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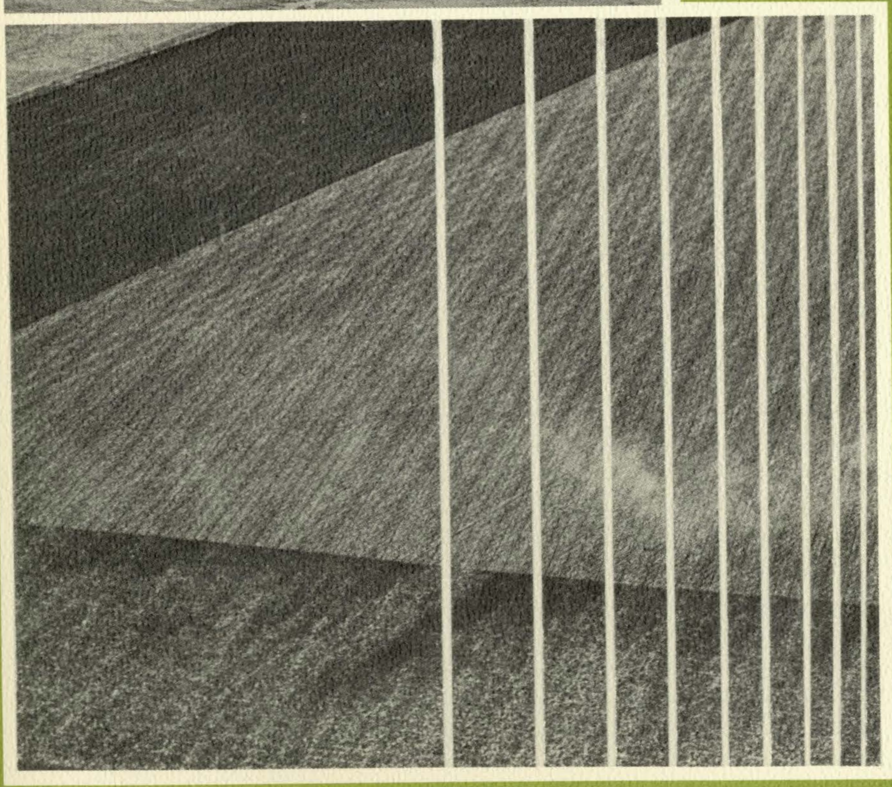
Fertility Levels of South Dakota Soils: A Summary of Soil Tests

R. C. Ward

P. L. Carson

B 624



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South Dakota State University
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Soil Fertility Levels of South Dakota Soils: A Summary of Soil Tests

Raymond C. Ward and Paul L. Carson[1]
[1]Research Manager, James Valley Agricultural Research and Extension Center and Assistant Professor Plant Science Department, and Professor, Plant Science Department, South Dakota State University.

Introduction

Soil test levels provide the best basis for recommending profitable rates of fertilizer to farmers and ranchers. Summaries of soil tests can be used (a) to provide information about fertility levels of soils in a general area; (b) to show differences in fertility levels from one area to another; and (c) to follow changes in fertility levels for a period of years.

The objectives of this publication are to show soil fertility levels (a) for each soil association, (b) for each county and (c) to provide an example of how these values can be used when summarized by soil associations within a county.

Methods and Materials

This summary is based on soil tests received at the South Dakota State University Soil Testing Laboratory from 1953 through 1967. Soil tests representing farmer fields were used. Phosphorus, potassium, and pH results were available for 1953-1967, and organic matter for 1963-1967.

Soil organic matter was determined colorimetrically by the sulfuric acid-potassium dichromate method (Ward and Carson, 1969). This test measures the readily-oxidized organic matter or approximately 75 percent of the total organic matter.

Organic matter changes the orange dichromate solution to a green chromate solution. The more intense the green color in the solution the more organic matter in the soil.

Organic matter values are reported as percent of readily-oxidizable organic matter and not as total organic matter. They are divided into four categories: less than 2.1, 2.1-3.0, 3.1-4.0, and greater than 4.0 percent organic matter.

Available soil phosphorus (P) was extracted by the Bray P-1 solution (0.03 normal ammonium floride and 0.025 normal hydrocloric acid) Ward and Carson 1969. Phosphorus values were divided into five categories: less than 6, 6-15, 16-25, 26-40, and greater than 40 pounds of P per acre.

Exchangeable soil potassium (K) was determined by extracting with 1 normal ammonium acetate (1.0N NH_4Ac) Ward and Carson 1969. Potassium values were divided into five categories: less than 51, 51-150, 151-250, 251-400, and greater than 400 pounds of K per acre.

Soil pH was determined on a saturated soil paste from 1953 to 1962 and after that on a 1:1 soil:water suspension (Ward and Carson, 1969). Distilled water was used to make up the paste or suspension. Soil pH was determined with a glass electrode and pH meter. Six categories of soil pH were summarized: less than 5.6, 5.6-6.2, 6.3-6.8, 6.9-7.2, 7.3-7.9, and greater than 7.9.

Results and Discussion

A total of 81,110 soil samples were summarized (Table 1). Brown, Brookings and Deuel Counties were represented by more than 4,000 samples each (4,916, 4,852 and 4,246 respectively). Very few soil samples were received from some counties because the land in these counties is largely native range.

Soil test levels of each soil association were also summarized. A soil association map is shown in Fig. 1. Descriptions of the soil associations are discussed by Westin, Puhr and Buntley (1967). A smaller number of tests are included in this summary (Table 2) because legal descriptions were not included on the Soil Sampling Information Sheets for all samples. Therefore, the tests could not be identified with a soil association. Three soil associations, Poinsett-Parnell-Buse-Sinai (Number 30), Clarno-Stickney-Dudley (Number 26) and Kranzburg-Vienna (Number 29), were represented with more than 5,000 soil test samples each. Several associations were represented by a small number of samples either because of their small size or because they were located in areas where grazing of native range is the predominate use of the land.

Organic Matter

Ward and Carson (1963) reported the importance of organic matter tests in making nitrogen (N) recommendations. The organic matter test does not measure recent N fertilizer treatments, manure applications or legume growth so the past cropping history must also be available when basing nitrogen fertilizer recommendations on this test. An organic matter level above 4.0 percent is considered to be high.

Figure 2 shows that soils in six counties in northeastern South Dakota tested high in organic matter more than 30 percent of the time. High organic matter levels in this area are attributed to lower temperatures and higher rainfall than other areas of South Dakota (Westin, Puhr and Buntley, 1967).

Research work (Diebert et al., 1967, 1968) in these northeastern counties has indicated that good nitrogen fertilizer responses occurred when small grains were grown in high organic matter soils. Nitrogen fertilizer is recommended at higher organic matter levels in northeastern South Dakota (Adams et al., 1973) than in other areas of South Dakota.

The large percentages of low and medium (2.1 to 4.0 percent) organic matter tests from the other counties indicated that increased crop yields will result from the use of supplemental nitrogen.

Several western South Dakota counties have more than 50 percent of the soil organic matter tests below 2.1 percent (See Fig. 2). Ward and Carson (1963) reported that economical returns could be obtained from an application of nitrogen fertilizer on these low organic matter soils even when they had been fallowed the previous year.

Figure 3 shows the percentage of organic matter from tests by soil associations. Northeastern South Dakota has a much larger percentage of soils high in organic matter (greater than 4 percent) than the rest of the state. Soil associations located west of the Missouri River showed a large percentage of soil organic matter tests below 2.1 percent.

Sandy soils such as the Blendon (Number 23) and Hecla-Hamar (Number 22) associations in east central South Dakota showed a larger percentage of organic matter tests in the less than 2.1 percent range than adjacent loamy associations. The Moody-Crofton-Alcester association (Number 36) in southeast South Dakota was lower in organic matter than the surrounding soil associations. This reflects the steeper slopes that occur with this association.

Phosphorus

When phosphorus soil tests are below 40 pounds of P per acre, phosphorus fertilizer applications will usually increase yields (Carson, Heil and Ward, 1965). Detailed phosphorus recommendations are given in South Dakota Cooperative Extension fact sheets concerning the fertilization of various crops and in the "Soils and Fertilizer Guide, 1973" (Adams, et al., 1973).

Bon Homme, Deuel, Hamlin and Roberts Counties had less than 10 percent of the phosphorus soil tests above 40 pounds of P per acre (Fig. 4). Another 28 counties had between 10 and 19 percent of the soil phosphorus tests above 40 pounds of P per acre. Most of these counties were located east of the Missouri River. This indicates the great need for phosphorus fertilizer in eastern South Dakota.

Deuel County showed the largest percentage (55 percent) of low phosphorus tests (6-15 pounds of P per acre). Bennett and Faulk Counties had the smallest percentage of low tests (9 percent). Seventeen counties had over 30 percent of the phosphorus tests above 40 pounds of P per acre. Six counties in western South Dakota had 40 percent or more of the phosphorus tests in the high range.

Phosphorus soil test differences from one county to another indicate that large variations may exist between soil associations. Figure 5 shows this to be true. A good example of phosphorus differences between soil associations is shown by comparing the Poinsett-Parnell-Buse-Sinai soil association (Number 30) and the adjacent Beadle-Forman-Cavour soil association (Number 25).

Soil association Number 30 and 80 percent of the soil samples testing very low to medium (0-25 pounds of P per acre) in phosphorus. The adjacent soil association Number 25 had 48 percent testing in these ranges. Other contrasting examples are shown in Fig. 5 which helps to explain phosphorus test differences among counties.

Potassium

South Dakota soils are considered to be high in available or exchangeable potassium (K). The soil test summary for potassium showed this to be true in most parts of the state except for the extreme eastern counties. In these counties rather large percentages of the potassium soil tests were in the medium and low ranges (less than 250 pounds of K per acre). Ward and Carson (1970) found that forage and row crop yields may be increased by an application of potassium fertilizer when K soil tests are below 250 pounds of K per acre.

Figure 6 shows that 62 percent of the soil samples received from Deuel County were low or medium in potassium (below 250 pounds K). Brookings County soil samples tested below 250 pounds of K per acre 53 percent of the time. Other counties showing over 30 percent medium and low potassium soil tests were Codington, Grant, Minnehaha, Moody, and Roberts.

Differences in K soil test levels between soil associations are shown in Fig. 7. The relationship between soil associations and K soil test levels is illustrated very plainly. The Kranzburg-Vienna soil association (Number 29) had 51 percent low and medium K tests while the adjacent Poinsett-Parnell-Buse-Sinai soil association (Number 30) had 13 percent low and medium K soil tests. This again points out the importance of knowing the location of the soil associations in establishing area-wide soil fertility programs.

Soil Fertility Levels of South Dakota Soils

Soil pH is a meaure of acidity and alkalinity. A soil pH of 7 is neutral while a pH below 7 is acid and above 7 is alkaline. Soil pH values were divided into 6 ranges, but the less than 5.6 range was not shown because of a lack of pH values in this range. The ranges shown are moderately acid (less than pH 6.3), slightly acid (6.3-6.8), neutral (6.9-7.2), alkaline (7.3-7.9) and strongly alkaline (greater than 7.9).

The county pH summary shows very few soil samples in the strongly alkaline range (Fig. 8). Ten to 13 percent of Harding, Hughes, Lyman and Mellette Counties soils were strongly alkaline. Most counties showed less than 5 percent of the soils in the strongly alkaline range.

The percent of soils in the moderately acid range (less than pH 6.3) was quite high in many counties. Response to added lime is not expected. Lime applications on South Dakota soils have not profitably increased crop yields (Ward and Lawrensen, 1970).

Soil pH by soil association is shown in Fig. 9. The clayey soils west of the Missouri River (soil association numbers 5, 6, 7, 8 and 10) were more alkaline (pH 7.3-7.9) than surrounding soils. In eastern South Dakota the Sisseton association (Number 34) had 36 percent of its soils in the strongly alkaline range (greater than pH 7.9) and 48 percent in the alkaline range. This was quite different from the adjacent Forman-Aastad-Cavour association (Number 32) which had 3 percent of its soils in the strongly alkaline range and 35 percent in the alkaline range.

The Moody-Trent-Crofton association (Number 37) had the largest percentage of moderately acid soils (45 percent). Three other associations had 30 percent or more soil samples in the moderately acid range. One of these, the Vebar association (Number 3), is west of the

Missouri River. It is a sandy-textured association. The Beadle-Forman-Cavour (Number 25) and the Wentworth-Egan-Baltic (Number 38) associations were the other two with 30 percent or more moderately acid soils.

