds tending to arrange in fine to medium prismatic structure; firm to slightly sticky and plastic; ped interiors are yellowish brown (10YR 5/8) with gray (10YR 5/1) surfaces, and gray (10YR 5/1) around pores; common very fine pores in ped interiors; no observed clay films inside peds; ped surfaces silt rich; very few soft Fe-Mn aggregates; strongly acid (pH 5.4); boundary clear and smooth.
B22t 12459	21 to 29 inches. Mottled gray (10YR 5/1) 40 percent and yellowish brown (10YR 5/8) 60 percent silty clay loam; moderate medium prismatic structure breaking to moderate medium blocky structure; firm; major ped surfaces are gray (10YR 5/1); common fine pores in ped interiors; patchy faint clay films on less prominent cleavage planes and in some fine pores; major ped surfaces are high in silt; strongly acid (pH 5.2); few Fe-Mn aggregates; boundary smooth and gradual.
B23t 12460	29 to 37 inches. Gray (10YR 5/1) silty clay loam with many medium distinct yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure breaking to weak, coarse blocky structure; firm to plastic and slightly sticky; major cleavage planes are gray (10YR 5/1); many very fine pores on ped surfaces, common fine pores in ped interiors; distinct clay films in fine pores; major cleavage planes high in silt; medium acid (pH 5.6); no roots; few Fe-Mn aggregates; boundary clear and smooth.
IIB24 12461	37 to 50 inches. Gray (10YR 5/1) sandy clay loam with some dark gray (10YR 4/1) vertical surfaces; massive; plastic and slightly sticky; many medium distinct yellowish brown (10YR 5/8) mottles; very dark gray (10YR 3/1) clay films on void surfaces; common fine voids; distinct broken very dark gray (10YR 3/1) clay films on void surfaces and planes of weakness; slightly acid (pH 6.4); few rotten micaceous minerals; boundary clear and wavy.
IIB3 12462	50 to 63 inches. Dark gray (10YR 4/1) gravelly sandy clay loam in upper part, grading to loamy sand below; massive in upper part, grading to single grain below; slightly sticky and slightly plastic in upper part, grading to nonsticky and nonplastic below; common coarse prominent mottles; neutral (pH 6.6); boundary abrupt and wavy.
IIIC 12463	63 to 73 inches. Light olive brown (2.5Y 5/4) stratified fine sand and gravelly coarse sand with bands of dirty yellowish brown (10YR 5/8) coarse sand; single grain, nonsticky and nonplastic; calcareous; water table present.

Remarks: All colors based on field moisture conditions.

Soil voids are described according to following classes:

Abundance classes:		
	Few	1 to 3 per square inch
	Common	4 to 7 per square inch
	Many	7 to 14 per square inch
Diameter classes:		
	Very fine	< 1 mm.
	Fine	1 to 2 mm.
	Medium	2 to 5 mm.
	Coarse	5 to 10 mm.
	Very coarse	> 10 mm.

The Ap, B22t and IIIC horizons were sampled for the Bureau of Public Roads.

SOIL SURVEY LABORATORY Lincoln, Nebr. July 1961

SOIL TYPE Sleeth silt loam **LOCATION** Fountain County, Indiana

SOIL NOS. S59-Ind-23-7 **LAB. NOS.** 12464-12473

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	3A1 0.02-0.002	2A2 > 2 (<19mm)	TEXTURAL CLASS
0-7	Ap	2.4a	3.9b	4.6c	4.3c	2.0c	69.9	12.9	30.3	42.7	Tr.	sil
7-11	B1t	0.6a	1.5b	1.9c	1.8c	1.3c	60.7	32.2	24.5	38.0	Tr.	sicl
11-18	B21t	0.2a	0.6b	0.7b	0.8b	1.5c	57.9	38.3	25.0	34.7	-	sicl
18-25	B22t	0.5a	0.8b	0.8b	1.0b	1.8c	61.1	34.0	28.9	34.4	-	sicl
25-33	B23t	0.2a	0.8b	0.8b	1.1b	2.2c	62.5	32.4	31.7	33.5	-	sicl
33-40	B24t	1.3c	4.4c	5.4	6.1	3.3	54.8	24.7	34.2	25.8	2	sil
40-50	IIB3	4.7	16.7	25.4	19.6	2.8	15.0	15.8	14.1	8.5	9	sl
50-62	IIC1	11.7	21.5	27.1	19.2	1.6	8.8	10.1	8.2	5.8	21	lcos
62-73	IIC2	8.7	36.5	30.8	12.7	0.7	4.3	6.3	5.0	2.5	9	cos
73-83	IIIC3	29.4d	37.4d	14.2d	6.4d	1.7d	8.1	2.8	7.6	4.1	28	cos

8C1a pH 1:1	6E1a Carbonate as $CaCO_3$ %	Carbonate Clay %	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6C1a Free Iron % Fe_2O_3	BULK DENSITY 4A1a Field-State g/cc	4A1c 30-cm. g/cc	4A1h Oven-Dry g/cc	WATER CONTENT 4B4 Field-State %	4B3 30-cm. %	4B2 15-Bar %
6.5	< 1		0.88	0.084	10	1.4	1.49	1.48	1.52	15.8	22.9	5.7
4.8			0.33	0.047	7	1.7	1.62	1.58	1.63	13.9	21.9	13.0
4.4			0.32	0.044	7	1.8						17.7
4.6			0.25	0.037	7	2.0	1.60	1.48	1.64	14.2	24.9	15.6
4.6			0.20			2.0	1.67	1.51	1.67	8.2	24.5	15.3
4.8			0.15			1.9	1.73	1.65	1.71	3.5	12.8	11.0
5.1			0.13			1.6	1.70	1.61	1.71	7.3	19.4	6.2
5.6			0.05			1.1						4.3
6.2			0.09			0.8						2.6
8.3	20		0.09			1.0						1.8

