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CROPS

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SOIL TYPES

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CROPS AND CROPPING SEQUENCES AS RELATED TO SOIL TYPE

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INTRODUCTION

Every soil sample submitted to the Agricultural Extension Service Soil Testing Laboratory, Columbus, Ohio is accompanied by a questionnaire which describes the soil type and cropping sequence which this sample represents. This bulletin is a summarization of 104,041 questionnaires submitted by Ohio farmers between July 1, 1956 and July 1, 1959 relating cropping sequence with soil type.

This bulletin provides information not included in Agricultural Census figures which are normally reported by county; therefore, the information is unique since it relates cropping sequence with soil type.

PROCEDURE AND PRESENTATION OF RESULTS

Information from the questionnaires was placed on IBM cards, which used to process the data into the various tables cited in the text².

Figure 1 shows the location of the major soil types. The heavy lines delineate regions of major soil divisions. Within these regions, the light lines delineate the major soil type areas³. There are 15 major soil types⁴ given in Figure 1, the numbers referring to the soil type area as given in the accompanying table.

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²The authors are indebted to Dr. C. R. Weaver, Station Statistician, and the staff of the Statistics Laboratory, Ohio Agricultural Experiment Station for assistance in processing these data.

³See "Fertility Status of Ohio Soils" by Jones, J. B., Mederski, H. J., and Musgrave, O. L. Ohio Agr. Expt. Sta. Res. Bul. 894, 1961.

⁴Morse, H. H. and Bane, S. 1958. Understanding Ohio Soils. Ohio Agr. Ext. Service Bul. 368.

Figures 2 through 5 show the percentage of crop land devoted to corn, soybeans, small grain, and meadow or pasture, respectively, by major soil type. Figures 6 through 8 show the percentage of crop land devoted to continuous corn, permanent pasture and rotation cropping, respectively, by major soil type. These figures are given to provide the reader with a general panoramic view of crop land utilization for four agronomic crops grown in Ohio and three selected agronomic cropping sequences. For more detailed information, reference should be made to the tables.

The tables give the percentage of crop land devoted to a particular cropping sequence by soil type. In Table 1, the percentage of crop land devoted to 11 cropping sequences is given for 59 soil types. In Table 2, the percentage of crop land devoted to tobacco, tomatoes and sugar beets is given by soil type.

The percentage of crop land devoted to row crops is greater in western Ohio than eastern and southern Ohio. In northwest Ohio, corn and soybeans occupy 30 to 50 percent of the crop land (Figures 2 and 3). By contrast, meadow and pasture occupy from 50 to 80 percent of crop land in the extreme southern and eastern half of Ohio (Figure 5). The percentage of crop land in corn and small grains is fairly constant over the state except for the extreme southern and southeastern parts (Figures 2 and 4).

The percentage of crop land devoted to continuous corn ranges from 1 to 5 percent over most of the state except in northwest Ohio and along the lake where the percentages are 10 and 12 percent, respectively, (Figure 6).

Sizeable percentages of the crop land in corn is continuous corn. Using the percentages given in figures 2 and 6, 5 to 30 percent of the crop land in corn was found to be in continuous corn. The highest percentages occur in the Hoytville (26%) and Lacustrine (30%) series soils, while the lowest percentages are to be found in the Blanchester (5%) and Cambridge (6%) soil series. For the remaining major soil series, the percentage of corn land in continuous corn ranges from 8 to 14 percent. For the entire state, including all soil types listed in Table 1, 22 percent of the corn land in Ohio is in continuous corn. Sizeable portions of the bottom land or terrace soils are in continuous corn. The percentage figures for these soils may be found in Table 1.

Crop land devoted to soybeans is almost entirely limited to northwest Ohio (Figure 3). Rotations including soybeans occupy from 25 to 75 percent of the cropland in the Lake Plain area (Table 1).

In Ohio, 67 to 97 percent of the crop land is devoted to rotation farming (Figure 8). Northwest Ohio has the largest proportion of land in rotation. The smallest proportion of land in rotation is found in southern and southeastern Ohio due to the sizeable portion of the crop land in permanent pasture (Figure 7).