Soil Associations Within a County

The data in Table 3 summarizes the soil tests by soil associations within each county. Locations of soil associations within a county are shown in Fig. 1. By referring to Table 3, a summary of soil tests for different associations can be developed for each county.

Roberts County map shown in Fig. 10-13 is slightly different than shown in Fig. 1 because a more detailed soil map (Derscheid and Westin, 1970) was used to draw the soil association lines.

Figure 10 shows the variability of organic matter tests (less than 4 percent) for the five soil associations within Roberts County. From Table 3 it can be seen that the less than 2.0, 2.1-3.0, and 3.1-4.0 percent columns were added to arrive at the values in Fig. 10. The lower the organic matter level the greater the need for nitrogen fertilizer on continuously cropped land. The potential need for nitrogen fertilizer is greatest on soil association Number 33 and least on soil associations Numbers 28 and 29.

A map showing the summation of the organic matter percents that are less than 4 percent within a soil association does not give an indication of variability found within that association. A series of maps, one for each organic matter range (less than 2.0 percent, 2.1-3.0 percent, 3.1-4.0 percent and greater than 4.0 percent) shown in Table 3, would provide a better summary of the values for a particular soil association. Because of this variability it is better to test each field to determine the organic matter content of that particular soil. This variability holds true for all tests and makes it desirable to test each soil to better measure its fertility character-

Variability of phosphorus tests within Roberts County are shown in Fig. 11. The percent of very low (0-5 lbs P/A) and low (6-15 lbs P/A) tests are reported from Table 3 for illustration purposes. The reader may want to see the percentage of soils in the medium phosphorus range (16-25 lbs P/A) and this could be done by referring to Table 3.

The striking difference in soil phosporus tests is that 90 percent of the soils in association Number 34 require large amounts of phosphorus fertilizer for maximum crop production. This summary could be used to alert farmers, fertilizer dealers and others to the possible need of a large supply of phosphorus in that area of Roberts County.

Potassium soil tests are shown to be low in certain areas of extreme eastern South Dakota, including Roberts County. By looking at potassium soil tests by soil associations within the county (Table 3 and Fig. 12) it is easy to see that two soil associations (Numbers 29 and 34) are medium or low in potassium (less than 250 lbs K/A) about 70 percent of the time.

In other words when row crops or legumes are grown in these soils, potash fertilizer will need to be applied 70 percent of the time. Soil association Number 32 which is adjacent to Number 34 is medium or low in potassium 26 percent of the time instead of 70 percent. This points out the need for knowing the soil associations in an area if one is to develop a good fertilizer program.

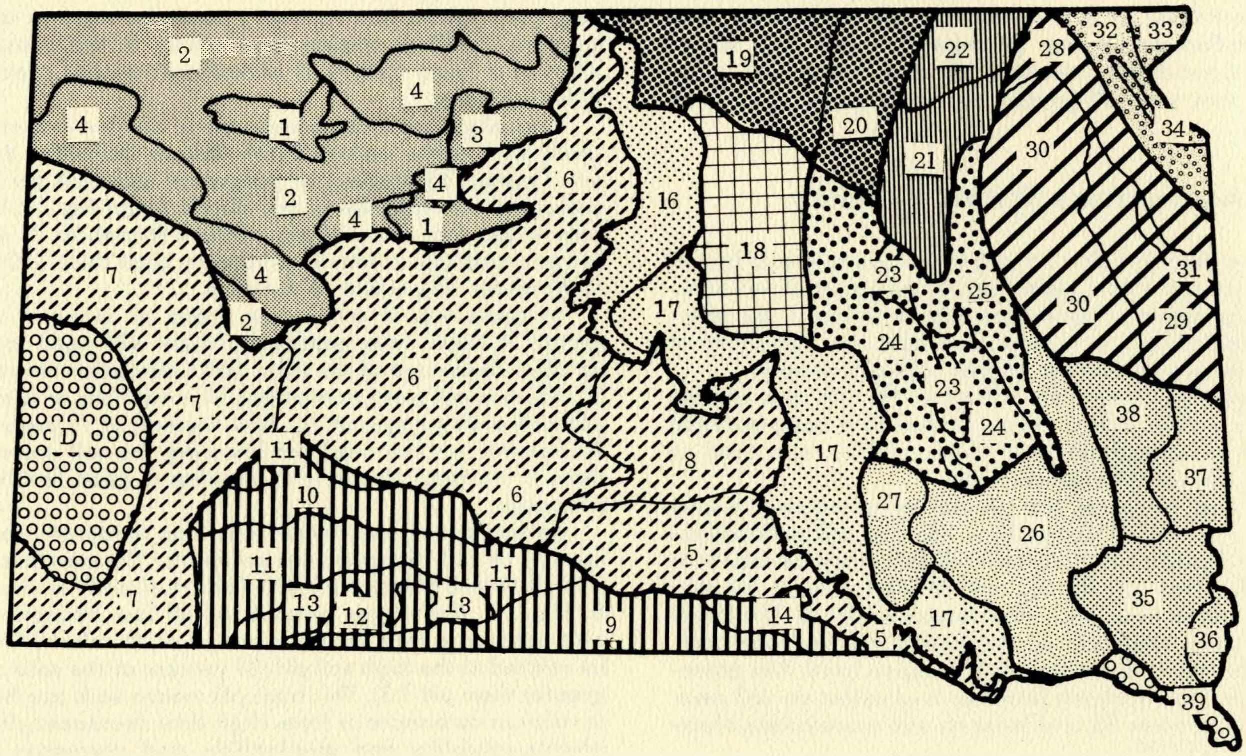
Soil pH by soil association may help to identify some fertility or soil management problems. The percentage of soils with a pH above 7.3 in Roberts County is shown in Fig. 13. The larger percentage of low phosphorus and potassium tests for soil association Number 34 can be related to the high soil pH (87 percent of the soils are greater than pH 7.3). This high pH means soils are high in calcium carbonate or lime. High lime decreases phosphorus solubility and availability, and decreases the supply of available potassium. Figure 13 is a good example of using pH to help explain some of the other plant food element availabilities.

Summary

The soil test summary provides the basic information on the soil fertility status of South Dakota soils. With the information presented, improved fertility programs can be developed whether it be on a state, county or soil association level. Data presented in Fig. 2-9 definitely point out differences in soil fertility levels across the state, and can be used to predict areas of greatest fertilizer needs.

These summaries are useful resources of information about the general fertility levels of a given area, but they do not substitute for sampling individual fields. By noting the number of tests falling in the various test ranges, it should give the reader some idea of the variability of soil tests within an area. This variability exemplifies the need for sampling individual fields for specific fertilizer recommendations.