5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K	5B1a	5C1 Base Sat. % NH_4OAc Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Ext. Bases	5A3a Sum Ext. Cations	8D3 Ca/Mg	6G2a KCl-Ext. Al me/100g. Clay	8D1 CEC me per 100g. Clay
←	milliequivalents per 100g. soil					→			← me/100g. →				
9.9	8.0	1.2	3.2	< 0.1	0.2		95	75	9.4	12.6	6.7	< 1	77
18.2	8.6	3.2	12.5	< 0.1	0.4		67	49	12.2	24.7	2.7	3	56
24.5	9.8	5.4	15.8	0.1	0.5		64	50	15.8	31.6	1.8	7	64
22.5	8.4	6.0	13.6	0.1	0.5		67	52	15.0	28.6	1.4	5	66
21.8	8.5	6.4	11.6	0.1	0.5		71	57	15.5	27.1	1.3	4	67
16.9	7.0	5.4	8.6	0.1	0.4		76	60	12.9	21.5	1.3	2	68
9.3	3.9	2.8	4.4	0.1	0.2		75	61	7.0	11.4	1.4	1	59
6.9	3.3	2.2	2.9	< 0.1	0.2		83	66	5.7	8.6	1.5	< 1	68
4.6	2.4	1.4	1.4	< 0.1	0.1		85	74	3.9	5.3	1.7	< 1	73
1.7		0.8	0.2	< 0.1	<0.1								61

a. Many Fe-Mn.
b. Common Fe-Mn.
c. Few Fe-Mn.
d. Few carbonates.

Soil Type: Sleeth silt loam
Soil Nos.: S59Ind-23-7
Location: Fountain County, Indiana, NE 1/4 of NW 1/4, Sec. 23, T30N, R7W, 4½ miles west of Montgomery County, 4 miles east of Stone Bluff, 265 feet south of blacktop, 345 feet west of north-south fence.
Vegetation: Clover.
Slope: Level.
Drainage and Permeability: Somewhat poorly (imperfectly) drained; slow permeability.
Parent Material: Stratified material underlain with stratified sands and gravels.
Collected by: Robert B. Grossman, Keith Huffman, and Jack Deal, November 12, 1959.
Described by: Robert B. Grossman and Jack Deal, November 12, 1959.

Horizon and Lincoln Lab. No.	
Ap 12464	0 to 7 inches. Dark grayish brown (10YR 4/2) silt loam; massive in place, breaks out as medium fine granular structure; slightly acid (pH 6.2); common roots; abrupt smooth boundary.
B1t 12465	7 to 11 inches. Gray (10YR 5/1) light silty clay loam with medium distinct mottles of yellowish brown (10YR 5/8); moderate fine to medium subangular blocky structure; firm; nonsticky, slightly plastic; grayish brown (2.5Y 5/2) ped surfaces probably high in silt; few roots; medium acid (pH 5.6); clear boundary.
B21t 12466	11 to 18 inches. Gray (10YR 5/1) silty clay loam with common (fewer than horizon below) medium distinct yellowish brown (10YR 5/8) mottles; moderate medium and fine blocky structure; firm to slightly sticky; strongly acid (pH 5.4); ped surfaces gray (10YR 5/1) probably high in silt; no clay films observed; few fine voids in ped interiors; few roots; very few Fe-Mn aggregates; clear boundary.
B22t 12467	18 to 25 inches. Gray (10YR 5/1) silty clay loam with common medium distinct yellowish brown (10YR 5/8) mottles; moderate medium blocky structure with moderate medium prismatic tendency; firm to slightly sticky and slightly plastic; strongly acid (pH 5.2); ped surfaces are gray (10YR 5/1) probably high in silt; common fine and very fine voids in ped interiors (fewer than horizon below); no clay films observed; common soft to hard 2 to 5 mm. Fe-Mn aggregates; few roots; gradual boundary.
B23t 12468	25 to 33 inches. Gray (10YR 5/1) heavy silty clay loam with common fine distinct yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure composed of medium blocks; extremely firm; medium acid (pH 5.6); ped surfaces are gray (10YR 5/1) and high in silt; faint very dark grayish brown (10YR 3/2) clay films on some void walls in ped interiors; many fine and very fine voids; few soft 2 to 5 mm. Fe-Mn aggregates; few roots; gradual smooth boundary.
B24t 12469	33 to 40 inches. Gray (10YR 5/1) heavy silty clay loam (some grit) with many medium prominent strong brown (7.5YR 5/8) mottles; weak coarse prismatic structure compounded from medium blocks; very firm; slightly acid (pH 6.4); ped surfaces are mainly gray (10YR 5/1) and high in silt; ped interiors are gray (10YR 5/1) around voids; distinct very dark grayish brown (10YR 3/2) clay films on void walls in ped interiors; few thin clay films on ped surfaces; many very fine and prominent fine voids; few soft 2 to 5 mm. Fe-Mn aggregates; few roots along vertical planes; abrupt and wavy boundary.
IIB3 12470	40 to 50 inches. Gray (10YR 5/1) loam with many medium prominent dark yellowish brown (10YR 4/4) mottles; massive; very firm; neutral (pH 6.6); common fine voids; thin clay films in some voids; very few roots; clear boundary.
IIC1 12471	50 to 62 inches. Stratified layers of gray (10YR 5/1) gravelly loamy sand and gravelly sandy clay loam with many coarse distinct yellowish brown (10YR 5/8) to dark brown (7.5YR 4/4) mottles; massive to single grain; loose to slightly sticky and slightly plastic; neutral (pH 7.0).
IIC2 12472	62 to 73 inches. Dark grayish brown (10YR 4/2) light coarse loamy sand with common faint coarse yellowish brown (10YR 5/4) and grayish brown (10YR 5/2) mottles; single grain; nonplastic and nonsticky; neutral (pH 7.0).
IIIC3 12473	73 to 83 inches. Stratified light olive brown (2.5Y 5/4) fine to coarse sands; water table at 74 inches; calcareous.

Remarks: All colors based on field moisture conditions.

