

# **Soil-Test Results Summaries 2006-2010**

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This report summarizes selected soil-test results for soil samples submitted by Iowa farmers to the Iowa State University Soil Testing and Plant Analysis Laboratory from January 2006 until December 2010. The summary does not include soil samples submitted from research or demonstration field trials, lawns, golf courses, horticultural fields, vineyards, or greenhouse media. The summary encompasses five years because according to the number of samples submitted from the different Iowa counties this is the minimum period for which interpretations are reasonable. Few samples were submitted from some counties, however. Therefore, caution is advised when interpreting the distribution of soil-test values among the different interpretation categories for some counties.

The soil-test results are summarized for phosphorus (P) by the Bray-1 method, potassium (K) by the ammonium-acetate method on dried samples, zinc (Zn) by the DTPA method, and pH using a 1:1 soil:water ratio. The analysis procedures used were those described in the North-Central Extension and Research Activities Committee (NCERA-13) "Recommended Chemical Soil Test Procedures for the North Central Region" (<http://extension.missouri.edu/explorepdf/specialb/sb1001.pdf>). The Bray-1 P values for calcareous soil samples (pH > 7.3) were adjusted according to Olsen P method values assuming that for acidic to neutral soils the Olsen P values on average are 60% of the Bray-1 P values. The Bray-1 P values for calcareous soils were not summarized when Olsen results were not available since this method is not recommended for calcareous soils.

The soil-test interpretation categories shown for P, K and Zn are those that were current in 2011 and were described in Iowa State University Extension and Outreach Publication PM 1688 "General Guide for Crop Nutrient and Limestone Recommendations in Iowa". The categories used to summarize soil pH results were chosen based on practical considerations and optimum pH suggested for different crops and soil association areas in Iowa in publication PM 1688.

Table 1 summarizes statewide results across all samples submitted to the laboratory. Tables 2 through 5 summarize results by county. All tables show the number of samples and the percent of soil samples testing within different interpretation categories.

**Table 1. Statewide soil-test P, K, Zn, and pH summaries for the five-year period 2006 to 2010.**

<b>Soil Test</b>	<b>Category (ppm)</b>	<b>Samples</b>	<b>%</b>
P †	Very Low (0-8)	1520	11.9
	Low (9-15)	2269	17.8
	Optimum (16-20)	1494	11.7
	High (21-30)	2418	18.9
	Very High (31+)	5071	39.7
	All P samples	12772	
K	Very Low (0-90)	593	4.6
	Low (91-130)	2045	16.0
	Optimum (131-170)	3279	25.7
	High (171-200)	2388	18.7
	Very High (201+)	4461	34.9
	All K samples	12766	
Zn	Low (0-0.4)	81	5.7
	Marginal (0.5-0.8)	215	15.3
	Adequate (0.9+)	1113	79.0
	All Zn samples	1409	
pH	< 5.0	54	0.4
	5.0 - 5.9	2154	16.8
	6.0 - 6.4	4024	31.3
	6.5 - 6.9	3702	28.8
	7.0+	2917	22.7
	All pH samples	12851	

† P, Bray-1; K, ammonium acetate; Zn, DTPA.