Figure 1 S. D. Soil Associations



A. NORTHWEST LOAMY AND SANDY TABLELAND

1 Morton, gently undulating

2 Morton-Bainville, rolling and undulating

3 Vebar, gently undulating

4 Vebar-Flasher, rolling and undulating

B. CLAY PLAIN

5 Millboro-Boyd-Samsil, undulating and steep

6 Opal-Samsil, undulating and steep

7 Pierre-Kyle, undulating and steep

8 Promise-Opal-Samsil, undulating and steep

C. SOUTHWEST SILTY AND SANDY TABLELAND

9 Anselmo, undulating and rolling

10 Badlands, hilly

11 Kadoka-Epping, rolling

12 Keith, undulating

13 Keith-Canyon-Anselmo, rolling

14 Reliance-Anselmo, undulating

15 Valentine, hilly

D. BLACK HILLS

E. AGAR SILTY PLAIN

16 Agar-Eakin, sloping

17 Highmore-Raber-Walker, undualting to rolling

F. GLENHAM LOAMY PLAIN

18 Glenham-Hoven, rolling to undulating

G. WILLIAMS LOAMY PLAIN

19 Williams-Heil, rolling to undulating

20 Williams-Barnes, undulating

H. LAKE DAKOTA PLAIN

21 Beotia-Aberdeen, nearly level

22 Hecla-Hamar, gently undulating

I. HOUDEK LOAMY PLAIN

23 Blendon, undulating

24 Houdek-Prosper-Tetonka-Cavo gently undulating

25 Beadle-Forman-Cavour, undulating

J. CLARNO LOAMY PRAIRIE

26 Clarno-Stickney-Dudley, gently undulating

27 Beadle-Dudley-Stickney, nearly level

K. POINSETT-KRANZBURG SILTY PRAIRIE

28 Forman-Buse-Poinsett, hilly to rolling

29 Kranzburg-Vienna, sloping

30 Poinsett-Parnell-Buse-Sinai, undulating

31 Singsaas-Oaklake, undulating

L. NORTHEAST LOWLAND

32 Forman-Aastad-Cavour, gently undulating

33 Great Bend-Glyndon-Hecla, gently undulating

34 Sisseton, undulating

M. MOODY SILTY PRAIRIE

35 Egan-Viborg-Badus, nearly level to undulating

36 Moody-Crofton-Alcester, strongly sloping

37 Moody-Trent-Crofton, sloping

38 Wentworth-Egan-Baltic, undulating

N. MISSOURI LOWLAND

39 Luton-Volin-Onawa, level

Fig. 2. Percent of Organic Matter Tests in Each Range By County

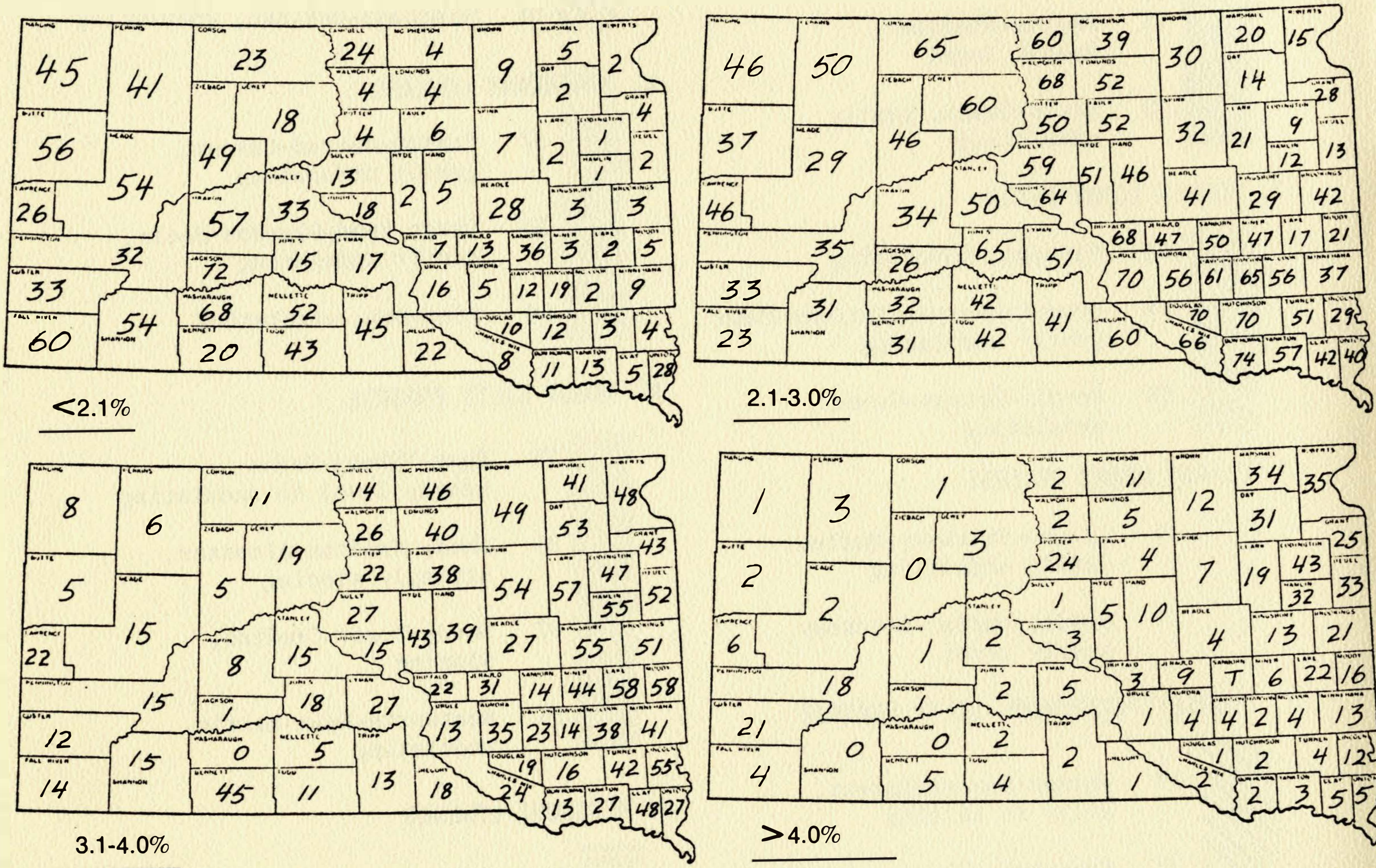
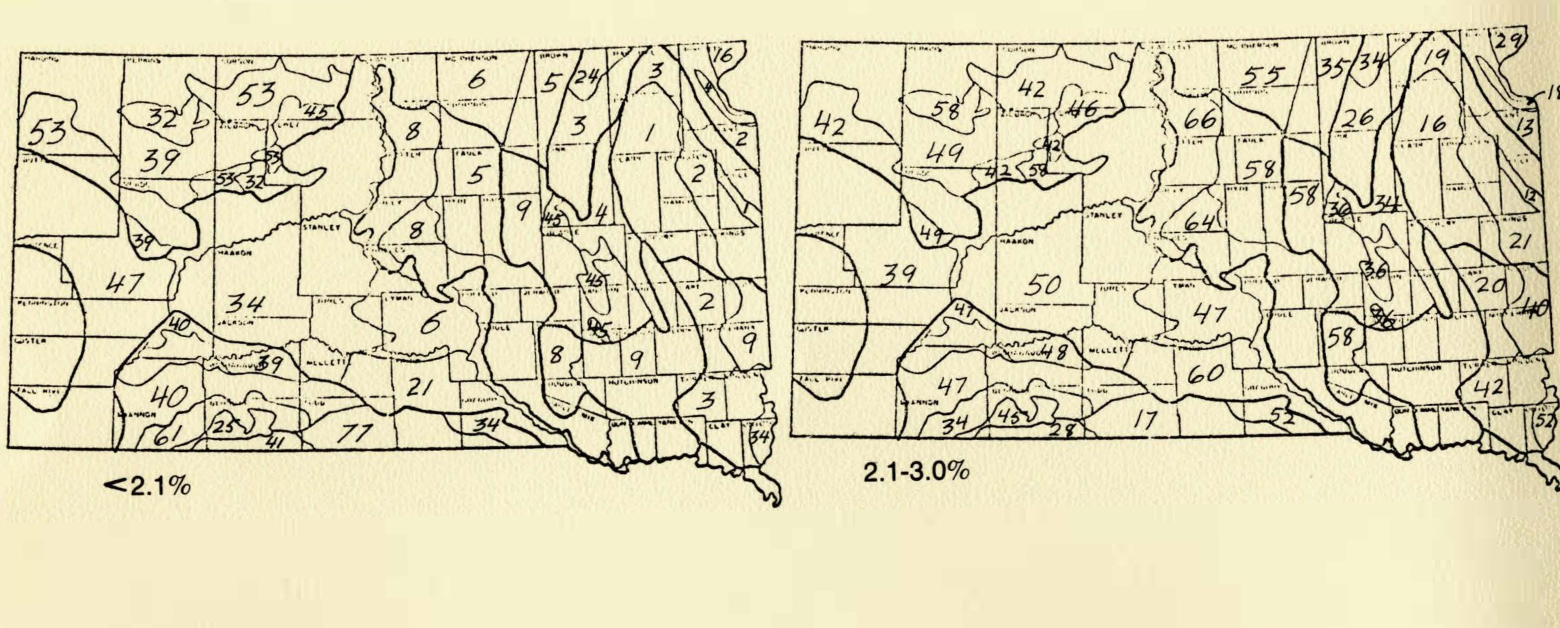
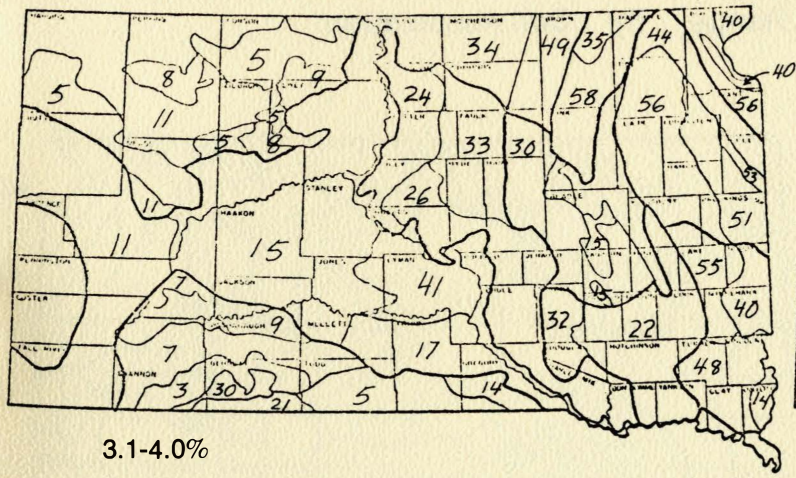
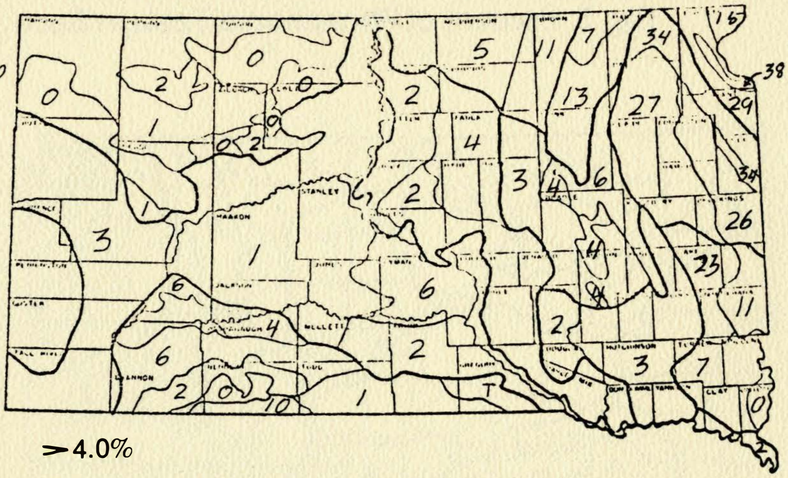


Fig. 3. Percent of Organic Matter Tests In Each Range By Soil Association



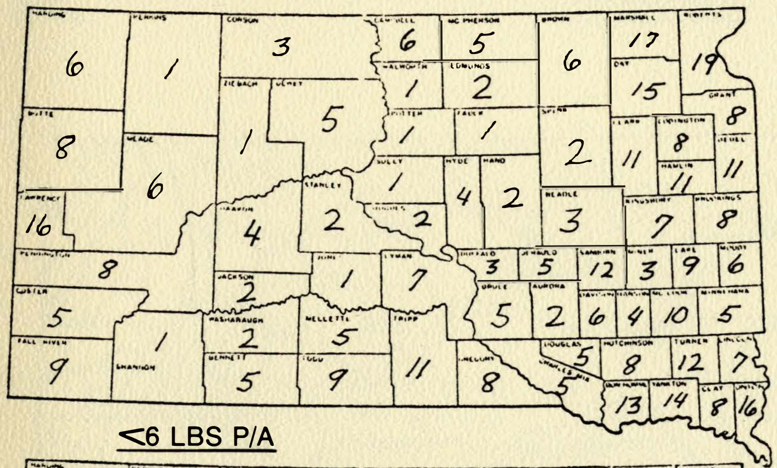


3.1-4.0%

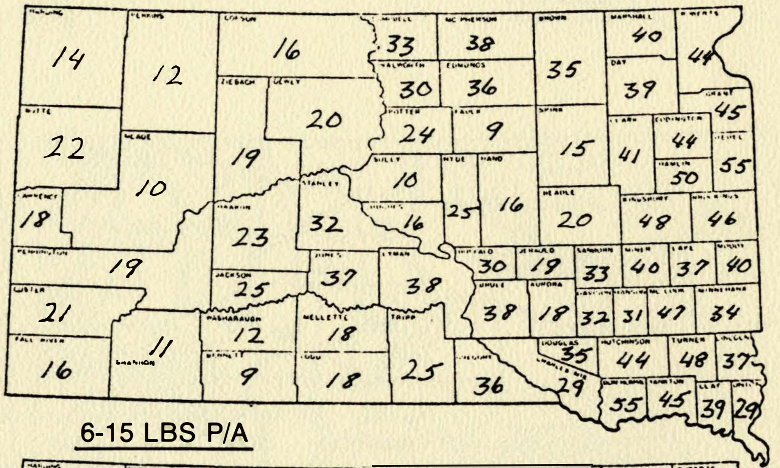


>4.0%

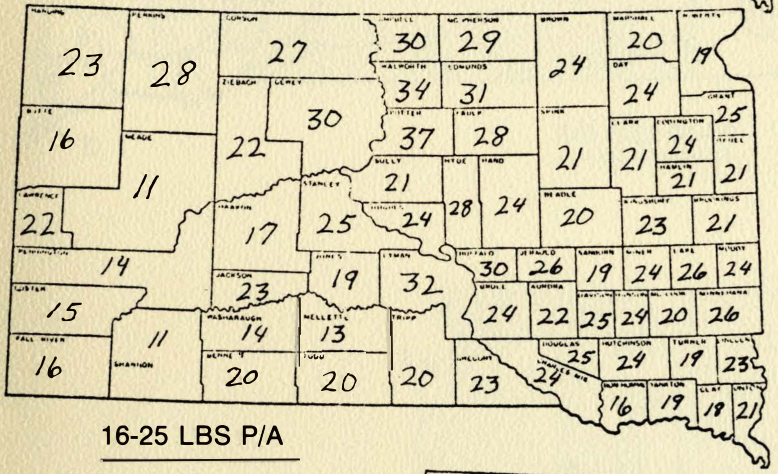
Fig. 4. Percent of Phosphorus Tests in Each Range By County