Soil voids are described according to following classes:

Abundance classes:		
	Few	1 to 3 per square inch
	Common	4 to 7 per square inch
	Many	7 to 14 per square inch
Diameter classes:		
	Very fine	< 1 mm.
	Fine	1 to 2 mm.
	Medium	2 to 5 mm.
	Coarse	5 to 10 mm.
	Very coarse	> 10 mm.

The Ap, B22t, and IIIC3 horizons were sampled for the Bureau of Public Roads.

SCS-421
10-64 (Rev. 9-58)

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL: Stoy silt loam SOIL Nos. S54Ind-87-1 LOCATION: Warrick County, Indiana

SOIL SURVEY LABORATORY: Beltsville, Maryland LAB. Nos. 551260 - 551267

Depth (in.)	Horizon	1B1b Total Sand (2-0 05)	Total Silt (0.05-0.002)	Total Clay (< 0.002)	Size class and particle diameter (mm) 3A1 Sand: Very coarse (2-1)	Sand: Coarse (1-0.5)	Sand: Medium (0.5-0 25)	Sand: Fine (0.25-0.1)	Sand: Very fine (0.1-0.05)	Silt (0.05-0.02)	Silt: Int. III (0.02-0.002)	Silt: Int. II (0.2-0.02)	Silt (2-0.1)		3B2 Cm	Coarse fragments 3B1: 2A2 ≥ 2 Pct.	2 - 19	19 - 76
		Pct. of < 2 mm															Pct. of < 76mm	
0-6	Ap		77.1	20.6	0.2	0.3	0.2	0.5	1.1		37.8	40.7				-		
6-12	B1		74.9	22.7	0.1[a]	0.4	0.2	0.5	1.2		37.8	38.5				-		
12-16	B21		71.4	26.2	0.1	0.4	0.3	0.6	1.0		38.6	34.2				-		
16-23	B22		71.1	26.4	0.1	0.3	0.2	0.6	1.3		37.0	35.6				-		
23-32	B23m		76.7	20.2	0.1	0.2	0.1	0.7	2.0		37.0	42.1				-		
32-55	B24m		66.4	20.4	0.4	0.9	0.4	2.7	8.8		32.0	45.1				-		
55-63	D1		43.9	23.0	3.7	2.4	1.3	9.2	16.5		23.3	43.5				-		
63+	D2		46.5	38.5	1.0	0.8	0.3	2.3	10.6		24.4	34.4				-		

Depth (in.)	6A1a Organic carbon Pct.	Nitrogen Pct.	C/N		Carbonate as $CaCO_3$ Pct.	Ext. iron as Fe Pct.	Bulk density g/cc	4A1e ⅓ bar g/cc	4A1h Oven dry g/cc	4D1 COLE	Water content Pct	4B1c ⅓ bar Pct	4B2 15 bar Pct.		4C1 WRD in/in	pH	8C1c (1:1) KCl	8C1a (1:1) H_2O
0-6	0.79																	4.4
6-12	0.11																	4.4
12-16	0.05																	4.5
16-23	0.02																	4.6
23-32	0.02																	4.8
32-55	0.01																	5.1
55-63	-																	5.4
63+	0.05																	5.7

Depth (in.)	Extractable bases 5B1a: 6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum	6H1a Ext. acidity	CEC: 5A3a Sum cations		6G1d Ext. Al			Ratios to clay: CEC Sum	Ext. iron	15-bar water	8G3 Ca/Mg		Base saturation: 5C3 Sum cations Pct	5C1 NH_4OAc Pct.
	meq/100 g																	
0-6	1.0	0.9	0.1	0.2		12.5	14.7										15	
6-12	1.4	1.1	0.2	0.2		13.5	16.4										18	
12-16	1.7	3.7	0.1	0.3		15.9	21.7										27	
16-23	0.9	4.1	0.3	0.3		14.4	20.0										28	
23-32	2.5	4.8	0.4	0.2		9.7	17.6										45	
32-55	2.7	5.0	0.4	0.1		4.5	12.7										64	
55-63	3.9	5.4	0.5	0.1		4.9	14.8										67	
63+	7.7	8.5	0.9	0.2		4.0	21.3										81	

Depth (in.)	Clay Fraction Analysis 7A1b-d: Mt.	Chl	Vm.	Mi.	Int.	Qtz.	Kl.	Gibbsite
	7A2 X-ray						7A3	

a Undecomposed organic matter in sand fraction.

Mt. = Montmorillonite, Chl. = chlorite, Vm. = Vermiculite, mi = mica, Int. = Interstratified layer, Qtz. = quartz, Kl. = Kaolinite

Relative amounts: blank = not determined, dash = not detected, tr. = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant.

Soil Type: Stoy silt loam
Soil No. S54Ind-87-1
Location: Warrick County, Indiana. SW 1/4 sec. 14, T. 5S., R. 8 W. The sample site is on the bank of a drain ditch for a strip mine.
Vegetation and land use: Saw briars, ragweed.
Drainage: Moderately well drained
Parent Material: Loess over sandstone. Loess thickness is 55 inches.
Physiographic Position: Upland

Horizon and Beltsville Lab. No.	
Ap 551260	0 to 6 inches. Yellowish brown (10YR 5/4) silt loam, poorly formed, very fine crumb structure, soft when dry, pH 4.8.
B1 551261	6 to 12 inches. Brownish yellow (10YR 6/6) silt loam with fine, faint yellow (10YR 8/6) mottles, poorly formed, fine angular blocky structure, soft when dry, pH 4.8.
B21 551262	12 to 16 inches. Strong brown (7.5YR 5/6) silty clay loam with medium, distinct pinkish white (7.5YR 8/2) mottles, well formed fine, angular blocky structure, friable when moist, pH 4.9.
B22 551263	16 to 23 inches. Yellowish brown (10YR 5/4) silty clay loam with many fine, faint, light yellowish brown (10YR 6/4) mottles, well formed medium, prismatic structure breaking to durable fine angular blocky structure, very friable when moist, pH 4.8.
B23m 551264	23 to 32 inches. Strong brown (7.5YR 5/6) silt loam with common fine distinct pinkish gray (7.5YR 6/2) mottles, durable, coarse prismatic structure, very hard when dry, pH 5.2.
B24m 551265	32 to 55 inches. Yellowish brown (10YR 5/6) silt loam, massive structure, hard when dry, pH 5.8.
D1 551266	55 to 63 inches. Brownish yellow (10YR 6/6) silt loam, with many medium, pronounced black (10YR 2/1) mottles, poorly formed, very fine angular blocky structure, hard when dry, pH 5.5.
D2 551267	63 inches plus. Reddish yellow (7.5YR 6/6) silty clay loam, poorly formed fine angular blocky structure which breaks to poorly formed medium platy structure, pH 6.0.