**Table 2. Soil-test P (Bray-1) summary by county for the period 2006 to 2010.**

County	Very Low		Low		Optimum		High		Very High	
	Samples	%	Samples	%	Samples	%	Samples	%	Samples	%
Adair	18	24	23	30	13	17	12	16	10	13
Adams	12	20	28	46	5	8	6	10	10	16
Allamakee	16	11	25	18	11	8	32	23	56	40
Appanoose	141	42	86	26	29	9	22	7	59	18
Audubon	0	0	2	11	3	17	7	39	6	33
Benton	20	4	93	19	66	13	121	24	200	40
Black Hawk	4	13	6	20	4	13	6	20	10	33
Boone	25	11	54	24	22	10	38	17	90	39
Bremer	7	10	13	19	8	12	12	18	28	41
Buchanan	12	15	23	28	11	14	18	22	17	21
Buena Vista	6	4	16	11	18	12	36	24	72	49
Butler	1	3	3	8	3	8	9	25	20	56
Calhoun	0	0	2	6	2	6	11	31	20	57
Carroll	39	6	69	11	73	11	106	16	363	56
Cass	5	19	6	23	2	8	1	4	12	46
Cedar	14	2	131	23	98	17	135	23	204	35
Cerro Gordo	0	0	4	10	8	20	12	30	16	40
Cherokee	17	5	74	21	50	14	73	21	133	38
Chickasaw	4	3	15	12	17	13	30	23	62	48
Clarke	64	50	22	17	9	7	9	7	25	19
Clay	57	6	144	15	119	12	214	22	423	44
Clayton	2	2	25	29	12	14	8	9	40	46
Clinton	0	0	1	3	3	8	11	29	23	61
Crawford	1	1	32	22	32	22	38	26	43	29
Dallas	12	10	24	20	17	14	17	14	53	43
Davis	63	42	35	23	10	7	8	5	33	22
Decatur	66	57	19	17	4	3	9	8	17	15
Delaware	10	9	19	17	14	12	25	22	45	40
Des Moines	11	29	5	13	2	5	6	16	14	37
Dickinson	17	7	26	10	17	7	38	15	153	61
Dubuque	9	16	11	19	6	10	8	14	24	41
Emmett	2	7	1	4	4	14	7	25	14	50
Fayette	0	0	33	25	28	21	39	30	31	24
Floyd	4	4	25	24	14	13	35	34	26	25
Franklin	1	11	2	22	0	0	4	44	2	22
Fremont	1	14	2	29	0	0	1	14	3	43
Greene	35	11	57	18	41	13	85	27	94	30
Grundy	2	5	22	51	4	9	2	5	13	30
Guthrie	17	11	46	29	21	13	33	21	39	25
Hamilton	1	4	1	4	1	4	3	13	17	74
Hancock	1	3	4	13	5	17	9	30	11	37
Hardin	2	3	15	21	7	10	14	20	32	46
Harrison	1	3	7	24	3	10	5	17	13	45
Henry	9	43	8	38	1	5	3	14	0	0
Howard	0	0	5	16	6	19	9	29	11	35
Humboldt	0	0	0	0	1	11	4	44	4	44
Ida	2	3	15	25	6	10	8	13	30	49
Iowa	4	12	8	24	4	12	5	15	12	36

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**Table 3. Soil-test potassium summary by county for the period 2006 to 2010.**