On the average, corn-smallgrain-meadow, corn-soybeans-smallgrain-meadow, and corn-smallgrain-meadow-meadow, are the most frequently used rotations over the entire state (Table 1). However, in particular areas, specific rotations are used more frequently than others. For instance, corn-oats-wheat-meadow is widely used only in northeast Ohio, while in western Ohio, corn-corn-smallgrain-meadow is more frequently used than elsewhere.

DISCUSSION

The cropping sequences employed by Ohio farmers tend to follow the topography characteristics of the land. The level plain soils in western and central Ohio are devoted largely to row crops. In the rolling hill counties in southern and eastern Ohio, the percentage of crop land in meadows and permanent pastures is high. The hazards of erosion limit the frequency of row crops in these areas. Of particular interest are the fairly large percentages of corn land devoted to continuous corn. Even in the rolling hill areas of Ohio, sizeable percentages (10 to 15 percent) of corn land are being continuously cropped. However, much of this corn is located on the terraces and bottom lands (See Table 1).

The cropping sequences employed by farmers on specific soil types within the major soil areas vary considerably (Table 1). For example, in the Lake Plain area, the percentage of crop land devoted to continuous corn varies from 1 to 16 percent. Much of this variation is probably due to local soil characteristics, particularly texture and drainage. The heavy Paulding-Latty soils are poorly drained, while the light textured Ottokee-Tedrow soils are well drained. The heavy Paulding-Latty soils, being more difficult to manage, are less frequently plowed and cultivated.

In addition to these agronomic factors which influence cropping sequences employed by the Ohio farmer, availability of markets and government regulation also exert their influence. An estimate of these influences is beyond the scope of this bulletin.

TABLE 1. -Percentage of crop land devoted to 11 cropping sequences catagorized by soil type

Soil type	Continuous corn	Corn-soybeans	Corn-small grain-meadow	Corn-oats-wheat-meadow	Corn-soybeans-small grain-meadow	Corn-corn-small grain-meadow	Corn-small grain meadow-meadow	Corn-corn-small grain-meadow-meadow	Corn-small grain-meadow-meadow-meadow	Permanent pasture	Long-time meadow	Numbers of samples
Hoytville-Toledo	4	3	10	4	40	8	5	2	1	0	2	6846
Nappanee-Fulton	6	3	11	5	39	9	6	2	1	0	0	4015
Wauseon-Granby	13	6	13	7	24	11	5	2	1	0	0	2215
Rimer-Seward-Ottokee-Tedrow	16	7	15	10	19	10	5	1	0	2	3	789
Paulding-Latty	1	3	8	1	76	2	3	0	0	0	1	997
Roselms	3	1	10	2	59	3	13	1	1	1	3	268
Pewano	3	2	14	5	31	12	16	6	2	2	2	3889
Blount	3	2	15	6	31	12	16	4	2	2	2	7163
Morley	2	1	15	9	28	10	17	4	3	1	2	5047
Brookston-Kokolo	4	1	27	1	24	14	13	5	1	4	3	6276
Crosby	1	3	28	1	22	15	13	4	2	3	3	6364
Miami-Celina	3	1	33	1	14	11	18	3	2	6	5	7563
Brookston-Ragsdale	5	0	34	0	3	22	14	9	0	6	3	860
Fincastle-Reesville	4	0	35	0	4	20	16	8	3	7	3	1462
Burkbeck-Russell-Xenia	2	0	33	1	3	12	21	6	3	11	7	2430
Blanchester	0	0	14	0	6	8	26	7	4	9	10	273
Clermont-Avonburg	2	0	21	0	14	6	28	4	4	8	9	1660

TABLE 1.—continued—Percentage of crop land devoted to 11 cropping sequences catagorized by soil type