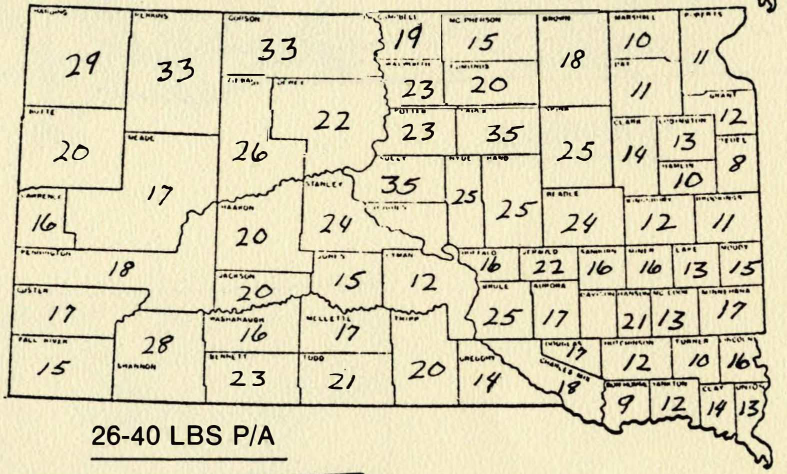
<6 LBS P/A



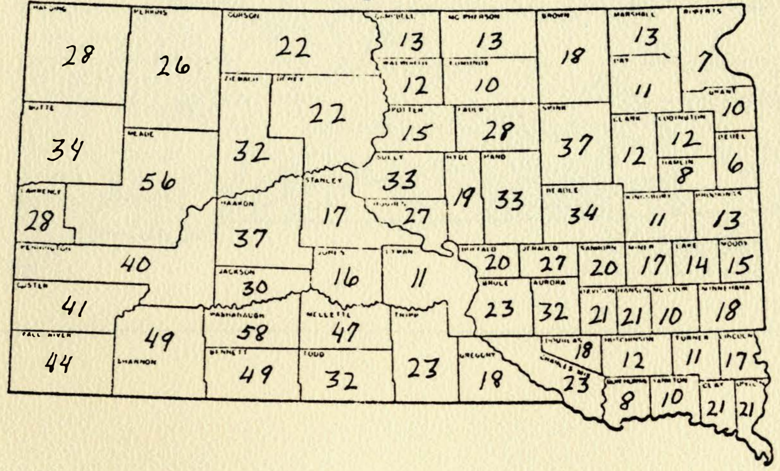
6-15 LBS P/A



16-25 LBS P/A



26-40 LBS P/A



>40 LBS P/A

Fig. 5. Percent of Phosphorus Tests in Each Range By Soil Association

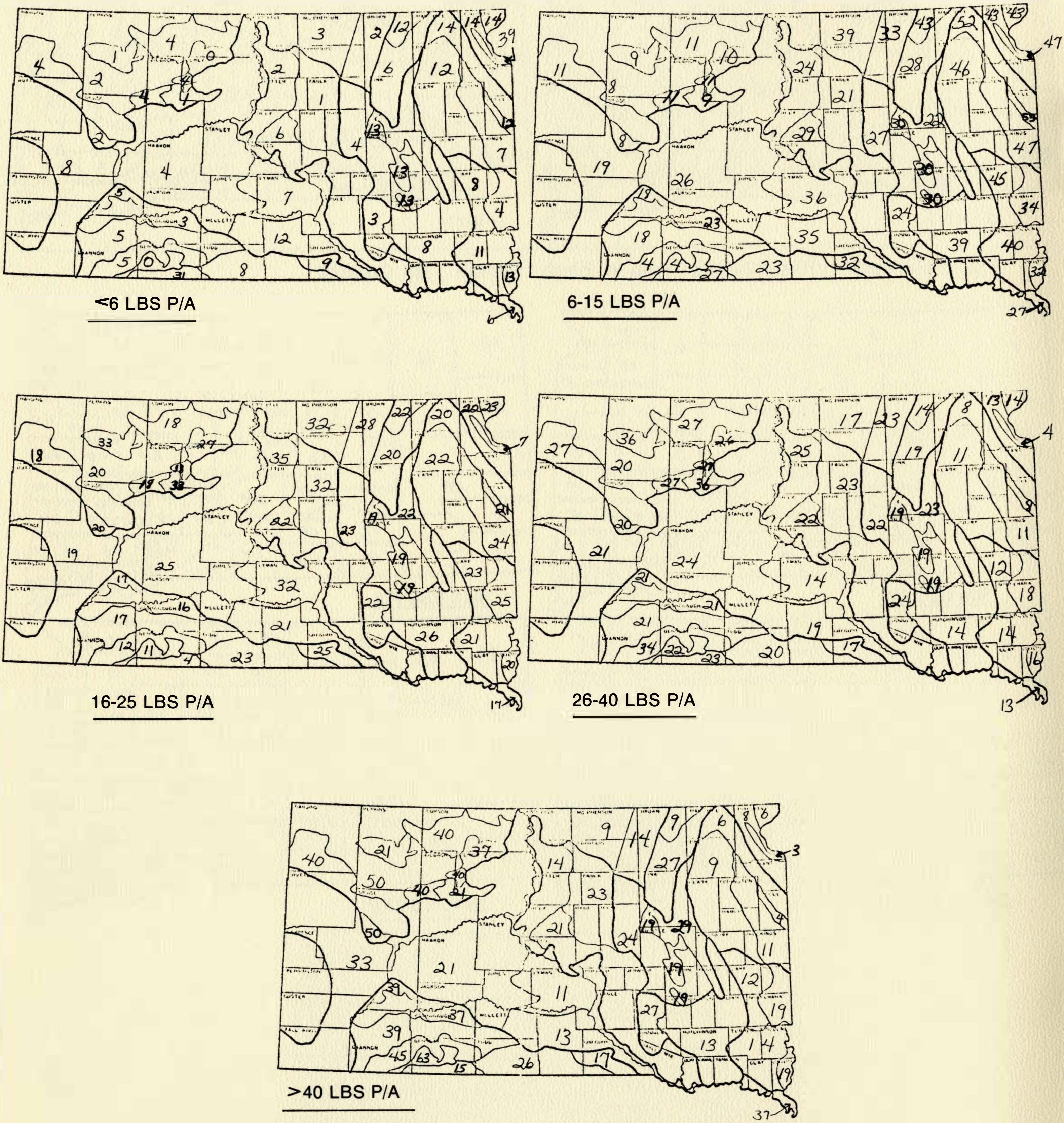
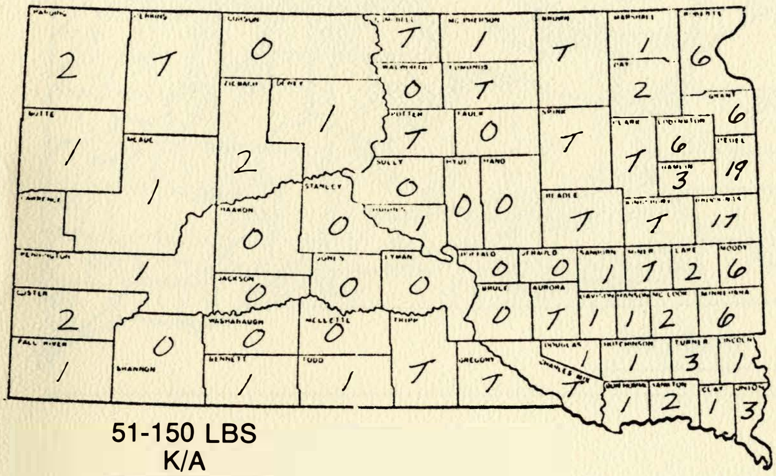
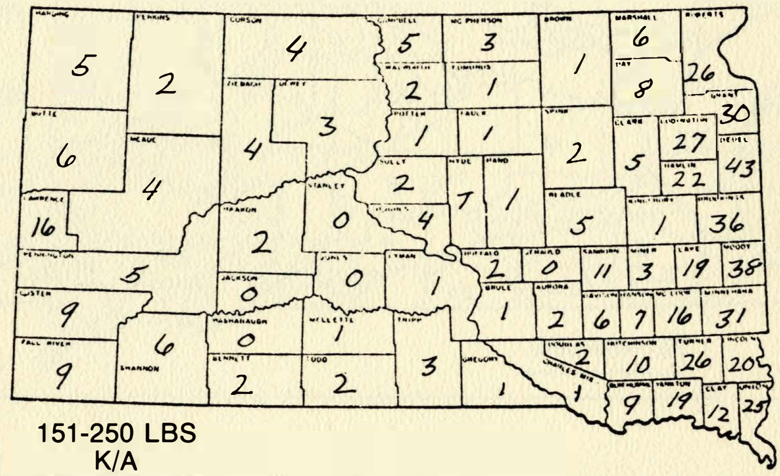


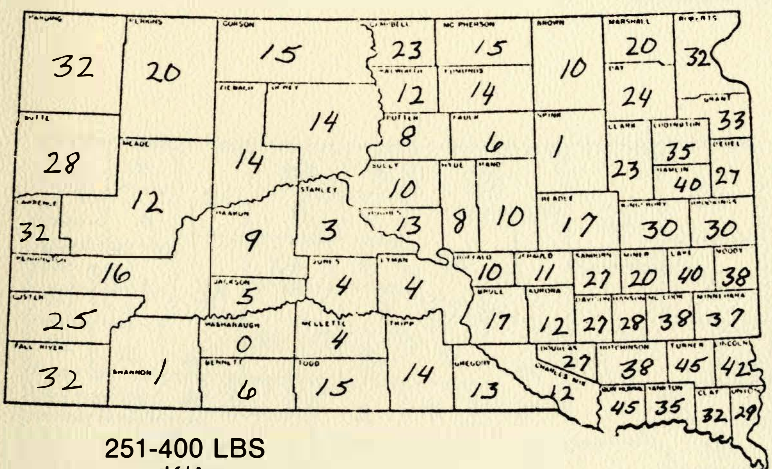
Fig. 6. Percent of Potassium Tests in Each Range By County



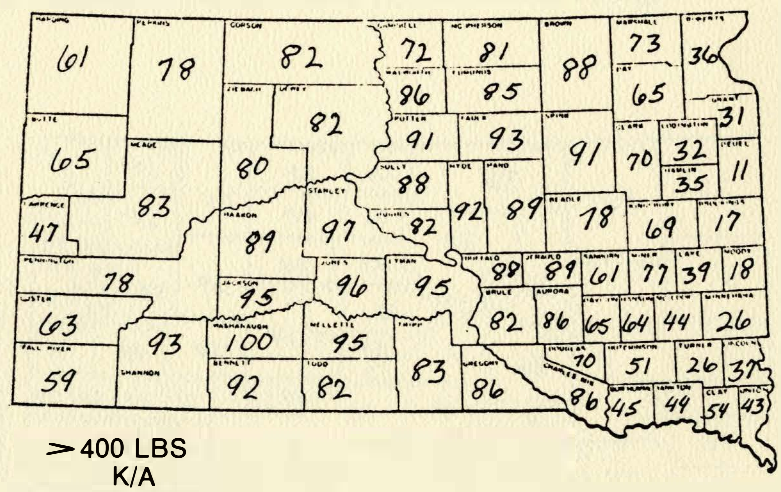
51-150 LBS
K/A



151-250 LBS
K/A

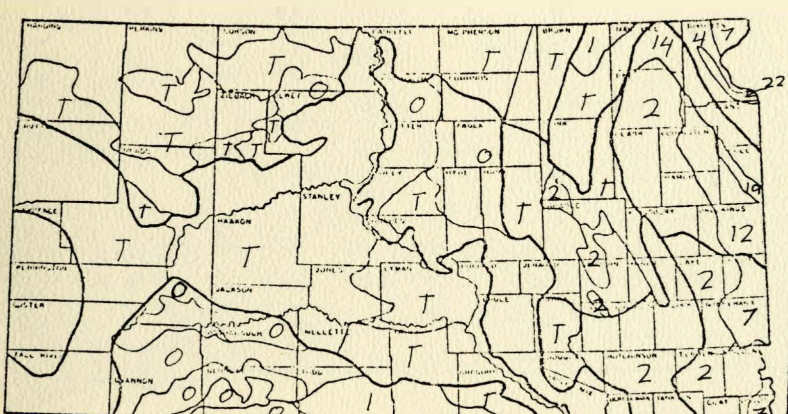


251-400 LBS
K/A

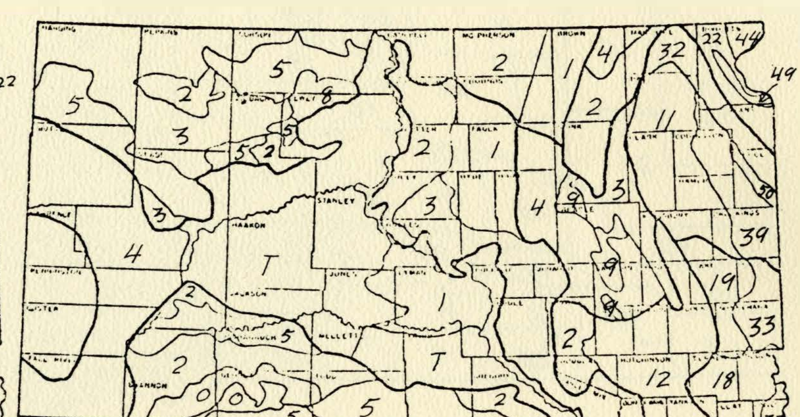


>400 LBS
K/A

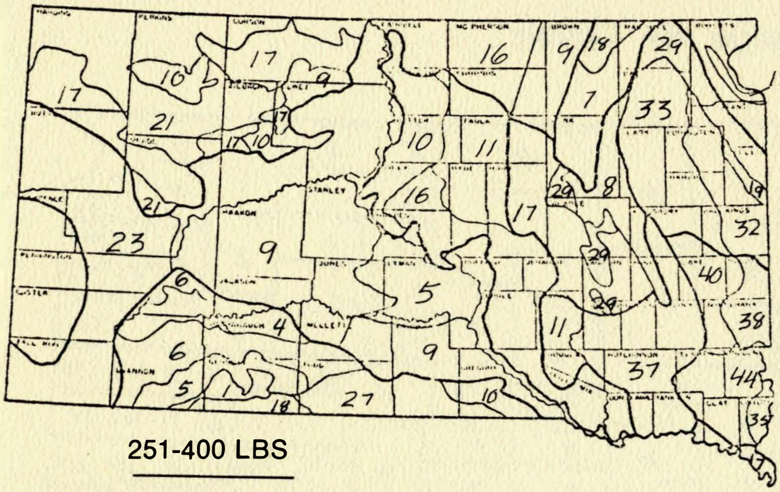
Fig. 7. Percent of Potassium Tests in Each Range By Soil Association