Notes: Colors refer to moist soil.

SCS-421
10-64 (Rev. 9-66)

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Tilsit silt loam SOIL Nos 43 LOCATION Martin County, Indiana

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 551006 - 551014

Depth (In.)	Horizon	1B1b Total: Sand (2-0.05)	Silt (0.05-0.002)	Clay (< 0.002)	Size class and particle diameter (mm) 3A1 — Sand: Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Silt: 0.05-0.02	Int. III (0.02-0.002)	Int II (0.2-0.02)	(2-0.1)		3B2 Cm	Coarse fragments 3B1: 2A2 ≥ 2 Pct.	2-19	19-76
		Pct. of < 2 mm															Pct. of < 76mm	
0-7	A1		69.2	23.6	0.3	1.4	0.8	1.9	2.8		49.1	24.1				-		
7-10	A2		65.5	28.7	0.4	1.4	0.8	1.4	1.8		34.2	34.0				-		
10-18	B1		60.5	32.4	0.5	1.5	0.9	1.8	2.4		31.8	32.3				-		
18-22	B21		77.7	15.4	0.1	0.8	0.6	1.3	4.1		44.3	38.5				-		
22-25	Bx1		71.3	23.2	0.2	0.6	0.5	1.0	3.2		40.2	35.1				-		
25-40	Bx2		64.6	30.6	0.1	0.6	0.5	1.0	2.6		37.1	30.8				-		
40-50	B3		64.5	27.1	0.1	0.8	0.8	1.9	4.8		35.4	35.2				-		
50-60	B32		60.1	27.2	0.2	0.2	0.2	2.5	9.6		32.4	39.3				-		
60-78	B33		52.7	31.5	0.2	0.2	0.2	3.1	12.1		28.8	38.7				-		

Depth (In.)	6A1a Organic carbon	Nitrogen	C/N		Carbonate as $CaCO_3$	Ext. iron as Fe	Bulk density:	4A1e ⅓ bar	4A1h Oven dry	4D1 COLE	Water content:	4B1c ⅓ bar	4B2 15 bar		4C1 WRD	pH:	8C1c (1:1) KCl	8C1a (1:1) H_2O
	Pct	Pct			Pct	Pct.	g/cc	g/cc	g/cc		Pct.	Pct	Pct		In/in			
0-7	1.18																	5.2
7-10	0.72																	5.3
10-18	0.37																	5.1
18-22	0.22																	4.8
22-25	0.10																	4.8
25-40	0.06																	4.7
40-50	0.08																	4.5
50-60	0.10																	4.7
60-78	0.09																	5.5

Depth (In.)	Extractable bases 5B1a: 6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum	6H1a Ext. acidity	CEC: 5A3a Sum cations		6G1d Ext. Al			Ratios to clay: CEC Sum	Ext iron	15 bar water	8D3 Ca/Mg		Base saturation: 5C3 Sum cations	5C1 NH_4OAc
	meq/100 g																Pct	Pct
0-7	3.6	0.7	0.1	0.1		7.6	12.1										37	
7-10	3.6	0.6	0.1	tr.		8.2	12.5										34	
10-18	3.1	0.6	0.1	0.1		6.2	10.1										39	
18-22	1.7	0.5	0.2	0.1		6.9	9.4										26	
22-25	2.2	2.3	0.3	0.2		10.0	15.0										33	
25-40	2.8	4.4	0.5	0.3		13.6	21.6										37	
40-50	3.1	4.6	0.5	0.2		10.7	19.1										44	
50-60	3.4	4.7	0.6	0.2		6.4	15.3										58	
60-78	5.0	6.4	0.9	0.2		3.6	16.1										78	

Depth (In.)	Clay Fraction Analysis 7A1b-d: Mt	Chl.	Vm	Mi.	Int	Qtz	Kl.	Gibbsite
	7A2 X ray						7A3	

Mt. = Montmorillonite, Chl = chlorite, Vm. = Vermiculite, mi = mica, Int. = Interstratified layer, Qtz. = quartz, Kl. = Kaolinite

Relative amounts: blank = not determined, dash = not detected, tr. = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant

Soil Type: Tilsit silt loam
Soil No.: 43
Location: Martin County, Indiana. NE 1/4 NW 1/4 SE 1/4 sec. 24, T. 2 N., R. 4 W., 39.6 miles from the Wabash River, along the southern traverse.
Physiography: 50 inch loess over residium from sandstone and shale.