Soil type	Continuous corn	Corn-soybeans	Corn-small grain-meadow	Corn-oats-wheat-meadow	Corn-soybeans-small grain-meadow	Corn-corn-small grain-meadow	Corn-small grain-meadow-meadow	Corn-corn-small grain-meadow-meadow	Corn-small grain-meadow-meadow-meadow	Permanent pasture	Long-time meadow	Numbers of samples
Wadsworth-Trumbull	2	0	6	28	2	2	21	2	12	14	11	871
Wayne-Rittman	2	0	10	26	1	2	24	1	8	10	12	1404
Cambridge-Vermango	1	0	7	22	1	1	16	1	20	16	14	311
7-B-3	1	0	10	18	2	7	17	0	10	16	10	
7-B-2	1	0	13	11	0	1	20	0	15	20	17	
Chippewa	1	0	17	21	2	3	16	0	3	25	7	254
Ravenna-Trumbull	3	0	12	29	1	3	16	1	6	16	10	986
Wooster-Canfield	1	0	17	29	0	3	19	0	5	9	10	3337
Muskingum-Keene-Wellston	1	0	11	5	0	1	19	1	9	26	27	7982
Meigs-Muskingum	0	0	8	2	0	0	12	1	7	29	40	2123
Westmoreland-Muskingum	0	0	3	1	0	0	15	1	7	29	42	421
Upshur	1	0	6	1	0	1	9	1	7	33	41	346
Muskingum-Westmoreland-Meigs	0	0	4	1	0	1	11	0	5	34	42	1527
No. 145	0	0	8	5	0	6	11	0	5	43	25	1392
Westland-Abginton-Pitchin-Sebewa	12	1	23	1	15	20	11	4	2	2	3	893

TABLE 1.—continued—Percentage of crop land devoted to 11 cropping sequences catagorized by soil type

Soil type	Continuous com	Corn-soybeans	Corn-small grain-meadow	Corn-oats-wheat-meadow	Corn-soybeans-small grain meadow	Corn-corn-small grain-meadow	Corn-small grain meadow-meadow	Corn-corn-small grain-meadow-meadow	Corn-small grain-meadow-meadow-meadow	Permanent pasture	Long-time meadow	Numbers of samples
∞ Cincinnati-Rossmoyne-Jessup-Grayford-Edenton	1	0	17	0	5	4	23	3	3	15	14	2447
Fairmont-Maddox-Heitt-Bratton-Hagers-Town-Cedarville	1	0	5	0	0	2	17	3	9	22	28	374
Marengo	3	0	22	8	20	10	19	3	2	4	6	1157
Condit-Bennington	2	1	19	11	20	7	20	3	3	6	6	2372
Alexandria-Cardington	2	1	24	10	11	7	23	2	3	7	9	3192
Hanover-Fallsburg-Millwood-Loudonville	1	0	40	3	0	0	19	0	6	12	20	550
Olmsted-Lorain-Fries-Monroeville	12	0	13	15	24	6	5	0	0	0	8	250
Canadia-Canadice-Painesville-Wilmer	12	0	22	13	16	5	6	0	0	6	10	203
Plainfield-Coloma	12	0	26	9	9	6	7	0	0	10	12	196
Trumbull-Mahoning	2	0	9	17	4	2	22	2	13	14	15	1840
Ellsworth	2	0	9	0	7	2	8	1	11	9	13	1498

TABLE 1.—continued—Percentage of crop land devoted to 11 cropping sequences catagorized by soil type

Soil type	Continuous corn	Corn-soybeans	Corn-small grain-meadow	Corn-oats-wheat-meadow	Corn-soybeans-small grain-meadow	Corn-corn-small grain-meadow	Corn-small grain meadow-meadow	Corn-corn-small grain-meadow-meadow	Corn-small grain-meadow-meadow	Permanent pasture	Long-time meadow	Numbers of samples
6 Montgomery-Fox-Ockley-Millcreek	7	1	24	2	15	15	16	6	3	4	4	1150
Chilo-Luray-Reynolds-Blago	13	1	18	7	6	8	14	2	5	10	13	615
Sebring-Purdy	6	0	17	9	5	6	23	2	6	12	12	504
Mentor-Glenford-Holston-Monogahela-Elk-Captina	1	0	20	8	0	0	20	0	1	9	16	1440
Sloan-Wabash-Algiers	21	2	18	0	14	16	10	4	2	3	3	936
Genessee-Ross-Shoals-Defiance	18	2	18	1	14	17	9	4	2	3	4	1408
Elkins-Dunning	19	1	16	4	3	10	14	4	3	10	10	1083
Wayland-Atkins-Melvin	11	1	17	7	4	5	16	2	4	17	13	462
Huntington-Linside-Pope-Philo-Chagrín-Lobdell	14	0	17	3	2	8	16	4	6	9	17	1623
Carlisle-Willette-Kerston-Edwards-Warners-Tawas	59	3	7	1	6	4	6	0	1	1	1	340
Average	6.6	2.1	16.4	8.5	15.0	7.7	15.0	3.1	5.0	11.8	12.2	