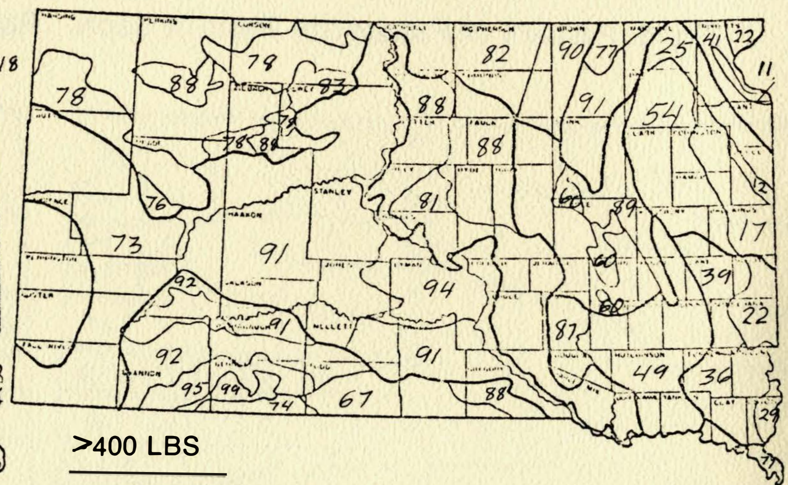
51-150 LBS
K/A



151-250 LBS
K/A

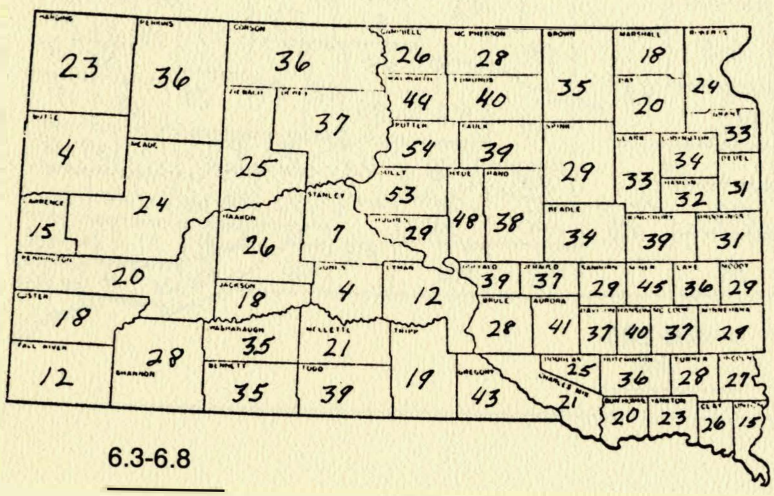


251-400 LBS

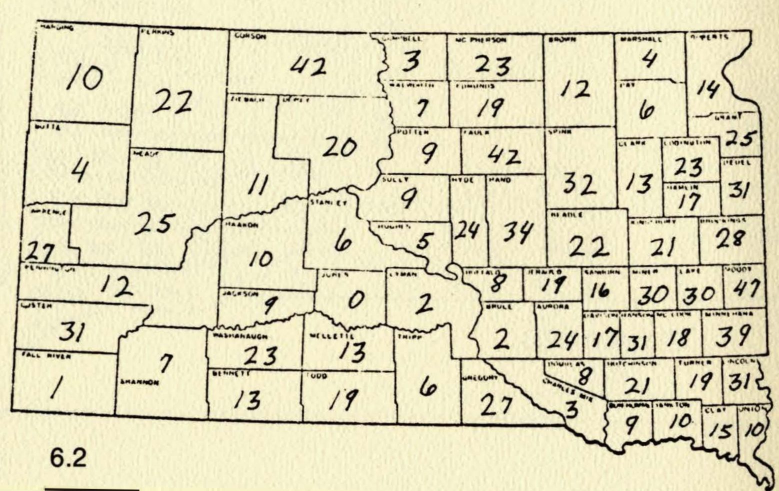


>400 LBS

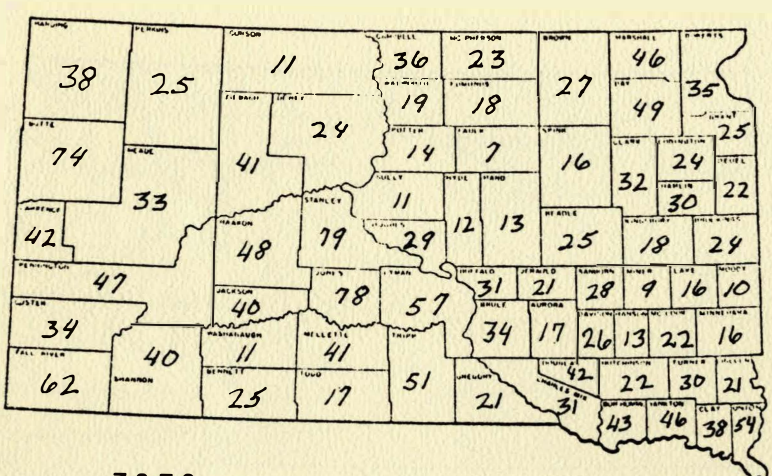
Fig. 8. Percent of PH Tests in Each Range By County



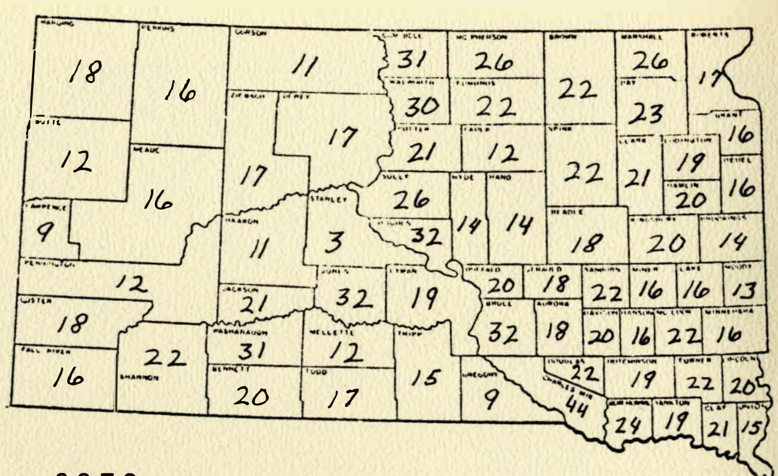
6.3-6.8



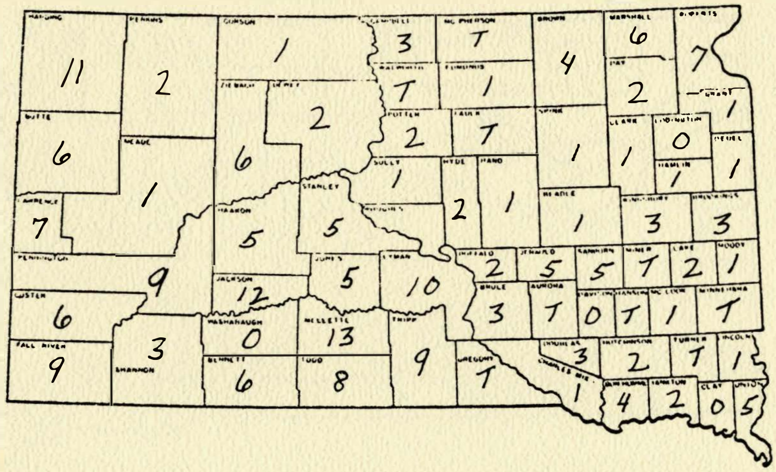
6.2



7.3-7.9

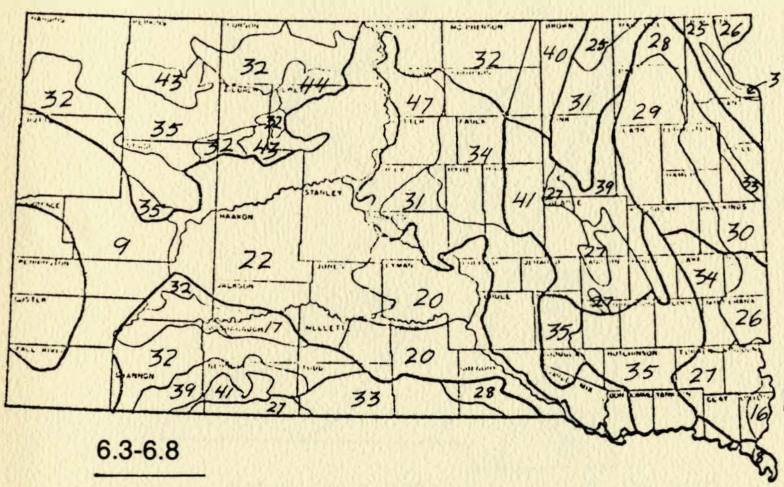


6.9-7.2

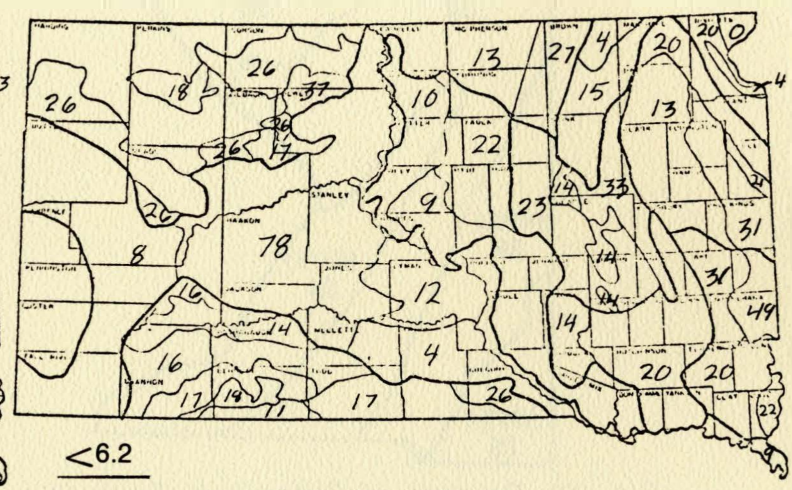


>7.9

Fig. 9. Percent of PH Tests on Each Range By Soil Association



6.3-6.8



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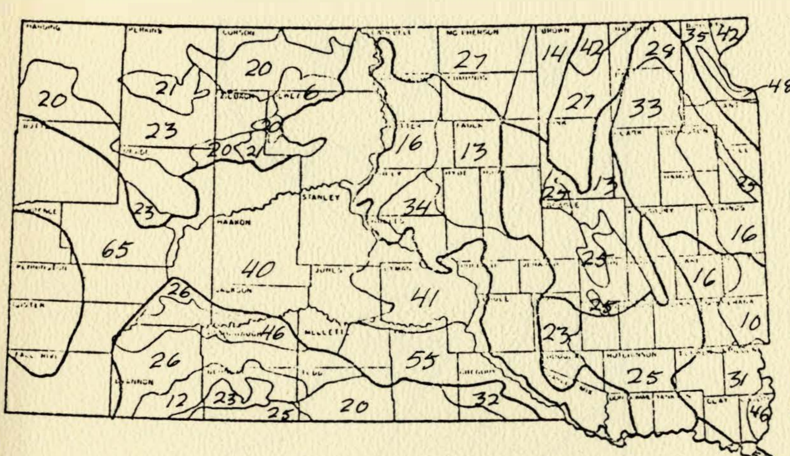
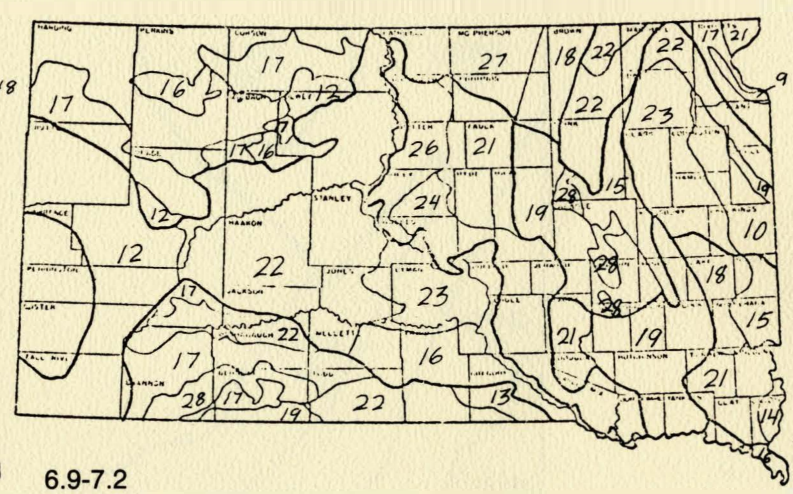