County	Very Low		Low		Optimum		High		Very High	
	Samples	%	Samples	%	Samples	%	Samples	%	Samples	%
Adair	0	0	8	11	24	32	18	24	26	34
Adams	0	0	5	8	22	36	10	16	24	39
Allamakee	13	9	46	33	33	24	16	12	31	22
Appanoose	47	14	124	37	71	21	29	9	66	20
Audubon	0	0	0	0	1	6	5	28	12	67
Benton	38	8	144	29	151	30	79	16	88	18
Black Hawk	3	10	10	33	5	17	7	23	5	17
Boone	21	9	44	19	72	31	37	16	55	24
Bremer	19	28	19	28	13	19	5	7	12	18
Buchanan	20	25	27	33	17	21	10	12	7	9
Buena Vista	2	1	5	3	33	22	24	16	84	57
Butler	3	8	11	31	9	25	4	11	9	25
Calhoun	0	0	0	0	4	11	16	46	15	43
Carroll	4	1	32	5	153	24	138	21	323	50
Cass	0	0	2	8	3	12	6	23	15	58
Cedar	2	0	137	24	257	44	83	14	103	18
Cerro Gordo	0	0	9	23	16	40	3	8	12	30
Cherokee	0	0	7	2	51	15	105	30	184	53
Chickasaw	5	4	42	33	41	32	14	11	26	20
Clarke	7	5	20	16	31	24	27	21	44	34
Clay	29	3	117	12	205	21	210	22	395	41
Clayton	6	7	30	34	32	37	7	8	12	14
Clinton	0	0	14	37	12	32	5	13	7	18
Crawford	1	1	2	1	50	34	38	26	55	38
Dallas	1	1	23	19	35	28	16	13	48	39
Davis	19	13	54	36	44	30	12	8	20	13
Decatur	4	3	38	33	37	32	13	11	23	20
Delaware	19	17	29	26	30	27	15	13	20	18
Des Moines	4	11	17	45	11	29	2	5	4	11
Dickinson	3	1	48	19	66	26	49	20	85	34
Dubuque	11	19	13	22	15	26	9	16	10	17
Emmett	0	0	3	11	7	25	7	25	11	39
Fayette	0	0	14	11	30	23	38	29	49	37
Floyd	12	12	44	42	30	29	13	13	5	5
Franklin	1	11	1	11	1	11	3	33	3	33
Fremont	0	0	0	0	1	14	1	14	5	71
Greene	11	4	76	24	114	37	69	22	42	13
Grundy	0	0	1	2	23	53	13	30	6	14
Guthrie	0	0	11	7	28	18	37	24	80	51
Hamilton	0	0	0	0	3	13	2	9	18	78
Hancock	0	0	7	23	8	27	7	23	8	27
Hardin	4	6	21	30	24	34	7	10	14	20
Harrison	0	0	6	21	6	21	4	14	12	43
Henry	9	43	7	33	5	24	0	0	0	0
Howard	2	6	6	19	14	45	1	3	8	26
Humboldt	0	0	0	0	1	11	1	11	7	78
Ida	0	0	2	3	8	13	13	21	38	62
Iowa	1	3	8	24	13	39	6	18	5	15

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(Table 3continued)

Jackson	9	16	9	16	18	31	12	21	10	17
Jasper	12	1	37	4	218	22	284	28	462	46
Jefferson	16	24	13	20	8	12	8	12	21	32
Johnson	4	6	10	16	27	43	6	10	16	25
Jones	4	11	8	23	12	34	6	17	5	14
Keokuk	12	4	43	14	78	25	59	19	123	39
Kossuth	0	0	2	17	8	67	1	8	1	8
Lee	8	31	11	42	6	23	0	0	1	4
Linn	21	11	57	30	72	37	25	13	18	9
Louisa	0	0	0	0	1	25	0	0	3	75
Lucas	26	10	64	26	87	35	32	13	41	16
Lyon	1	0	1	0	2	1	24	9	240	90
Madison	0	0	2	6	4	12	7	21	20	61
Mahaska	4	2	13	5	53	22	70	29	101	42
Marion	3	3	11	12	34	37	22	24	23	25
Marshall	5	10	11	22	17	33	15	29	3	6
Mills	0	0	0	0	2	18	2	18	7	64
Mitchell	17	8	52	24	69	32	34	16	45	21
Monona	2	7	2	7	3	10	0	0	22	76
Monroe	7	6	29	25	51	44	15	13	13	11
Montgomery	0	0	0	0	10	20	14	29	25	51
Muscatine	8	11	7	10	39	55	10	14	7	10
O'Brien	1	0	5	2	77	28	76	28	117	42
Osceola	0	0	0	0	0	0	1	100	0	0
Page	0	0	0	0	1	3	4	12	28	85
Palo Alto	1	0	21	10	52	24	46	21	96	44
Plymouth	0	0	2	1	17	5	59	19	239	75
Pocahontas	0	0	8	8	25	25	24	24	45	44
Polk	6	6	17	17	31	31	14	14	33	33
Pottawattamie	0	0	3	11	5	19	4	15	15	56
Poweshiek	0	0	2	25	1	13	1	13	4	50
Ringgold	2	5	10	25	15	38	7	18	6	15
Sac	0	0	7	11	13	20	12	19	32	50
Scott	1	8	6	46	1	8	0	0	5	38
Shelby	0	0	0	0	2	17	3	25	7	58
Sioux	0	0	0	0	2	2	14	12	101	86
Story	8	4	35	17	48	23	36	17	82	39
Tama	1	2	4	7	12	22	16	29	22	40
Taylor	0	0	7	7	16	16	23	24	51	53
Union	1	1	2	3	18	27	18	27	28	42
Van Buren	17	23	24	32	15	20	10	14	8	11
Wapello	30	10	63	21	90	31	62	21	49	17
Warren	3	3	21	18	40	33	20	17	36	30
Washington	3	4	21	27	26	33	14	18	14	18
Wayne	29	18	65	41	31	20	12	8	20	13
Webster	0	0	1	3	10	27	4	11	22	59
Winnebago	0	0	3	60	2	40	0	0	0	0
Winneshiek	7	8	30	32	34	37	12	13	10	11
Woodbury	1	3	11	34	4	13	4	13	12	38
Worth	2	3	11	15	12	16	11	15	38	51
Wright	0	0	0	0	0	0	1	25	3	75