TABLE 2.—Percentage of crop land devoted to tobacco, tomatoes, or sugar beets either in continuous culture or rotation catagorized by soil type

Soil Type	Cropping Sequence			
	Tobacco		Tomatoes	Sugar beets
	Continuous	Rotation	In rotation	In rotation
Hoytville-Toledo			5	6
Nappanee-Fulton			3	4
Wauseon-Granby			2	4
Rimer-Seward-Ottokee-Tedrow			1	2
Pewamo			1	1
Blount			1	1
Morley			1	
Crosby		1		
Blanchester	8	6		
Clermont-Avonburg	1			
Cincinnati-Rossmoyne-Jessup-Grayford-Edenton	9	3		
Fairmount-Maddox-Heitt-Bratton-Hagerstown-Cedarville	6	8		
Westland-Abington-Pitchin-Sebewa-Montgomery		1	1	
Sloan-Wabash-Algiers			1	
Genessee-Ross-Shoals-Defiance	1		2	1
Carlisle-Willette-Kerston-Edwards-Warners-Tawas				1

KEY TO MAP

Lake Plain	Lacustrine
<p>1. Roselms Paulding Latty</p>	<p>8. Canadea Lorain Olmsted</p>
<p>2. Hoytville Toledo Nappanee Fulton</p>	<p>Plainfield Chenango Wilmer</p>
<p>Glaciated Clay Loam Till</p>	<p>Glaciated Limestone</p>
<p>3. Morley Blount Pewamo</p>	<p>9. Cardington Bennington-Condit Marengo</p>
<p>Glaciated Loam Till</p>	<p>Glaciated Clay</p>
<p>4. Miami Celina Crosby Brookston</p>	<p>10. Mahoning Trumbull Elsworth</p>
<p>Glaciated Loam Till with Silt Mantle</p>	<p>Glaciated Sandstone and Shale</p>
<p>5. Fincastle Xenia Russell Reesville Brookston, Ragsdale</p>	<p>11. Cambridge Varango Alden</p>
<p>Illinois Glaciated Loam Till</p>	<p>Glaciated Shale and Sandstone SCL Till</p>
<p>6. Blanchester Rossmoyne Avonburg Clermont</p>	<p>12. Wadsworth Rittman Wayne</p>
<p>Residual Limestone</p>	<p>Glaciated Sandstone</p>
<p>7. Bratton Burgin Fairmount</p>	<p>13. Wooster Canfield Ravenna Chippewa</p>
<p>Hagerstown Cedarville Haddox</p>	<p>Illinois Glaciated Sandstone and Shale</p>
<p>Residual Sandstone and Shale</p>	<p>14. Hanover Fallsburg Millwood Loudonville</p>
<p>15. Muskingum Wellston Keene Westmoreland Muskingum</p>	<p>Meigs-Muskingum Upshur Westmoreland Meigs-Muskingum</p>