7.3-7.9



6.9-7.2

>7.9

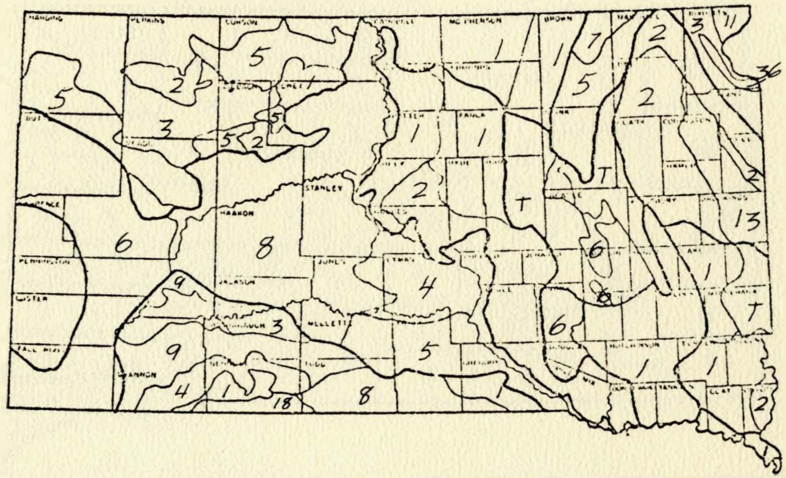


Fig. 10. Percent of Organic Matter Tests below 4.0%
70% — % Soil Tests in range
32 — Soil association number

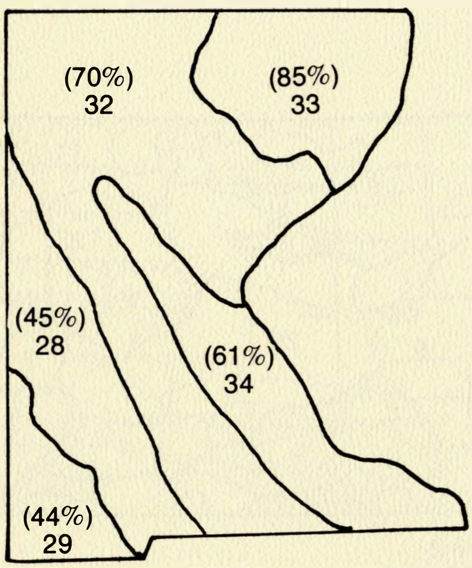


Fig. 11. Percent of Phosphorus Tests Between 0 and 15 lbs. P/A

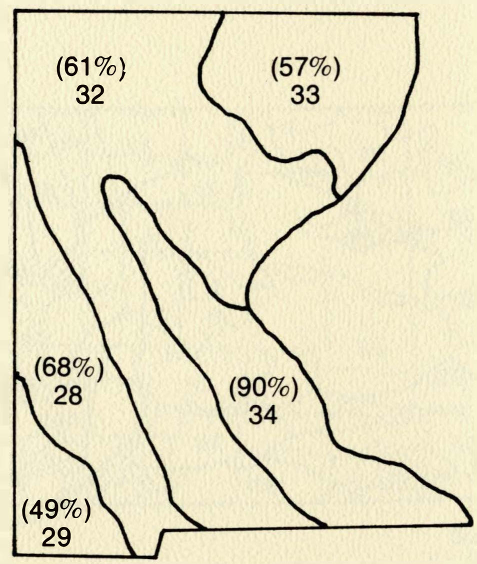


Fig. 12. Percent of Potassium Tests Between 0 and 250 lbs. K/A

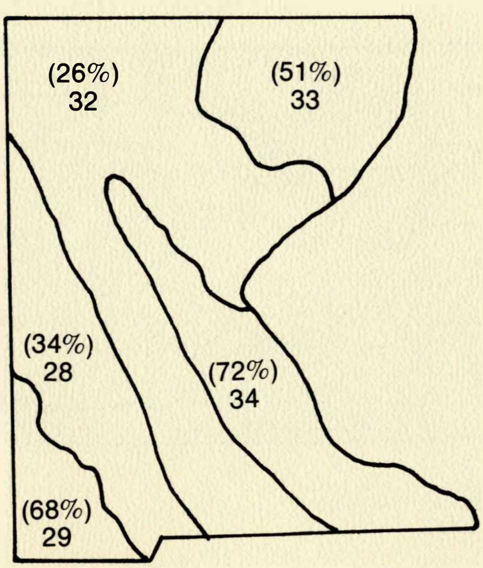


Fig. 13. Percent of PH values 7.3 or above

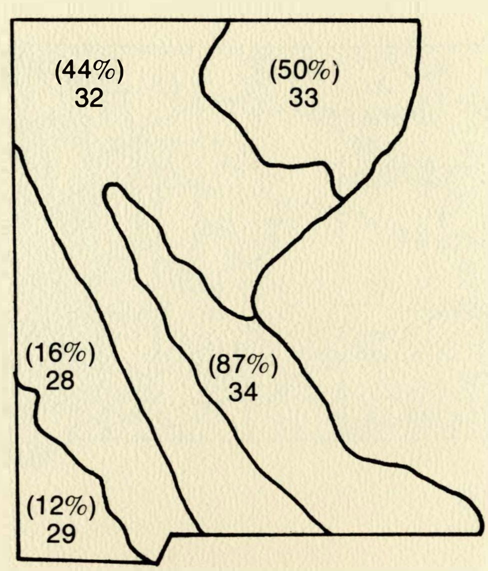


Table 1. The total number of soil samples received from each county

County	Number of samples received: P, K, and pH Tests	Organic Matter Tests
Aurora	854	570
Beadle	1464	566
Bennett	260	195
Bon Homme	2265	1263
Brookings	4852	2241
Brown	4916	2261
Brule	451	264
Buffalo	92	59
Butte	724	220
Campbell	610	406
Charles Mix	2350	1157
Clark	1082	315
Clay	1364	347
Codington	1708	504
Corson	550	506
Custer	160	33
Davison	891	425
Day	2778	1220
Deuel	4246	1241
Dewey	204	149
Douglas	1272	676
Edmunds	1225	934
Fall River	204	84
Faulk	607	386
Grant	1494	534
Gregory	1174	783
Haakon	194	122
Hamlin	2426	941
Hand	529	274
Hanson	995	459
Harding	190	86
Hughes	375	187
Hutchinson	2072	1151
Hyde	268	197
Jackson	379	72
Jerauld	507	352
Jones	86	65
Kingsbury	2906	1208
Lake	1817	902
Lawrence	256	89
Lincoln	2345	805
Lyman	338	123
McCook	1657	694
McPherson	470	348
Marshall	1976	853
Meade	452	201
Mellette	186	125
Miner	1510	818
Minnehaha	3102	1356
Moody	2136	521
Pennington	438	272
Perkins	498	278
Potter	1198	1135
Roberts	2434	905
Sanborn	794	309
Shannon	90	26
Spink	2009	1089
Stanley	104	48
Sully	205	133
Todd	284	142
Tripp	1190	924
Turner	2445	1353
Union	1592	335
Walworth	1011	773
Washabaugh	64	22
Yankton	1674	686
Ziebach	111	84

Table 2. The total number of soil tests represented in each soil association

SOIL ASSOCIATION Number	Name	Number of Tests P, K, and pH Tests	Organic Matter Tests
1	Morton, gently undulating	213	184
2	Morton-Bainville, rolling and undulating	661	421
3	Vebar, gentley undulating	116	67
4	Vebar-Flasher, rolling and undulating	233	43
5	Millboro-Boyd-Samsil, undulating and steep	1065	649
6	Opal-Samsil, undulating and steep	551	323
7	Pierre-Kyle, undulating and steep	1046	378
8	Promise-Opal-Samsil, undulating and steep	324	102
9	Anselmo, undulating and rolling	443	303
10	Badlands, hilly	62	23
11	Kadoka-Epping, rolling	158	96
12	Keith, undulating	81	20
13	Keith-Canyon-Anselmo, rolling	92	41
14	Reliance-Anselmo, undulating	548	221
15	Valentine, hilly	74	29
16	Agar-Eakin, sloping	1432	944
17	Highmore-Raber-Walker, undulating to rolling	2532	1464
18	Glenham-Hoven, rolling to undulating	729	519
19	Williams-Heil, rolling to undulating	1718	1229
20	Williams-Barnes, undulating	1575	711
21	Beotia-Aberdeen, nearly level	3955	1697
22	Hecla-Hamar, gently undulating	1480	592
23	Blendon, undulating	522	238
24	Houdek-Prosper-Tetonka-Cavo, gently undulating	2767	1423
25	Beadle-Forman-Cavour, undulating	1659	515
26	Clarno-Stickney-Dudley, gently undulating	6118	2751
27	Beadle-Dudley-Stickney, nearly level	750	310
28	Forman-Buse-Poinsett, hilly to rolling	2056	908
29	Kranzburg-Vienna, sloping	5570	1616
30	Poinsett-Parnell-Buse-Sinai, undulating	6594	1995
31	Singsaas-Oaklake, undulating	1105	258
32	Forman-Aastad-Cavour, gently undulating	2452	563
33	Great Bend-Glyndon-Hecla, gently undulating	149	55
34	Sisseton, undulating	121	113
35	Egan-Viborg-Badus, nearly level to undulating	4002	1532
36	Moody-Crofton-Alcester, strongly sloping	1181	142
37	Moody-Trent-Crofton, sloping	2712	491
38	Wentworth-Egan-Baltic, undulating	2777	1007
39	Luton-Volin-Onawa, level	998	136

Table 3. Summary of Soil Tests for Soil Associations Within Each County. Soil Samples Received from 1953 through June 1967.

County	Soil Ass'n. Number	Number of Samples (O.M.)	Number of Samples P,K, pH	Organic Matter <2.0	Organic Matter 2.1-3.0	Organic Matter 3.1-4.0	Organic Matter >4.0	Phosphorus 0-5 lbs P/acre	Phosphorus 6-15 lbs P/acre	Phosphorus 16-25 lbs P/acre	Phosphorus 26-40 lbs P/acre	Phosphorus >40 lbs P/acre	Potassium 51-150 lbs K/acre	Potassium 151-250 lbs K/acre	Potassium 251-400 lbs K/acre	Potassium >400 lbs K/acre	pH <5.6	pH 5.6-6.2	pH 6.3-6.8	pH 6.9-7.2	pH 7.3-7.9	pH >8.0
				Percentage of Samples Testing in each Range													Percentage of Samples Testing in Each Range					
Aurora	17	(37)	80	0	38	57	5	0	15	12	19	54	0	0	6	94	0	12	47	26	15	0
	24	(17)	52	29	41	24	6	2	17	19	31	31	0	2	8	90	2	19	43	19	17	0
	26	(111)	111	4	55	37	4	2	10	35	35	18	0	3	17	80	0	19	49	18	14	0
	27	(141)	320	6	64	28	2	2	17	22	30	29	0	1	10	89	3	21	40	21	14	1
Beadle	23	(103)	224	52	32	11	5	10	30	18	17	25	2	6	32	60	0	19	35	27	18	1
	24	(175)	462	18	64	17	1	3	26	22	23	26	0	3	18	79	0	15	38	22	23	2
	25	(116)	350	7	31	54	8	2	14	17	27	40	0	1	7	92	1	34	30	9	26	0
Bennett	11	(2)	2	0	100	0	0	0	0	0	0	0	0	0	0	100	0	0	50	50	0	0
	12	(20)	72	25	45	30	0	0	4	11	22	63	0	0	1	99	3	16	43	17	20	1
	13	(16)	45	50	38	6	6	7	4	16	31	42	0	0	3	97	0	20	30	35	15	0
	15	(29)	52	41	28	21	10	0	0	0	0	0	4	4	18	74	0	4	29	21	25	21
Bon Homme	5	(32)	82	16	66	12	6	16	43	16	17	8	1	1	33	65	0	10	15	27	47	1
	17	(241)	421	19	66	14	1	20	47	14	10	9	0	10	39	51	0	15	12	19	52	2
	26	(317)	852	8	83	8	1	11	29	45	9	6	1	15	53	31	0	11	30	28	30	1
Brookings	29	(939)	3066	2	31	52	15	7	45	24	11	13	15	40	31	14	2	32	32	12	20	4
	30	(510)	528	2	20	55	22	23	32	25	12	8	5	29	39	32	0	17	40	21	20	2
	31	(43)	52	2	9	60	28	26	61	9	2	2	24	39	31	6	0	25	22	17	17	19
Brown	20	(464)	796	5	27	54	14	2	45	30	15	8	T	1	10	89	1	22	41	19	16	1
	21	(537)	1513	2	25	59	14	4	28	21	23	24	T	1	3	96	T	12	36	23	27	2
	22	(486)	1166	27	38	33	2	9	43	22	16	10	0	4	17	79	T	4	28	24	40	4
	25	(8)	65	0	62	38	0	4	37	26	16	17	0	0	2	98	2	12	34	25	27	0
Brule	5	(11)	28	27	64	9	0	7	25	36	14	18	0	3	21	76	0	4	42	25	25	4
	8	(0)	1	0	0	0	0	0	0	100	0	0	0	0	0	100	0	0	0	0	100	0
	17	(171)	274	15	74	10	1	3	36	26	16	19	0	0	20	80	T	3	34	31	31	1
Buffalo	8	(6)	8	17	67	16	0	0	38	25	12	25	0	0	12	88	0	38	38	12	12	0
	17	(34)	60	9	59	26	6	8	28	27	15	22	0	2	5	94	0	6	39	20	32	3
Butte	4	(3)	6	67	33	0	0	0	50	0	33	17	0	14	29	57	0	0	29	0	71	0
	7	(142)	469	58	37	4	1	8	22	18	21	31	0	4	28	68	T	2	4	11	79	4
Campbell	6	(8)	12	25	38	37	0	0	30	50	10	10	0	0	29	71	0	7	21	29	43	0
	16	(156)	247	29	57	12	2	6	29	28	21	16	0	6	33	61	0	2	30	32	33	3
	19	(150)	239	23	64	11	2	5	34	32	18	11	T	3	20	77	0	4	24	26	43	3
Charles Mix	5	(66)	304	18	68	14	0	3	37	20	18	22	0	0	12	88	0	4	28	27	40	1
	17	(561)	987	3	70	26	1	4	29	24	23	20	0	1	10	89	T	4	31	25	38	2
	27	(133)	208	10	50	38	2	1	25	19	25	31	0	2	8	90	0	3	31	24	40	2
Clark	25	(50)	167	0	16	82	2	2	21	34	24	19	2	1	6	91	0	28	49	15	8	0
	26	(8)	8	0	0	75	25	0	12	37	38	13	0	0	0	100	0	33	67	0	0	0
	30	(128)	739	3	26	70	1	13	43	21	13	10	1	5	28	66	T	10	29	23	36	1

