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BORON FERTILIZATION OF CORN IN KENTUCKY

by

L.W. Murdock, K.L. Wells, and H.F. Miller

The need for use of boron (B) for alfalfa production has been recognized for many years in Kentucky and is presently recommended for general use as an annual topdressing on alfalfa fields. Use of B is also recommended in Kentucky for red clover fields which are to be harvested for seed. In recent years, there has been interest in use of fertilizer B for good corn production in Kentucky. Plant available B is greatly affected by soil pH and decreases with increasing soil pH. Because of this, some states recommend use of B on corn grown on soils with a pH of 6.1 or higher. Also, some commercial soil testing laboratories serving Kentucky routinely test for B, and often recommend its use for corn. This has resulted in many corn growers in Kentucky asking if they need to use B on corn.

In order to determine if B is needed for corn production in Kentucky, a large number of field trials have been conducted by the U.K. Agronomy Department to test for B response. These studies were conducted during 1972-1976 under various soil, climatic, and corn production systems in the state. Results of these field trials are listed below.

RESPONSE OF CORN TO BORON FERTILIZATION OVER FIVE YEARS THROUGHOUT KENTUCKY

<u>County</u>	<u>Soil Series</u>	<u>Soil pH</u>	<u>Number of Replications</u>	<u>CORN YIELDS</u>		<u>Boron Rate #/ac</u>
				<u>No Boron bu/A</u>	<u>Boron bu/A</u>	
		1972				
Union	Huntington	7.3	4	131	128	1
Union	Huntington	7.3	4	131	125	3
Henderson	Huntington	7.4	4	126	132	1
Henderson	Huntington	7.4	4	126	158	3

cont'd

RESPONSE OF CORN (cont'd)

<u>County</u>	<u>Soil Series</u>	<u>Soil pH</u>	<u>Number of Replications</u>	<u>Corn Yields</u>		
				<u>No Boron bu/A</u>	<u>Boron bu/A</u>	<u>Boron Rate #/ac</u>
<u>1973</u>						
Shelby	Lowell	6.1	4	210	193	3
Shelby	Huntington	6.3	4	140	146	3
Breathitt	Allegheny	6.8	3	175	165	3
Breathitt	Pope	7.0	3	162	171	3
Pulaski	Crider	7.0	4	145	148	3
Caldwell	Zanesville	5.4	1	69	74	0.33
Daviess	Falaya	7.0	1	166	159	0.33
Graves	-	6.7	1	104	105	0.33
Crittenden	Philo	7.5	1	165	159	0.33
Union	Huntington	6.8	1	45	54	0.33
Butler	-	5.4	3	173	162	3
Simpson	-	6.9	3	138	142	3
Simpson	-	6.7	3	102	113	3
Barren	Pembroke	7.1	3	130	144	3
Union	Collins	5.9	1	133	136	0.33
<u>1974</u>						
Breathitt	Pope	6.9	4	122	122	1
Breathitt	Allegheny	5.9	3	162	151	1
Lee	Allegheny	6.0	3	183	179	1
Green	Baxter	6.3	3	115	120	1
<u>1975</u>						
Graves	Collins	-	1	125	126	0.33
Caldwell	Pembroke	6.5	3	98	102	1
Caldwell	Pembroke	6.5	3	98	114	2
Graves	Collins	5.7	3	145	141	1
Graves	Collins	5.7	3	145	143	2
Graves	Grenada	6.2	3	121	101	1
Graves	Grenada	6.2	3	121	102	2
McCracken	Robinsonville	6.1	3	100	96	1
McCracken	Robinsonville	6.1	3	100	92	2
<u>1976</u>						
Graves	Grenada	6.8	3	139	149	1
Graves	Grenada	6.8	3	139	131	2
Graves	Collins	6.4	3	184	150	1
Graves	Collins	6.4	3	184	187	2
AV.				135	134	

Of these 36 different tests, only two resulted in significantly higher yields from use of B (Barren County in 1973; Henderson County @ 3 lb B/A in

1972). Three tests also resulted in significantly lower yields from use of B. In either case (significant increase or significant decrease), soil pH was 6.1 or greater.

As shown in the table, average yield from all sites was 135 bu/A without B and 134 bu/A with B. Considering only those sites with pH 6.1 or greater, average yield was 133 bu/A without B and 132 bu/A with B.

In a number of the studies, plant leaf samples were taken in order to insure that no toxicities or deficiencies existed. All of the other nutrients were found to be at acceptable concentrations. Boron content in the leaf tissue was found to be adequate even where no B was added. The concentration of B in the leaves increased with boron fertilization, indicating the B applied was available for plant use.

SUMMARY

Results of these studies show it is very difficult to predict a response of boron fertilization on corn. It also indicates that boron fertilization of corn on most soils in the state of Kentucky will likely result in no increase in yield. A negative response in corn yield from boron fertilization appears just as probable as a positive response. The data show little evidence that B fertilization on corn would be profitable on Kentucky soils at the present time.