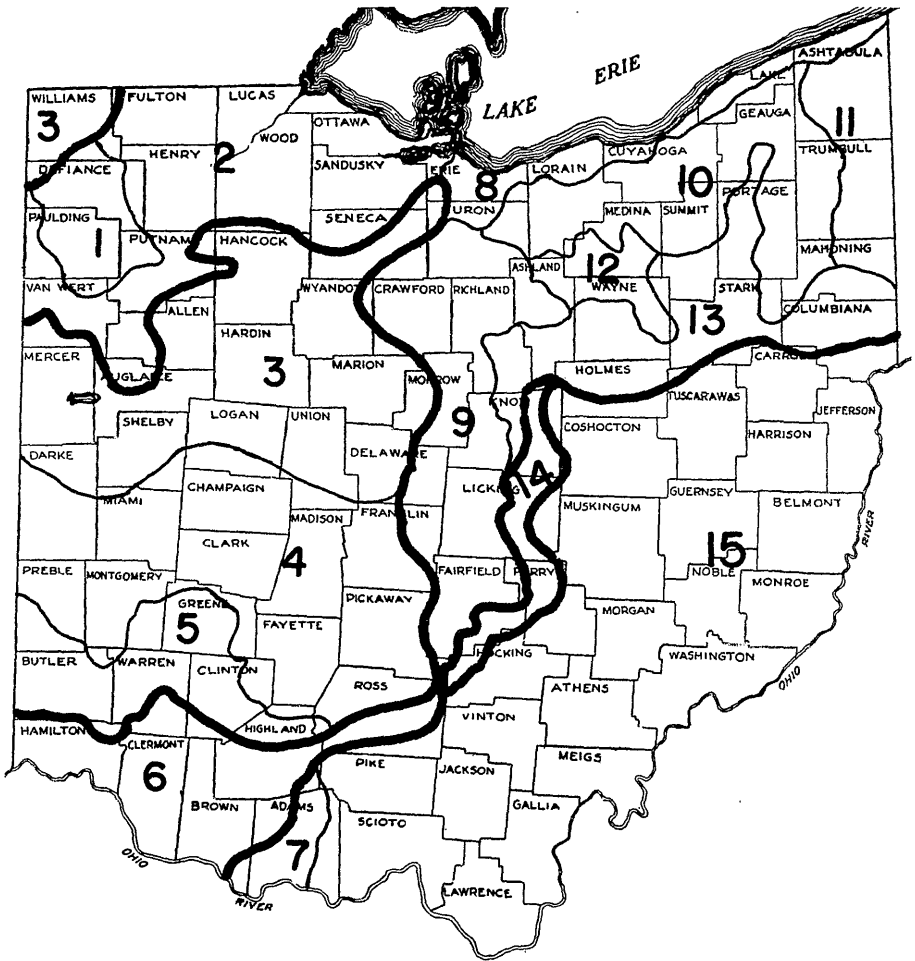


Figure 1. Major Soil Types.