Horizon and Beltsville Lab. No.	
A1 551006	0 to 7 inches. Pale brown (10YR 6/3), silt loam, smooth (a few very small sand particles detected with 10X hand lens), iron concretions.
A2 551007	7 to 10 inches. Light yellowish brown (10YR 6/4), silt loam, smooth, (a few very small sand particles present), also iron concretions.
B1 551008	10 to 18 inches. Yellow (10YR 7/6), heavy silt loam, smooth, (a few very small sand particles present), also iron concretions.
B21 551009	18 to 22 inches. Mottled brownish yellow (10YR 6/5), light gray (10YR 7/1), and brownish yellow (10YR 6/8), heavy silt loam, smooth, containing iron concretions.
Bx1 551010	22 to 25 inches. Mottled light gray (10YR 7/1), light yellowish brown (10YR 6/4), and reddish yellow (7.5YR 6/8), light silty clay loam, smooth, containing iron concretions.
Bx2 551011	25 to 40 inches. Mottled light brownish gray (10YR 6/2) and reddish yellow (7.5YR 6/8), silty clay loam, smooth, containing iron concretions.
B3 551012	40 to 50 inches. Mottled brownish yellow (10YR 6/8), light gray (10YR 7/1), and strong brown (7.5YR 5/8), heavy silt loam, smooth, (a few very fine grit particles), containing iron concretions.
B32 551013	50 to 60 inches. Brownish yellow (10YR 6/6) mottled with light gray (10YR 7/1), heavy silt loam, containing a noticeable increase in very fine sand (about 5 percent grit), also iron concretions.
B33 551014	60 to 78 inches. Brownish yellow (10YR 6/6), mottled with light gray (10YR 7/1), and yellowish brown (10YR 5/8), heavy silt loam, gritty, containing iron concretions.
R	78 inches plus. Mansfield cap rock (sandstone).

SOIL SURVEY LABORATORY Lincoln, Nebr. December 1959

SOIL TYPE Warsaw silt loam **LOCATION** Tippecanoe County, Indiana

SOIL NOS. S59Ind-79-1 **LAB. NOS.** 11758-11764

General Methods: 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	3A1 0.02-0.002	2A2 > 2 (<19mm)	TEXTURAL CLASS
0-2	A11	1.8	3.8	2.0	2.0	3.3	61.7	25.4	25.7	40.3	3	sil
2-13	A12	1.2	3.5	1.8	1.3	2.4	62.7	27.1	25.1	40.6	Tr.	sicl/sil
13-16	B1t	1.2	3.8	1.8	1.1	2.3	59.6	30.2	22.8	39.6	Tr.	sicl
16-20	IIB21t	2.1	4.4	2.0	1.5	2.4	53.5	34.1	20.7	35.8	Tr.	sicl
20-35	IIB22t	15.1	10.8	3.1	2.4	2.9	24.1	41.6	12.4	15.9	45	c
35-40	IIB23	36.3a	9.5a	1.9a	1.9a	2.0a	11.8	36.6	6.6	8.1	58	sc
40+	IIIC	65.6b	12.0b	2.4b	2.3b	2.1b	12.0	3.6	8.4	6.8	73	lcos

pH 8C1a 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6C1a Free Iron % Fe_2O_3		6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
6.7			4.04	0.332	12	1.7		<1				12.8
6.3			2.31	0.199	12	1.7						11.2
5.5			1.61	0.136	12	1.8						11.6
5.3			1.36	0.118	12	2.1						13.4
5.1			1.20	0.104	12	2.8						15.6
6.9			0.93	0.093	10	3.4		2				19.2
8.3			0.06	0.006		1.2		34				2.4

5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K	5B1a 5C1 Base Sat. % NH_4OAc Exch.	5C3 Base Sat. % on Sum Cations	5B1a Sum Ext. Bases	5A3a Sum Ext. Cations	8D3 Ca/Mg		MOISTURE AT SATURATION %
←	milliequivalents per 100g. soil				→			← me/100g. →				
23.1	17.1	5.2	6.4	<0.1	1.0	101	78	23.3	29.7	3.3		
18.4	12.4	4.1	7.9	<0.1	0.6	93	68	17.1	25.0	3.0		
16.9	8.8	3.8	9.9	<0.1	0.2	76	56	12.8	22.7	2.3		
17.9	9.8	3.7	11.5	<0.1	0.3	77	54	13.8	25.3	2.6		
21.8	11.8	4.0	13.4	0.1	0.4	75	55	16.3	29.7	3.0		
22.7		6.9	7.4	0.1	0.4							
2.0		0.8	<0.1	<0.1	<0.1							

a. Trace carbonates. Limestone fragments?
b. Few carbonates. Limestone fragments?

Soil Type: Warsaw silt loam
Soil Nos.: 859Ind-79-1
Location: SE 1/4 of SW 1/4, Sec. 19, T23N, R4W, West Lafayette, Tippecanoe County, Indiana.
Vegetation and Use: Bluegrass cover bordering gravel pit of Western Indiana Sand and Gravel Company.
Slope and Land Form: Level with less than 1 percent slope.
Drainage and Permeability: Well to excessively drained with little runoff but medium to rapid internal drainage.
Parent Material: Loamy overburden on calcareous gravel and sand.
Collected by: T. M. Bushnell and H. P. Ulrich for laboratory data to be presented on the International Congress of Soil Science tour, 1960.
Described by: H. P. Ulrich, July 24, 1959.

Horizon and Lincoln Lab. No.	
A11 11758	0 to 2 inches. Very dark brown (10YR 2/2) coarse silt loam; moderate fine to very fine granular structure; friable; slightly acid; abrupt smooth boundary 1 to 3 inches thick. Contains numerous fibrous roots. A thin mat of very dark grayish brown fibrous roots and grass leaves up to 2 inches thick covers the mineral soil. Colors are for moist conditions here and below.
A12 11759	2 to 13 inches. Very dark brown (10YR 2/2) silt loam; strong fine to medium granular structure; friable; hard when dry; slightly acid; clear wavy boundary 8 to 14 inches thick.
B1t 11760	13 to 16 inches. Dark brown (7.5YR 3/2 to 10YR 3/3) heavy silt loam to coarse silty clay loam; strong fine to medium subangular blocky structure; firm; very hard when dry; medium acid; clear wavy boundary 3 to 6 inches thick.
IIB21t 11761	16 to 20 inches. Dark brown (7.5YR 3/2 to 10YR 3/3) slightly gravelly silty clay loam; moderate medium subangular and angular blocky structure; firm; very hard when dry; plastic and sticky when wet. Medium acid, clear wavy boundary 3 to 5 inches thick; few thin clay coatings on ped faces.
IIB22t 11762	20 to 35 inches. Dark brown (7.5YR 3/2) to dark reddish brown (5YR 3/2) gravelly clay loam; lumpy to weak coarse subangular blocky structure; friable; medium acid; clear wavy boundary 10 to 20 inches; medium, dark organic-mineral coatings on pebbles and ped faces.
IIB23 11763	35 to 40 inches. Dark reddish brown (5YR 3/2 to 2/2) gravelly clay loam; weak coarse subangular blocky structure; friable; plastic and sticky when wet; slightly acid to neutral; abrupt irregular boundary 3 to 7 inches thick with tongues extending 9 to 12 inches or more deeper. Black organic-mineral coatings very thick.
IIIC 11764	40 inches plus. Brown (10YR 5/3) fine gravel and sand with a very thin silt coating; highly calcareous; rounded dark and light-colored igneous rock with numerous limestone pebbles and a few dark brown shale fragments.

