

BORON CONTENT OF NORTH DAKOTA FLAX

C. O. Clagett and H. J. Klosterman

A great majority of the early work on boron in relation to flax culture has dealt with symbiotropism, or the role of this element in the competition of flax with the micro-organisms for elements of the soil in a normal soil containing considerable organic matter. Boron content of the soil appears to have been a factor in flax culture in Russia for some time if the number of papers on the subject is any indication. Flax requirement for boron was shown in the early thirties by Shkolnik. Plant growth was stimulated by about 0.5 ppm in the nutrient solution supplied to sand cultures. With no B present he found poor root growth and early death of the plant, with over .5 ppm there was indication of toxicity. Other Russian workers have reported that no boron is required by flax in the absence of micro-organisms. I think that these works can be discounted probably on the basis of use of impure chemicals or improperly washed medium of support. The beneficial effect of boron additions to heavily limed soils have been repeatedly demonstrated by Russian workers and by workers in this country as well as other European countries. There is no evidence that calcium ties up the boron directly but rather that soil organic matter under the influence of the calcium binds the boron in a form not available to plants. Under conditions of this type, N, P, and K fertilization have actually been shown to be deleterious to decrease the yields of the crop in question. Undoubtedly, in such cases boron is the limiting factor in crop production.

The effect of calcium on boron requirements is of interest in the northwest. This area of lower rainfall and poorer drainage is associated with large amounts of available calcium and magnesium and in some cases with considerable soil organic matter. Under these conditions one might assume that boron may be a limiting factor. Our soils men have frequently indicated that there are no good methods available for soils testing in this area. We have analyzed the plants grown in the soil and attempted to draw conclusions as to adequacy. Flax grains and straw obtained in the experiments on mineral depletion of soil by various crops, reported before this group the past two years, were analyzed for boron content. The results are shown in Table 1.

Boron Content of North Dakota Flax
(Dakota Variety)

Year Grown	Fargo		Location	
	grain ppm	straw ppm	grain ppm	straw ppm
1947	17	27		
1948	16	30		30
1949	16	23	16	23
1949 Green Flax early boll stage		23		
1949 Plot 30 Flax		21		

There are very few reports on Boron analysis of flax seed or straw so that there is little basis for deciding whether these figures are sufficient or indicate a low level. The few Russian reports we have found are all based on grams boron removed per hectare with no yield data to convert to ppm.

There are, however, numerous reports on the Boron content of potatoes, sugar beets, and alfalfa. We have analyzed a number of samples of potato leaves, sugar beet roots and alfalfa from various parts of the state of North Dakota. Values are listed in second table.

Table II

Boron Content of Various Crops Compared With Literature Values		
Crop	North Dakota ppm Boron	Literature ppm Boron
Potato leaves N. W., N. Dak.	38 32	22-50 (Wisconsin)
Sugar Beet Root	13	10-16 (U. S., Russia)
Alfalfa	44	29-50 (Canada, Russia)

The Boron content of these three crops was comparable to that reported from various sources in the literature, therefore, there appears to be no boron deficiency in the areas surveyed.

NORTH DAKOTA CO-OPERATIVES CO-ORDINATE TRANSPORTATION

A Review

North Dakota Co-operatives Co-Ordinate Transportation for Economy and Service is the title of Miscellaneous Report 132 recently published by the Co-operative Research and Service Division of the Farm Credit Administration under the authorship of Leonard N. Conyers and Robert J. Byrne. This is a report of the operations of the Farmers Union Federated Co-operative Shipping Association of Minot, North Dakota, in their co-ordinated two-way haul transportation program. This federation now has 44 member co-operative associations of which 36 are listed as local oil associations, 4 as local elevator associations, 2 as local livestock shipping associations, 1 as a local grain association, and 1 as a central exchange. The Summary and Conclusions list as achieved results: development of an adequate, efficient, and dependable transportation service for its farmer patrons; pick-up and assembly service for livestock; elimination of discrimination between large and small shippers; reduction of transportation costs; prompt payment for livestock killed or injured in transit; reduction of time in transit for livestock; and personalized service to patrons.

The publication contains a consolidated statement of hauling operations for the years of 1942 to 1948 inclusive, expressed in terms of dollars. The statement indicates that the total receipts have increased from \$37,915 in 1942 to \$108,223 in 1948. Some of this increase undoubtedly is due to the increase of the value of the commodities hauled. The report does not give a clear-cut indication of the volume of farm supplies handled on the back haul as compared to the volume of livestock hauled to the South St. Paul livestock market. All of the livestock hauled is marketed through the Farmers Union Livestock Association of South St. Paul. The West Fargo livestock market is not mentioned in the report so apparently none of the livestock is hauled to the Farmers Union Livestock Association at West Fargo, North Dakota. The report would indicate that the Farmers Union Federated Co-operative Shipping Association is set up to co-ordinate the movement of livestock and farm supplies in and out of St. Paul and that no such co-ordination is attempted for nearer livestock markets. (Perry V. Hemphill, Associate Agricultural Economist)