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Table 3 continued

County	Soil Ass'n. Number	Number of Samples (O.M.)	Number of Samples P,K, pH	Percentage of Samples Testing in each Range ORGANIC MATTER <2.0	2.1-3.0	3.1-4.0	>4.0	PHOSPHORUS lbs P/acre 0-5	6-15	16-25	26-40	>40	Percentage of Samples Testing in Each Range POTASSIUM lbs K/acre 51-150	151-250	251-400	>400	pH <5.6	5.6-6.2	6.3-6.8	6.9-7.2	7.3-7.9	>8.0
Clay	35	(209)	738	2	40	53	5	10	45	20	13	12	1	15	42	42	1	15	30	22	32	T
	39	(26)	388	15	46	38	1	5	26	16	15	38	1	5	18	76	1	15	23	20	40	1
Codington	28	(41)	61	2	7	37	54	14	44	24	11	7	0	57	36	7	3	24	36	20	16	1
	29	(123)	815	1	8	43	48	5	44	28	15	8	7	37	36	20	1	32	39	12	15	2
	30	(111)	414	0	9	56	34	11	48	21	12	8	T	5	33	62	0	3	18	32	45	2
	31	--------	59	0	0	0	0	8	54	31	0	8	17	24	31	27	0	50	29	7	7	7
Corson	2	(199)	233	28	55	15	2	T	14	39	30	17	0	2	20	78	3	36	44	9	10	0
	3	(56)	62	39	50	11	0	0	18	42	24	16	0	9	10	81	3	39	39	11	6	1
	4	(6)	30	83	17	0	0	15	12	30	15	28	0	0	11	89	0	46	26	8	16	3
	6	(8)	47	12	38	50	0	12	50	25	12	1	0	9	8	83	0	0	11	44	33	11
Custer	7	(10)	76	50	20	20	10	6	22	20	19	33	4	4	22	70	0	0	0	0	0	0
Davison	23	(8)	8	22	11	56	11	0	12	12	25	51	0	0	22	78	18	0	0	54	27	0
	24	(21)	107	5	43	48	5	4	28	27	17	24	0	5	21	74	0	23	36	17	23	1
	26	(225)	543	14	64	20	2	8	34	26	17	15	1	6	23	70	T	21	38	17	23	1
Day	21	(256)	450	3	27	60	10	4	36	32	13	15	0	2	6	92	T	14	44	24	18	T
	25	(13)	32	0	15	62	23	9	28	16	28	19	0	0	25	75	0	9	25	34	31	0
	28	(39)	210	3	13	51	33	20	41	17	12	10	6	12	23	59	0	6	22	23	48	1
	29	(1)	4	0	100	0	0	0	75	0	0	25	25	50	0	25	0	25	50	0	25	0
	30	(300)	1733	2	13	35	50	19	42	21	11	7	2	10	28	60	T	4	14	24	55	2
Deuel	28	(376)	874	4	16	51	28	14	55	21	6	4	22	43	26	9	1	26	31	18	21	3
	29	(233)	797	1	9	57	33	7	58	21	8	6	12	38	33	17	4	37	35	9	14	1
	31	(215)	1042	1	12	52	35	12	55	21	9	3	19	51	18	12	2	22	29	18	28	1
	32	(1)	259	0	0	100	0	8	48	24	12	8	2	28	41	29	2	36	28	15	18	1
Dewey	1	(36)	48	22	61	17	0	0	6	40	33	21	0	2	4	94	2	31	46	17	4	0
	2	(0)	1	0	0	0	0	0	0	0	0	100	0	0	0	100	0	0	0	100	0	0
	3	(11)	22	73	27	0	0	0	0	16	42	42	0	4	8	88	0	18	59	15	7	1
	4	(0)	4	0	0	0	0	0	20	0	40	40	0	0	20	80	0	40	40	0	20	0
	6	(20)	29	10	50	40	0	3	6	48	19	24	0	0	0	100	0	18	52	15	11	4
Douglas	17	(36)	70	0	44	53	3	3	26	20	24	27	0	0	8	92	3	12	24	26	35	0
	26	(255)	265	6	80	14	0	2	40	27	16	15	0	2	30	68	0	9	28	23	38	2
	27	(36)	222	11	64	19	6	5	33	25	18	19	1	2	15	82	T	16	36	22	26	0
Edmunds	18	(5)	11	0	40	60	0	9	18	45	18	10	0	9	18	73	0	11	44	0	44	1
	19	(604)	847	4	52	39	5	3	38	37	17	11	0	1	14	85	T	16	32	28	22	2
	20	(156)	272	3	46	46	5	2	21	26	34	17	0	0	7	93	0	39	40	14	5	2
Fall River	7	(20)	74	90	5	5	0	8	10	20	24	38	0	11	24	65	0	0	0	25	50	25
Faulk	18	(162)	190	3	50	43	4	1	14	32	32	21	0	T	6	94	2	29	47	16	6	0
	20	(17)	17	12	47	41	0	0	0	0	0	0	0	6	6	88	0	29	35	18	18	0
	24	(148)	263	7	57	32	4	1	6	27	34	32	0	T	5	95	2	50	36	9	3	0

County	Soil Ass'n. Number	Number of Samples (O.M.)	Number of Samples P,K, pH	Percentage of Samples Testing in each Range ORGANIC MATTER <2.0	2.1-3.0	3.1-4.0	>4.0	PHOSPHORUS lbs P/acre 0-5	6-15	16-25	26-40	>40	Percentage of Samples Testing in Each Range POTASSIUM lbs K/acre 51-150	151-250	251-400	>400	pH <5.6	5.6-6.2	6.3-6.8	6.9-7.2	7.3-7.9	>8.0
Grant	28	(287)	430	2	29	44	24	10	50	23	11	6	6	36	40	18	1	19	35	19	26	0
	29	(39)	184	0	38	36	26	3	43	25	16	13	5	34	37	24	2	37	35	12	12	2
	32	(41)	634	2	29	61	8	8	39	26	16	11	4	23	32	41	1	25	31	14	28	1
	34	(2)	10	0	0	100	0	20	30	20	30	0	20	30	40	10	0	40	20	0	30	10
Gregory	5	(85)	168	26	47	26	1	20	36	22	14	8	0	1	6	93	0	10	24	10	56	0
	9	(2)	28	100	0	0	0	0	29	24	17	30	0	7	33	60	0	30	24	24	21	1
	14	(164)	343	21	62	16	1	3	34	31	18	14	0	1	9	90	1	36	35	9	19	0
Haakon	6	(59)	88	54	37	9	0	1	23	19	20	37	0	2	12	86	0	0	0	0	100	0
Hamlin	29	(160)	318	2	11	52	35	8	46	24	12	1	8	42	34	16	1	26	29	12	29	3
	30	(341)	1503	0	9	62	29	11	51	20	11	7	1	15	39	45	1	15	31	22	31	0
Hand	17	(19)	40	0	53	47	0	3	25	25	25	22	0	0	7	93	2	54	28	12	4	0
	18	(42)	84	10	43	36	11	1	16	27	21	35	0	1	14	85	2	35	38	15	8	2
	24	(76)	248	9	58	34	0	2	10	20	27	41	0	2	12	86	T	29	37	16	17	1
Hanson	24	(15)	50	13	60	27	0	4	18	12	30	36	0	6	12	82	0	40	40	8	10	2
	26	(119)	496	13	66	19	2	3	25	23	24	25	T	5	24	71	1	36	37	14	12	0
Harding	2	(31)	90	36	55	9	0	7	20	32	25	16	1	2	30	67	2	8	15	18	48	9
	4	(10)	45	50	30	20	0	4	10	14	37	35	2	6	35	57	0	12	34	17	27	10
	7	(5)	12	40	60	0	0	9	9	36	36	10	0	0	25	75	0	0	17	25	58	0
Hughes	6	(5)	10	20	80	0	0	10	10	30	30	20	0	0	20	80	0	10	30	0	50	10
	8	(3)	7	0	33	67	0	14	14	43	0	29	14	0	28	58	0	14	0	29	43	14
	16	(9)	34	0	67	33	0	0	15	21	21	35	0	0	3	97	0	9	44	35	9	3
	16	(9)	34	0	67	33	0	0	15	21	29	23	0	2	11	87	0	6	32	40	20	2
Hutchinson	17	(21)	47	5	57	29	9	11	53	15	15	6	0	8	43	49	0	6	19	21	51	3
	26	(771)	1507	14	71	13	2	6	43	26	13	12	2	10	37	51	1	22	41	14	21	1
	35	(19)	19	10	58	32	0	47	32	5	10	6	5	37	42	16	0	10	16	26	47	1
Hyde	8	(21)	26	0	33	52	15	4	12	50	23	11	0	0	0	100	0	13	35	35	13	4
	17	(48)	58	0	31	62	7	0	11	17	43	29	0	0	1	99	0	28	61	7	4	0
	18	(112)	156	3	63	31	3	6	34	26	20	14	0	1	13	86	0	25	49	13	13	0
Jackson	6	(18)	40	56	44	0	0	0	18	20	35	27	0	0	3	97	5	18	24	21	29	3
	10	(4)	10	100	0	0	0	0	30	20	30	20	0	0	0	100	0	24	21	18	30	7
	11		9					12	44	22	22	0	0	0	0	100	0	0	11	11	44	34
Jerauld	17	(145)	214	6	52	38	4	2	14	34	24	26	0	0	6	94	1	19	44	19	16	1
	24	(10)	206	17	60	22	1	3	25	24	21	27	0	2	16	82	0	21	34	23	21	1
Jones	6	(25)	30	20	76	4	0	26	45	13	10	6	0	0	10	90	0	0	0	17	83	0
	8	(8)	17	0	62	37	0	0	41	24	24	12	0	0	0	100	0	0	0	12	88	0
Kingsbury	25	(50)	273	0	26	70	4	1	30	22	22	24	1	4	12	83	0	32	42	15	11	0
	26	(53)	52	0	34	58	8	9	50	33	4	4	0	54	38	58	0	12	38	24	23	3
	30	(444)	1816	1	24	58	17	5	48	25	12	9	T	8	34	58	0	21	43	23	12	1