Remarks: The soil when sampled was dry to the tongues of IIB23 which were moist. The IIB22t is darker brown than is typical for the series. Although fibrous roots are concentrated in the A horizon, a few larger roots are present throughout the solum extending down the tongues to the loose gravel.

The IIB22t horizon ranges from dark brown to reddish brown.

The IIB23 horizon is a characteristic feature of this soil, but it may be thin in some places. Tongues usually are present extending to depth of 1 to 2 feet or more. Calcareous gravel and sand usually range from 30 to 48 inches in valley train areas.

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U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Zanesville silt loam SOIL Nos. 51 LOCATION Harrison County, Indiana

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 551026 - 551032

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand Very coarse (2–1)	Sand Coarse (1–0.5)	Sand Medium (0.5–0.25)	Sand Fine (0.25–0.1)	Sand Very fine (0.1–0.05)	Silt 0.05–0.02	Silt Int. III (0.02–0.002)	Silt Int. II (0.2–0.02)	Silt (2–0.1)		3B2 Cm	Coarse fragments 3B1 2A2 > 2 Pct	2 – 19	19 – 76
		Pct. of < 2 mm															Pct. of < 76mm	
0-1	A11		73.6	15.2	0.6[a]	1.3[a]	1.2	4.7	3.4		48.8	31.3				-		
1-3	A12		73.2	15.9	0.3[a]	1.1[a]	1.0	4.8	3.7		46.9	33.2				-		
3-12	A2		65.9	20.4	1.0	1.4	1.0	6.0	4.3		41.3	33.1				-		
12-16	B1		57.5	26.2	0.8	1.3	1.0	7.4	5.8		36.0	32.3				-		
16-26	B2		53.9	26.5	1.7	2.0	1.2	8.4	6.3		31.4	34.7				-		
26-33	Bx1		57.2	26.5	0.7	1.5	1.1	7.4	5.6		37.2	30.7				-		
33-38	Bx2		49.7	27.0	1.5	1.9	1.4	10.6	7.9		30.8	34.2				-		

Depth (In.)	6A1a Organic carbon Pct.	Nitrogen Pct.	C/N		Carbonate as $CaCO_3$ Pct.	Ext. iron as Fe Pct.	Bulk density g/cc	4A1e ⅓ bar g/cc	4A1h Oven dry g/cc	4D1 COLE	Water content Pct.	4B1c ⅓ bar Pct.	4B2 15 bar Pct.		4C1 WRD in/in	pH	8C1c (1:1) KCl	8C1a (1:1) H_2O
0-1	2.52																	5.5
1-3	0.94																	5.0
3-12	0.31																	4.7
12-16	0.20																	4.6
16-26	0.14																	4.7
26-33	0.10																	4.5
33-38	-																	4.5

Depth (In.)	Extractable bases 5B1a 6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum	6H1a Ext. acidity	CEC 5A3a Sum cations		6G1d Ext. Al			Ratios to clay CEC Sum	Ext. iron	15-bar water	8D3 Ca/Mg		Base saturation 5C3 Sum cations Pct	5C1 NH_4OAc Pct.
	meq/100 g																	
0-1	1.7	tr.	0.1	0.2		7.9	9.9										20	
1-3	1.2	0.8	0.1	0.1		6.3	8.5										26	
3-12	1.8	0.9	0.1	0.1		7.5	10.4										28	
12-16	2.8	2.1	0.1	0.2		9.3	14.5										36	
16-26	3.4	1.6	0.1	0.2		10.2	15.5										34	
26-33	2.8	1.4	0.1	0.2		10.4	14.9										30	
33-38	2.0	1.4	0.1	0.1		10.8	14.4										25	

Depth (In.)	Clay Fraction Analysis 7A1b-d Mt	Chl.	Vm	Mi.	Int	Qtz.	Kl	Gibbsite
	7A2 X-ray						7A3	

Mt. = Montmorillonite, Chl = chlorite, Vm = Vermiculite, mi = mica, Int. = Interstratified layer, Qtz. = quartz, Kl. = Kaolinite

Relative amounts blank = not determined, dash = not detected, tr = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant.

Soil Type: Zanesville silt loam
Soil No.: 51
Location: Harrison County, Indiana. SE 1/4 SE 1/4 NE 1/4 sec. 29, T. 1 S., R. 4 E., 80.3 miles from the Wabash River, along the southern traverse.
Physiography: 16 inch loess over residium from cherty limestone.

Horizon and Beltsville Lab. No.	
A11 501026	0 to 1 inch. Grayish brown (10YR 5/2), silt loam, mostly smooth (< 3 percent grit), containing some iron concretions.
A12 501027	1 to 3 inches. Yellowish brown (10YR 5/4), silt loam, smooth (< 2 percent grit), containing iron concretions.
A2 501028	3 to 12 inches. Brownish yellow (10YR 6/6), heavy silt loam, mostly smooth (< 5 percent grit), containing iron concretions.
B1 501029	12 to 16 inches. Mottled yellowish brown (10YR 5/8) and brownish yellow (10YR 6/8), heavy silt loam, somewhat gritty (about 5 percent grit), containing iron concretions.
B2 501030	16 to 26 inches. Mottled brownish yellow (10YR 6/8) and reddish yellow (7.5YR 6/8), silty clay loam, gritty, containing iron concretions.
Bx1 501031	26 to 33 inches. Mottled light gray (10YR 7/2) and brownish yellow (10YR 6/8), silty clay loam, gritty.
Bx2 501032	33 to 38 inches. Yellowish brown (10YR 5/4), mottled with light gray (10YR 7/2) and black (10YR 2/1), heavy silty clay loam, gritty.
IIR	38 inches plus. Hard limestone rock.