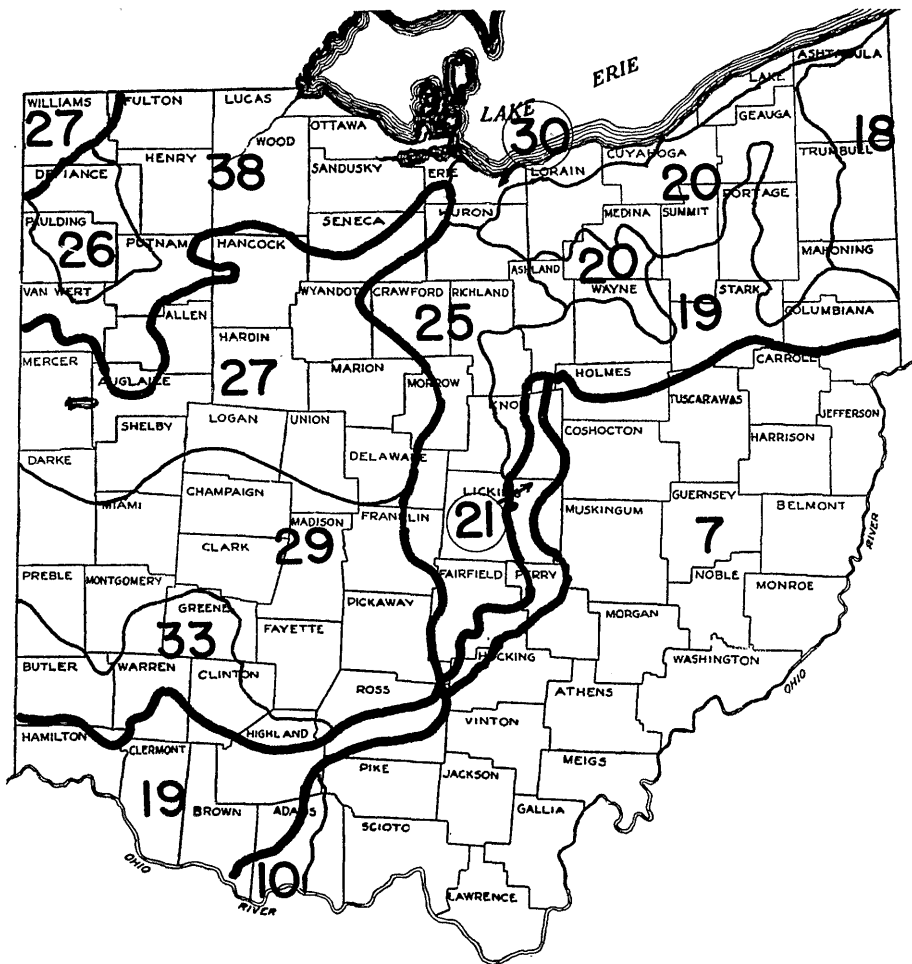


Figure 2. Percentage of crop land devoted to corn.

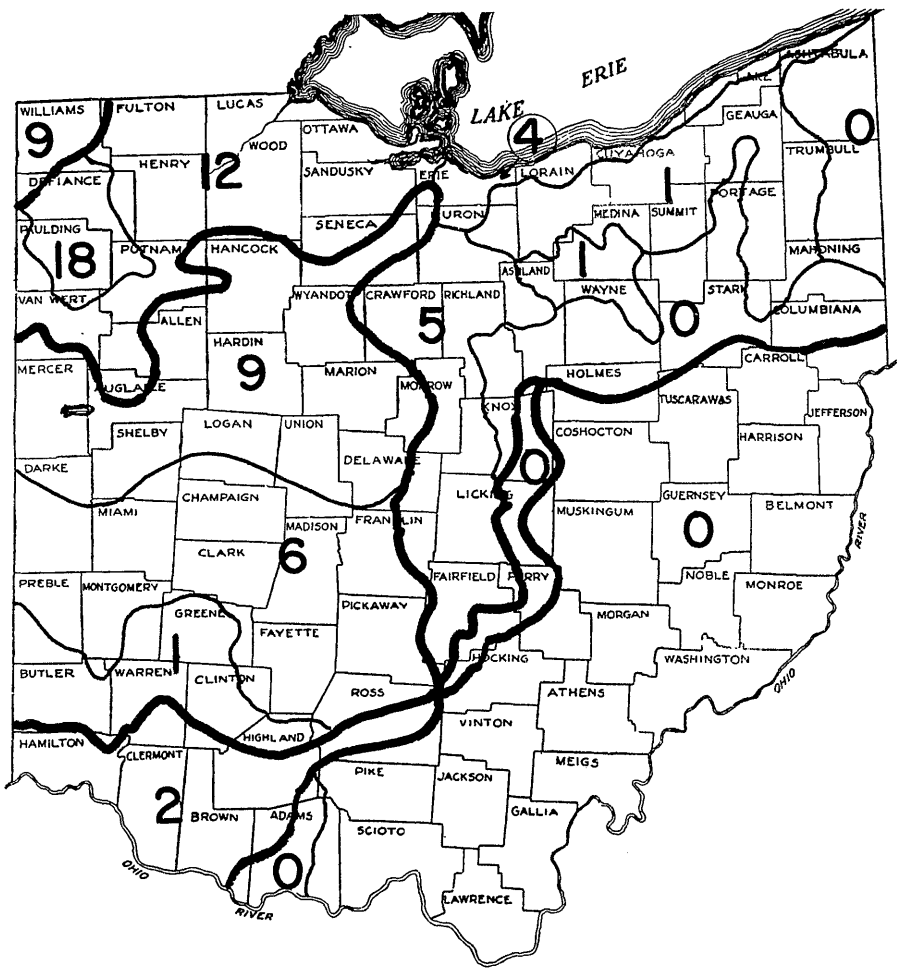


Figure 3. Percentage of crop land devoted to soybeans.