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Table 3 continued

County	Soil Ass'n. Number	Number of Samples (O.M.)	Number of Samples P,K, pH	ORGANIC MATTER <2.0	ORGANIC MATTER 2.1-3.0	ORGANIC MATTER 3.1-4.0	ORGANIC MATTER >4.0	PHOSPHORUS (lbs P/acre) 0-5	PHOSPHORUS 6-15	PHOSPHORUS 16-25	PHOSPHORUS 26-40	PHOSPHORUS >40	POTASSIUM (lbs K/acre) 51-150	POTASSIUM 151-250	POTASSIUM 251-400	POTASSIUM >400	pH <5.6	pH 5.6-6.2	pH 6.3-6.8	pH 6.9-7.2	pH 7.3-7.9	pH >8.0
				Percentage of Samples Testing in each Range													Percentage of Samples Testing in Each Range					
Lake	26	(56)	144	0	27	64	9	10	39	28	12	12	1	24	34	41	1	14	37	21	27	0
	37		7					14	57	14	14	0	0	14	72	14	0	14	14	71	0	1
	38	(579)	1512	2	16	58	24	7	49	21	11	12	2	16	40	42	1	32	36	16	14	1
Lawrence	7	(37)	126	27	57	14	2	14	21	26	18	21	1	14	38	47	0	0	100	0	0	0
Lincoln	35	(362)	1389	2	25	62	11	7	32	26	18	17	1	15	40	44	1	28	28	21	21	1
	36	(51)	370	24	47	29	0	5	32	22	18	22	3	28	36	33	4	38	22	14	21	1
Lyman	8	(64)	265	8	48	39	5	8	39	28	13	11	0	1	5	94	0	0	0	0	0	0
McCook	25	(15)	63	0	47	27	27	5	24	24	25	22	0	8	11	81	4	42	35	10	8	1
	26	(305)	786	3	57	37	3	9	44	21	15	11	2	14	37	47	T	15	39	22	22	2
	38	(36)	146	6	42	44	8	13	47	16	16	8	1	29	29	41	0	16	26	27	30	1
McPherson	19	(252)	304	4	45	44	7	5	41	32	14	8	0	5	16	79	1	18	30	21	28	2
	20	(4)	57	0	25	50	25	0	19	25	21	35	0	0	9	91	10	58	19	3	10	0
Marshall	21	(446)	1038	7	26	47	20	14	40	19	12	15	T	3	17	80	T	4	19	27	43	7
	22	(86)	303	10	24	52	13	27	41	20	7	5	1	4	22	73	T	2	13	18	52	15
	28	(107)	292	3	12	22	63	19	55	15	5	6	4	13	31	52	T	7	16	26	50	1
	30	(62)	62	2	5	18	75	27	52	14	5	2	11	23	29	37	0	2	13	34	51	0
	32	(44)	76	4	2	39	55	13	58	16	9	4	1	10	24	65	0	1	22	31	45	1
Meade	2	(72)	103	51	33	14	2	8	5	11	22	54	1	6	13	80	0	17	30	16	31	6
	4	(1)	28	100	0	0	0	0	0	4	7	89	0	0	4	96	0	18	46	21	7	8
	7	(56)	178	61	21	12	6	3	11	15	21	50	1	3	9	87	4	20	18	16	40	2
Mellette	5	(6)	27	17	83	0	0	0	27	8	4	61	0	7	0	93	0	15	31	8	38	8
	6	(47)	66	62	38	0	0	6	18	25	21	30	0	0	8	92	2	12	10	6	53	17
	10	(10)	15	20	60	20	0	7	7	0	13	73	0	0	7	93	0	7	20	20	53	0
	11	(34)	44	56	35	3	6	4	27	4	16	49	0	0	5	95	0	18	30	10	22	20
Miner	24	(668)	695	1	58	36	5	4	42	28	14	12	T	4	21	75	1	15	54	20	9	1
	25	(56)	420	0	52	43	5	2	28	25	20	25	0	2	14	84	T	38	41	13	7	1
	26	(32)	164	3	53	34	10	5	48	16	14	17	1	3	26	70	0	48	31	14	7	0
Minnehaha	37	(314)	1626	11	48	30	10	4	32	26	18	20	5	30	39	26	4	44	26	13	13	T
	38	(335)	765	2	25	51	22	10	36	26	14	14	2	19	42	37	1	25	31	22	21	T
Moody	29	(32)	34	3	19	62	16	15	26	35	3	21	15	49	27	9	0	33	42	15	9	1
	37	(177)	1158	7	26	58	9	4	38	24	17	17	8	36	38	18	4	46	26	17	7	0
	38	(57)	354	4	18	61	17	7	44	27	12	10	4	29	41	26	1	30	32	20	16	1
Pennington	7	(74)	112	34	49	15	2	4	21	21	27	26	0	1	7	92	0	12	18	8	55	7
	10	(7)	8	43	43	0	14	0	25	38	12	25	0	0	13	87	12	12	12	0	62	2
	11	(44)	53	34	43	14	9	9	9	25	25	32	0	4	12	84	0	4	38	17	40	1
Perkins	1	(120)	137	27	62	7	4	1	9	34	38	18	1	1	10	88	0	14	42	15	26	3
	2	(102)	220	52	44	4	0	1	11	29	34	25	T	1	24	75	1	27	38	11	22	1
	4	(8)	44	50	50	0	0	0	14	23	35	28	0	0	18	82	0	16	37	28	19	0
Potter	6	(35)	84	9	60	31	0	1	26	34	26	13	1	0	12	87	0	0	38	25	36	1
	16	(469)	665	4	66	28	2	1	22	39	26	12	0	0	3	97	1	13	55	21	10	T
	18	(180)	221	9	65	24	2	2	21	34	20	23	0	1	14	85	1	8	39	33	17	2

County	Soil Ass'n. Number	Number of Samples (O.M.)	Number of Samples P,K, pH	Percentage of Samples Testing in each Range: ORGANIC MATTER <2.0	2.1-3.0	3.1-4.0	>4.0	PHOSPHORUS 0-5	6-15	16-25	26-40	>40	Percentage of Samples Testing in Each Range: POTASSIUM 51-150	151-250	251-400	>400	pH <5.6	5.6-6.2	6.3-6.8	6.9-7.2	7.3-7.9	>8.0
								lbs P/acre					lbs K/acre									
Roberts	28	(58)	176	0	7	38	55	12	56	20	7	1	7	27	29	37	1	18	27	38	16	0
	29	(9)	31	0	0	44	56	8	41	33	15	3	12	54	25	9	0	21	29	38	8	4
	32	(477)	1504	1	12	57	30	17	44	20	12	8	5	21	33	41	1	15	22	18	40	4
	33	(55)	156	16	29	40	15	14	43	23	14	7	7	44	27	22	0	7	24	19	39	11
	34	(111)	111	4	18	39	39	41	49	6	2	3	22	50	16	12	0	1	2	10	50	37
Sanborn	23	(60)	130	50	35	13	2	24	28	15	17	16	4	19	24	53	0	10	21	28	38	3
	24	(97)	460	30	50	20	0	9	32	14	20	25	1	7	20	72	1	20	33	19	25	2
Shannon	10		22	0	0	0	0	4	22	17	26	31	0	14	0	86	0	0	9	32	59	0
	11		6	0	0	0	0	0	20	20	40	20	0	14	0	86	0	0	0	29	57	14
	13	(16)	37	62	38	0	0	0	5	8	35	52	0	0	3	97	0	11	44	25	14	6
	15		3	0	0	0	0	0	0	0	33	67	0	0	0	100	0	50	50	0	0	0
	12		3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0
Spink	20	(70)	78	4	61	31	4	1	13	29	34	23	0	0	9	91	1	17	33	24	20	5
	21	(458)	954	1	27	63	9	1	12	16	23	48	0	1	4	95	1	34	40	16	8	1
	23	(66)	140	33	45	18	4	3	34	24	23	16	1	6	29	64	0	10	23	32	30	5
	24	(97)	176	18	57	22	3	2	23	29	27	19	0	4	19	77	0	11	41	23	25	0
	25	(207)	372	4	36	53	7	2	13	20	26	39	0	2	2	96	1	32	39	20	8	0
Stanley	6	(30)	76	43	30	23	4	1	44	13	27	15	0	0	4	96	0	0	0	0	0	0
Sully	6	(5)	12	0	60	40	0	18	18	24	29	11	0	0	0	100	0	0	50	33	17	0
	16	(0)	30	0	0	0	0	0	7	17	45	31	0	0	10	90	0	24	59	10	7	0
	17	(87)	125	12	61	26	1	2	12	22	33	31	0	2	9	89	0	8	56	26	9	1
	18	(21)	46	0	57	43	0	5	7	37	27	24	0	0	6	94	0	7	43	34	14	2
Todd	5	(8)	10	62	38	0	0	10	20	10	0	60	0	0	0	100	0	0	50	10	40	0
	9	(64)	86	45	36	12	5	11	24	12	15	38	0	1	18	81	0	32	28	22	11	7
	11	(9)	23	0	100	0	0	0	13	22	26	39	0	0	4	96	4	44	30	9	4	9
	13	(9)	14	78	22	0	0	15	0	8	38	39	0	0	14	86	0	15	50	8	0	27
	15	(0)	18	0	0	0	0	35	30	4	22	9	0	4	22	74	0	26	22	17	26	9
Tripp	5	(441)	4411	21	61	17	1	15	33	23	23	6	0	T	3	97	0	2	11	9	69	9
	9	(237)	314	85	11	4	0	6	24	22	24	24	1	3	28	68	T	12	36	22	23	7
	14	(57)	186	70	21	9	0	17	29	16	16	22	1	3	13	83	0	5	14	20	57	4
Turner	26	(182)	428	4	60	35	1	13	55	18	7	7	1	24	44	31	1	17	32	26	24	0
	35	(783)	1347	2	49	43	6	12	46	19	12	11	3	25	48	24	T	18	26	22	32	2
Union	35	(69)	262	20	42	33	5	20	30	20	14	16	2	24	40	34	1	9	19	16	52	3
	36	(91)	765	41	55	4	0	17	32	18	15	18	3	36	34	27	1	12	13	14	57	3
	39	(42)	320	21	45	26	8	8	23	16	12	41	1	3	10	86	0	8	19	14	52	7
Walworth	6	(48)	56	15	71	12	2	2	24	32	24	18	0	0	7	93	0	4	15	54	27	0
	16	(310)	456	3	73	23	1	1	25	35	25	14	0	1	8	91	0	9	47	31	13	0
	19	(223)	327	4	68	26	2	1	41	34	17	7	0	3	17	80	T	8	40	29	22	1
Washabaugh	10	(2)	6	0	100	0	0	0	50	17	17	16	0	0	0	100	0	20	20	20	40	0
	11	(7)	18	57	43	0	0	0	17	17	8	58	0	0	0	100	0	22	39	30	9	1

continued on next page

Table 3 continued

County	Soil Ass'n. Number	Number of Samples (O.M.)	Number of Samples P,K, pH	Percentage of Samples Testing in each Range: ORGANIC MATTER <2.0	2.1-3.0	3.1-4.0	>4.0	PHOSPHORUS (lbs P/acre) 0-5	6-15	16-25	26-40	>40	Percentage of Samples Testing in Each Range: POTASSIUM (lbs K/acre) 51-150	151-250	251-400	>400	pH <5.6	5.6-6.2	6.3-6.8	6.9-7.2	7.3-7.9	>8.0
Yankton	26	(317)	812	10	62	26	2	12	43	18	12	15	2	20	41	37	T	13	31	20	34	2
	35	(90)	188	2	59	36	3	22	52	11	10	5	5	40	36	19	0	2	15	20	63	0
	39	(68)	240	26	54	19	1	6	32	18	12	32	1	7	27	65	T	4	12	14	68	2
Ziebach	1	(28)	28	64	32	14	0	0	14	18	29	39	0	0	22	78	3	3	40	20	23	11
	2	(17)	26	47	53	0	0	0	7	15	22	48	0	4	8	88	0	17	26	17	39	1
	4	(15)	20	40	60	0	0	5	5	30	30	30	0	5	20	75	0	6	18	53	18	5
	6	(15)	26	33	53	13	1	0	46	31	23	0	0	0	4	96	8	0	0	0	48	44

(O.M.) means the number of samples summarized for organic matter.
P, K, pH means the number of samples summarized for these three tests, which were run for a greater number of years.
T=Trace

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