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL: Zanesville silt loam SOIL Nos. 42A LOCATION: Martin County, Indiana

SOIL SURVEY LABORATORY: Beltsville, Maryland LAB. Nos. 55995 - 551003

Depth (in.)	Horizon	1B1b Total: Sand (2-0.05)	Silt (0.05-0.002)	Clay (< 0.002)	Size class and particle diameter (mm) 3A1 — Sand: Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Silt: 0.05-0.02	Int. III (0.02-0.002)	Int. II (0.2-0.02)	(2-0.1)		3B2 Cm	Coarse fragments 3B1: 2A2 > 2 Pct.	2-19	19-76
		Pct. of < 2 mm															Pct. of < 76mm	
0-5	A1		58.7	22.7	0.5	0.6	0.4	6.9	10.2		41.7	32.6				-		
5-9	A2		54.6	26.3	0.5	0.3	0.4	7.1	10.8		42.9	28.0				-		
9-12	B1		43.8	27.0	0.6	0.4	0.5	11.6	16.1		30.7	38.4				-		
12-20	B2		78.9	13.3	0.3	0.9	0.7	1.9	4.0		35.8	48.4				-		
20-24	Bx1		73.7	17.7	0.2	1.2	0.8	1.9	4.5		45.8	33.7				-		
24-36	Bx2		75.2	17.6	0.2	0.8	0.6	1.4	4.2		42.6	37.8				-		
36-48	IIBx3		63.9	21.0	0.7	1.7	2.6	5.1	5.0		37.5	34.1				-		
48-60	IIB31		51.7	29.8	0.9	2.1	3.2	6.4	5.9		31.2	29.8				-		
60-90	IIB32		81.5	10.2	0.6	1.8	0.9	2.4	2.6		35.9	49.8				-		
90-114	IIB33		82.0	9.8	0.6	1.9	0.8	2.2	2.7		33.5	52.6				-		
114-132	IIB34		78.0	16.2	0.2	1.1	0.6	1.7	2.2		37.9	43.5				-		

Depth (in.)	6A1a Organic carbon Pct.	Nitrogen Pct.	C/N		Carbonate as $CaCO_3$ Pct.	Ext. iron as Fe Pct.	Bulk density: g/cc	4A1e ⅓ bar g/cc	4A1h Oven dry g/cc	4D1 COLE	Water content: Pct.	4B1c ⅓ bar Pct.	4B2 15 bar Pct.		4C1 WRD in/in	pH:	8C1c (1:1) KCl	8C1e (1:1) H_2O
0-5	0.88																	6.4
5-9	0.91																	6.2
9-12	0.24																	4.7
12-20	0.15																	4.6
20-24	0.14																	4.5
24-36	0.14																	4.5
36-48	0.10																	4.6
48-60	0.09																	4.7
60-90	0.09																	5.0
90-114	0.08																	5.8
114-132	0.09																	6.2

Depth (in.)	Extractable bases 5B1a: 6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum	6H1a Ext. acidity	CEC: 5A3a Sum cations		6G1d Ext. Al		Ratios to clay: CEC Sum	Ext. iron	15-bar water	8D3 Ca/Mg		Base saturation: 5C3 Sum cations Pct.	5C1 NH_4OAc Pct.
	meq/100 g																
0-5	5.8	0.5	tr.	0.1		4.2	10.6									60	
5-9	5.6	0.6	0.1	0.1		4.6	11.0									58	
9-12	2.4	1.1	0.1	0.1		7.6	11.3									33	
12-20	1.5	1.4	0.1	0.2		10.2	13.4									24	
20-24	1.5	2.9	0.3	0.4		16.8	21.9									23	
24-36	1.6	4.2	0.4	0.4		18.0	24.6									27	
36-48	1.1	4.0	0.3	0.2		10.0	15.6									36	
48-60	1.7	3.5	0.4	0.1		6.8	12.5									46	
60-90	3.1	4.7	0.5	0.1		4.1	12.5									67	
90-114	4.3	5.9	0.6	0.1		2.8	13.7									78	
114-132	4.7	5.6	0.7	0.1		2.4	13.5									82	

Depth (in.)	Clay Fraction Analysis 7A1b-d: Mt.	Chl.	Vm	Mi.	Int.	Qtz.	Kl.	Gibbsite	
	7A2 X-ray						7A3		

Mt. = Montmorillonite, Chl. = chlorite, Vm. = Vermiculite, mi = mica, Int. = Interstratified layer, Qtz. = quartz, Kl. = Kaolinite

Relative amounts: blank = not determined, dash = not detected, tr. = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant.

Soil Type: Zanesville silt loam
Soil No.: 42A
Location: Martin County, Indiana. SE 1/4 SW 1/4 NE 1/4 sec. 19, T. 2 N., R. 4 W., 35.8 miles from the Wabash River, along the southern traverse.
Physiography: 36 inch loess over residium from sandstone, siltstone and shale.