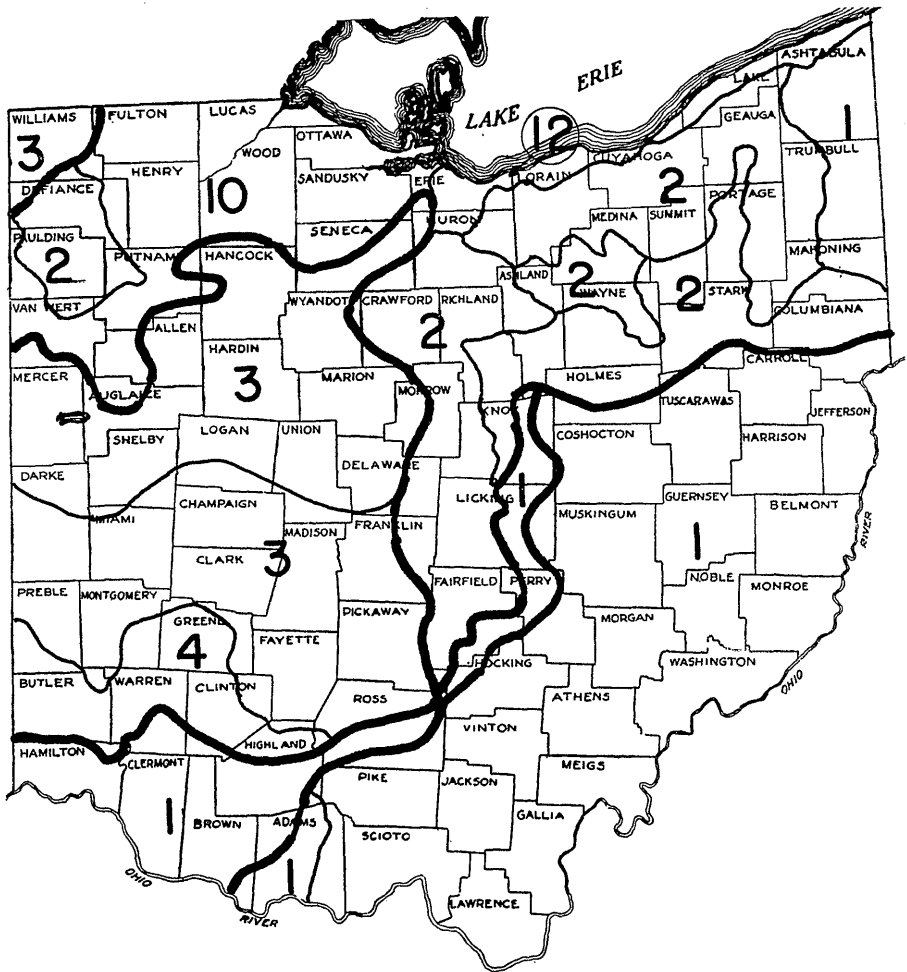


Figure 6. Percentage of crop land devoted to continuous corn culture.