**Table 4. Soil-test zinc summary by county for the period 2006 to 2010.**

County	< 0.5		0.5 to 0.8		0.9+	
	Samples	%	Samples	%	Samples	%
Adair	2	15	5	38	6	46
Adams	2	11	6	33	10	56
Allamakee	0	0	0	0	23	100
Appanoose	0	0	0	0	7	100
Audubon	0	0	0	0	1	100
Benton	1	3	7	18	31	79
Black Hawk	0	0	0	0	0	0
Boone	4	12	10	29	20	59
Bremer	0	0	2	9	20	91
Buchanan	0	0	2	20	8	80
Buena Vista	0	0	2	11	16	89
Butler	3	16	9	47	7	37
Calhoun	0	0	1	4	24	96
Carroll	10	26	3	8	25	66
Cass	0	0	1	100	0	0
Cedar	0	0	4	9	43	91
Cerro Gordo	7	19	14	38	16	43
Cherokee	3	4	7	9	70	88
Chickasaw	0	0	4	22	14	78
Clarke	0	0	5	25	15	75
Clay	4	11	9	24	25	66
Clayton	0	0	6	14	37	86
Clinton	0	0	0	0	0	0
Crawford	6	24	11	44	8	32
Dallas	0	0	0	0	0	0
Davis	0	0	2	20	8	80
Decatur	0	0	0	0	7	100
ware	0	0	1	2	47	98
Des Moines	0	0	0	0	6	100
Dickinson	0	0	0	0	0	0
Dubuque	0	0	1	8	12	92
Emmett	0	0	0	0	15	100
Fayette	0	0	1	33	2	67
Floyd	0	0	0	0	6	100
Franklin	0	0	0	0	3	100
Fremont	0	0	0	0	0	0
Greene	2	15	1	8	10	77
Grundy	0	0	0	0	0	0
Guthrie	0	0	0	0	0	0
Hamilton	0	0	0	0	0	0
Hancock	0	0	0	0	0	0
Hardin	2	50	0	0	2	50
Harrison	2	67	1	33	0	0
Henry	2	20	5	50	3	30
Howard	0	0	1	100	0	0
Humboldt	0	0	0	0	4	100
Ida	0	0	3	15	17	85
Iowa	0	0	1	5	21	95

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(Table 4 continued)