Horizon and Beltsville Lab. No.	
A1 55995	0 to 5 inches. Pale brown (10YR 6/3) silt loam, smooth (a few fine sand and medium sand grains detected), containing iron concretions.
A2 55996	5 to 9 inches. Very pale brown (10YR 7/3), silt loam, smooth (very few grit particles) containing iron concretions.
B1 55997	9 to 12 inches. Light yellowish brown (2.5Y 6/5), light silty clay loam, smooth (less grit than in above horizons), containing iron concretions.
B2 55998	12 to 20 inches. Mottled very pale brown (10YR 7/3) and brownish yellow (10YR 6/6), smooth (< 2 percent grit of fine sand size) light silty clay loam, containing iron concretions.
Bx1 55999	20 to 24 inches. Mottled very pale brown (10YR 7/3) and brownish yellow (10YR 6/6) coated with white (10YR 8/1), silty clay loam, smooth (very little grit present), containing iron concretions.
Bx2 551000	24 to 36 inches. Mottled very pale brown (10YR 7/3), light gray (10YR 7/1), brownish yellow (10YR 6/8), and dark yellowish brown (10YR 4/4), heavy silty clay loam to a light silty clay, smooth (an increase in grit but < 5 percent grit), containing iron concretions.
IIBx3 551001	36 to 48 inches. Mottled brownish yellow (10YR 6/8) and light gray (10YR 7/1), silty clay loam, gritty (about 6 percent sands), containing iron concretions.
IIB31 551002	48 to 60 inches. Mottled brownish yellow (10YR 6/8) and light gray (10YR 7/1) silty clay, gritty, containing iron concretions.
IIB32 551003	60 to 90 inches. Brownish yellow (10YR 6/6) mottled with light gray (10YR 7/1), silt loam, gritty, containing iron concretions.
IIB33 551004	90 to 114 inches. Mottled brownish yellow (10YR 6/6), very pale brown (10YR 7/3), light gray (10YR 7/1), heavy silt loam, gritty, containing iron concretions.
IIB34 551005	114 to 132 inches. Mottled brownish yellow (10YR 6/8), light gray (10YR 7/1), and reddish yellow (7.5YR 6/8), loam or clay loam, very gritty, containing iron concretions.
R	132 inches plus. Hard rock.

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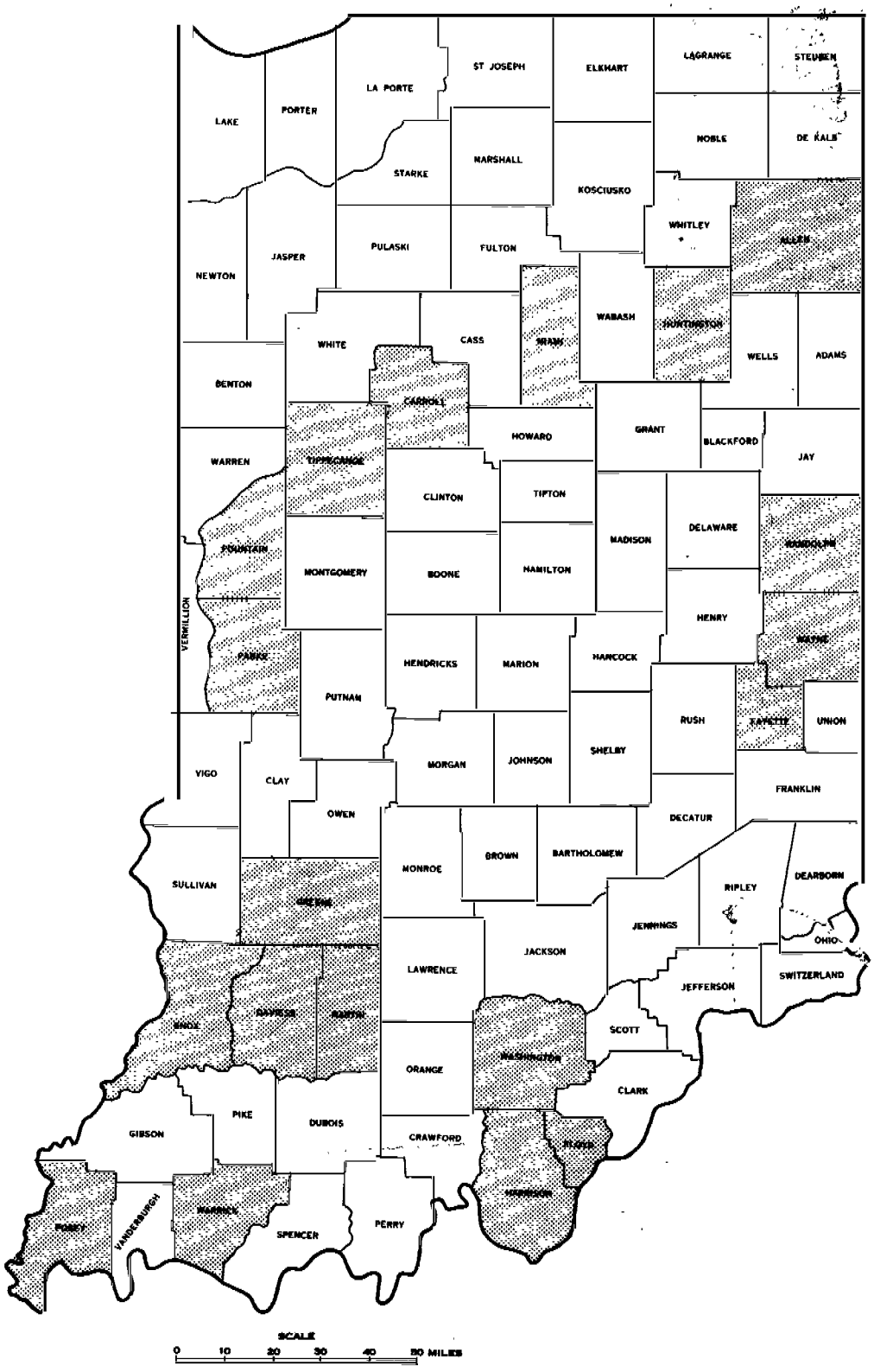
INDIANA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PULASKI
FULTON
WABASH
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WELLS
ADAMS
WHITE
CASS
MIAMI
BENTON
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WARREN
TIPPECANOE
CLINTON
TIPTON
MADISON
DELAWARE
RANDOLPH
FOUNTAIN
MONTGOMERY
BOONE
HAMILTON
HENRY
WAYNE
VERMILLION
PARKE
HENDRICKS
MARION
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DUBOIS
GIBSON
CRAWFORD
FLOYD
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PERRY
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