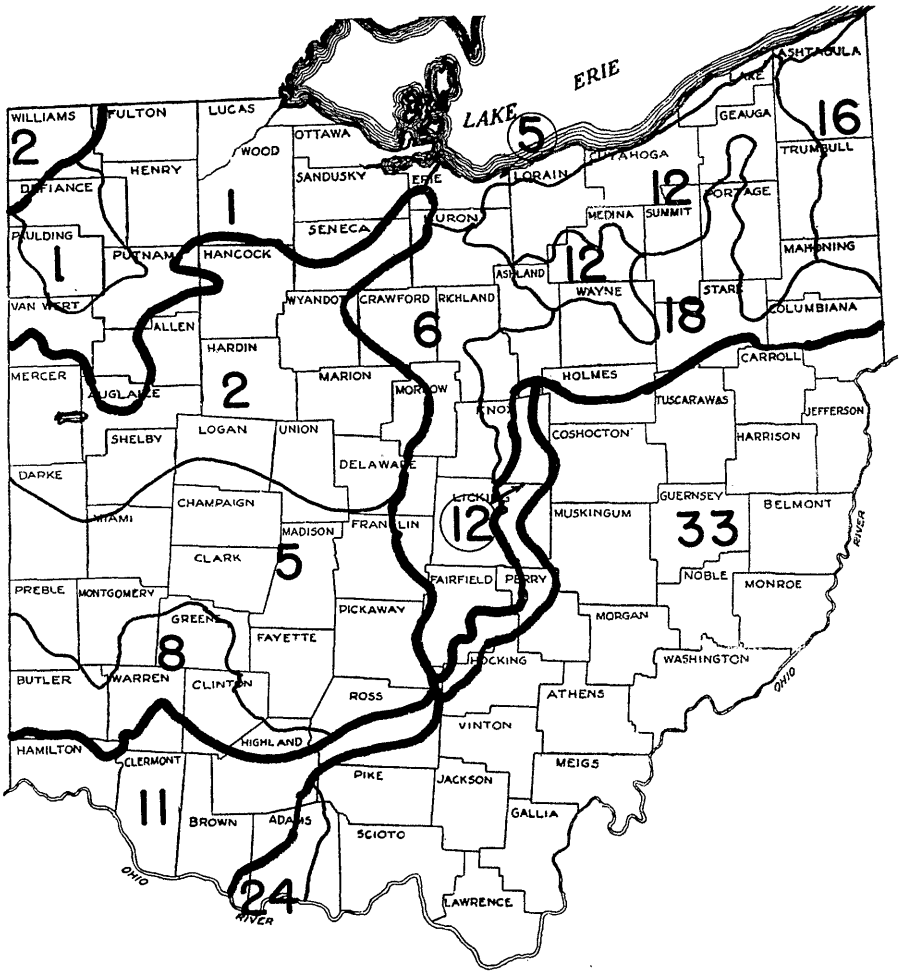


Figure 7. Percentage of crop land in permanent pasture.

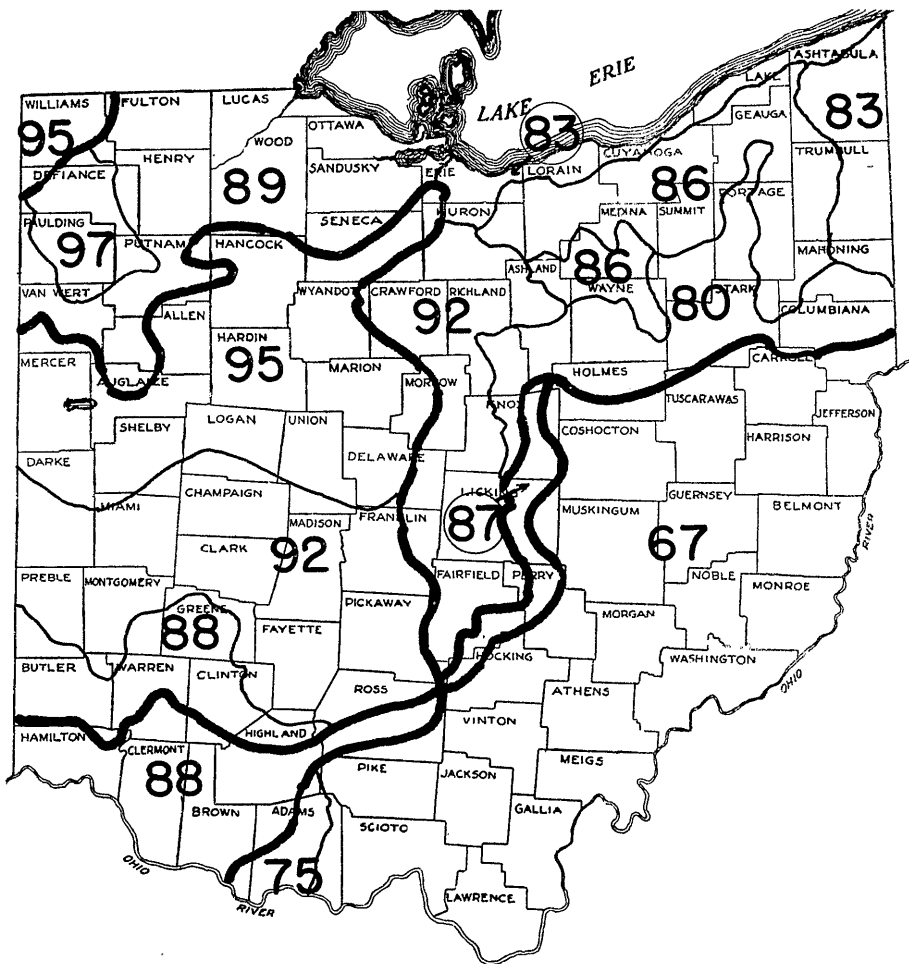


Figure 8. Percentage of crop land in rotation with two or more crops.

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