Jackson	1	13	7	88	0	0
Jasper	0	0	2	18	9	82
Jefferson	0	0	0	0	0	0
Johnson	0	0	1	10	9	90
Jones	1	50	0	0	1	50
Keokuk	0	0	1	11	8	89
Kossuth	7	70	1	10	2	20
Lee	1	25	1	25	2	50
Linn	1	4	3	11	23	85
Louisa	0	0	0	0	0	0
Lucas	0	0	1	4	25	96
Lyon	0	0	0	0	6	100
Madison	0	0	0	0	0	0
Mahaska	0	0	2	4	46	96
Marion	0	0	1	11	8	89
Marshall	0	0	1	50	1	50
Mills	0	0	0	0	2	100
Mitchell	0	0	3	12	22	88
Monona	0	0	1	25	3	75
Monroe	5	83	1	17	0	0
Montgomery	0	0	0	0	6	100
Muscatine	0	0	1	4	27	96
O'Brien	0	0	0	0	39	100
Osceola	0	0	0	0	0	0
Page	0	0	3	18	14	82
Palo Alto	0	0	2	100	0	0
Plymouth	3	6	8	15	41	79
Pocahontas	0	0	0	0	34	100
Polk	1	6	1	6	16	89
Pottawattamie	0	0	2	33	4	67
Poweshiek	0	0	0	0	0	0
Ringgold	0	0	4	100	0	0
Sac	1	5	2	11	16	84
Scott	0	0	0	0	4	100
Shelby	0	0	3	50	3	50
Sioux	4	15	8	31	14	54
Story	1	10	2	20	7	70
Tama	0	0	0	0	4	100
Taylor	0	0	2	6	30	94
Union	0	0	0	0	0	0
Van Buren	0	0	3	75	1	25
Wapello	0	0	0	0	33	100
Warren	1	3	0	0	30	97
Washington	0	0	2	22	7	78
Wayne	2	15	4	31	7	54
Webster	0	0	0	0	1	100
Winnebago	1	20	3	60	1	20
Winneshiek	0	0	10	50	10	50
Woodbury	0	0	0	0	3	100
Worth	1	10	4	40	5	50
Wright	0	0	0	0	0	0

**Table 5. Soil pH summary by county for the period 2006 to 2010.**

County	< 5.0		5.0 to 5.9		6.0 to 6.4		6.5 to 6.9		≥ 7.0	
	Samples	%	Samples	%	Samples	%	Samples	%	Samples	%
Adair	0	0	14	18	24	32	18	24	20	26
Adams	0	0	10	15	26	40	11	17	18	28
Allamakee	0	0	11	8	29	21	51	36	50	35
Appanoose	2	1	65	19	93	27	84	24	101	29
Audubon	0	0	2	11	7	39	7	39	2	11
Benton	4	1	116	23	182	36	119	24	80	16
Black Hawk	0	0	9	30	12	40	3	10	6	20
Boone	1	0	50	21	62	26	36	15	86	37
Bremer	0	0	5	7	8	12	20	29	35	51
Buchanan	1	1	6	7	25	31	46	57	3	4
Buena Vista	1	1	14	9	31	21	59	40	44	30
Butler	0	0	5	14	14	39	12	33	5	14
Calhoun	0	0	1	3	13	37	12	34	9	26
Carroll	0	0	97	15	199	31	174	27	180	28
Cass	0	0	5	19	8	31	9	35	4	15
Cedar	0	0	48	8	239	41	219	38	76	13
Cerro Gordo	0	0	2	5	10	25	9	23	19	48
Cherokee	1	0	122	35	135	39	53	15	36	10
Chickasaw	0	0	22	17	52	40	36	28	19	15
Clarke	0	0	12	9	50	37	46	34	26	19
Clay	3	0	197	21	374	39	231	24	152	16
Clayton	0	0	14	16	11	13	29	33	34	39
Clinton	0	0	0	0	0	0	4	11	34	89
Crawford	0	0	37	25	58	40	27	18	24	16
Dallas	0	0	24	20	26	21	25	20	48	39
Davis	0	0	42	28	48	32	43	28	18	12
Decatur	0	0	23	20	46	40	31	27	15	13
Delaware	0	0	9	8	17	15	55	48	34	30
Des Moines	0	0	3	8	9	23	11	28	16	41
Dickinson	7	3	53	21	65	26	62	25	64	25
Dubuque	0	0	4	7	15	26	16	28	23	40
Emmett	0	0	0	0	0	0	1	4	27	96
Fayette	0	0	91	69	24	18	8	6	8	6
Floyd	0	0	10	10	34	33	43	42	16	16
Franklin	0	0	0	0	4	44	1	11	4	44
Fremont	0	0	1	14	2	29	3	43	1	14
Greene	5	2	124	40	60	19	57	18	66	21
Grundy	0	0	1	2	12	28	27	63	3	7
Guthrie	0	0	12	7	34	21	71	44	45	28
Hamilton	0	0	7	30	8	35	1	4	7	30
Hancock	0	0	5	17	4	13	3	10	18	60
Hardin	0	0	10	14	11	16	22	31	27	39
Harrison	0	0	2	7	3	10	6	21	18	62
Henry	0	0	4	17	3	13	3	13	14	58
Howard	0	0	3	10	11	35	8	26	9	29
Humboldt	0	0	3	33	1	11	1	11	4	44
Ida	0	0	11	18	27	44	10	16	13	21
Iowa	0	0	2	6	10	30	7	21	14	42

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(Table 5 continued)

Jackson	0	0	13	22	14	24	15	26	16	28
Jasper	0	0	117	12	333	33	341	34	222	22
Jefferson	0	0	12	17	24	35	21	30	12	17
Johnson	0	0	4	6	15	24	30	48	14	22
Jones	0	0	0	0	11	30	15	41	11	30
Keokuk	0	0	44	14	100	32	110	35	61	19
Kossuth	0	0	0	0	2	17	0	0	10	83
Lee	0	0	3	11	3	11	7	26	14	52
Linn	0	0	15	8	47	24	73	38	58	30
Louisa	0	0	0	0	2	50	1	25	1	25
Lucas	1	0	46	18	69	27	80	32	55	22
Lyon	0	0	6	2	116	43	112	42	34	13
Madison	0	0	5	13	13	34	8	21	12	32
Mahaska	0	0	8	3	65	27	107	44	64	26
Marion	0	0	11	10	28	27	40	38	26	25
Marshall	0	0	4	8	16	31	27	53	4	8
Mills	0	0	5	45	1	9	2	18	3	27
Mitchell	0	0	19	9	64	29	98	45	36	17
Monona	0	0	4	13	2	7	4	13	20	67
Monroe	0	0	20	17	39	34	36	31	20	17
Montgomery	0	0	17	35	12	24	12	24	8	16
Muscatine	0	0	6	8	25	35	34	48	6	8
O'Brien	0	0	49	18	123	45	79	29	25	9
Osceola	0	0	0	0	1	100	0	0	0	0
Page	0	0	1	3	7	21	17	52	8	24
Palo Alto	0	0	11	5	57	26	51	24	97	45
Plymouth	25	8	66	21	119	38	67	21	40	13
Pocahontas	0	0	5	5	24	24	18	18	55	54
Polk	1	1	34	34	24	24	32	32	10	10
Pottawattamie	0	0	2	7	10	37	6	22	9	33
Poweshiek	0	0	0	0	1	13	4	50	3	38
Ringgold	0	0	11	28	13	33	12	30	4	10
Sac	0	0	4	6	14	22	14	22	33	51
Scott	1	7	1	7	2	13	7	47	4	27
Shelby	0	0	5	42	4	33	0	0	3	25
Sioux	0	0	39	33	37	32	15	13	26	22
Story	0	0	27	13	58	28	60	29	64	31
Tama	0	0	6	11	15	27	17	31	17	31
Taylor	0	0	34	35	40	41	12	12	11	11
Union	0	0	7	10	24	36	26	39	10	15
Van Buren	0	0	22	30	21	28	14	19	17	23
Wapello	0	0	59	20	97	33	99	33	42	14
Warren	0	0	21	17	47	38	36	29	21	17
Washington	0	0	9	11	43	54	24	30	4	5
Wayne	0	0	34	22	53	34	34	22	36	23
Webster	0	0	14	38	8	22	9	24	6	16
Winnebago	0	0	0	0	2	40	1	20	2	40
Winneshiek	0	0	13	14	18	19	21	23	41	44
Woodbury	0	0	1	3	3	9	3	9	25	78
Worth	1	1	11	15	21	28	19	26	22	30
Wright	0	0	1	25	1	25	2	50	0	0