Shade and Soil Moisture as Factors in Competition Between Selected Crops and Field Bindweed, *Convolvulus arvensis*

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COMPETITION between wild and cultivated plants, as well as between plants of the same species growing in close proximity, is the usual occurrence in the field, meadow, or pasture. Plants growing in a limited area compete for the available growth elements necessary for their development, such as water, mineral, nutrients, and sunlight.

That crop plants vary greatly in their ability to compete with weeds and other crop plants has been shown by Brenchley (1), Godel (5), Montgomery (8), and Pavlychenko and Harrington (9, 10).

In the bindweed control research conducted at the Lamberton Minn., Station much emphasis has been placed on the use of competitive field crops as a means of controlling bindweed, *Convolvulus arvensis* L.

This study deals primarily with the competition between plants of selected crops and field bindweed for moisture and light, along with an attempt to evaluate their relative importance.

The two studies described in this paper were conducted on plant material grown from 1937 to 1940 in experiments at the Lamberton Station. The usual field plot techniques were followed in the planning and care of the experimental plots.

SOIL MOISTURE STUDIES

Of the primary growth factors, water is the element for which competition most frequently develops. Pavlychenko and Harrington (9) found this factor to be critical in western Canada. Clements, *et al.* (4) state that soil moisture is most often the limiting growth factor in the arid and semiarid Great Plains.

Where areas are heavily infested with bindweed and no special control measures or cultural practices are used, or where rainfall is limited, competition for soil moisture becomes very acute and most crops suffer serious growth reduction as a result of bindweed competition.

MATERIALS AND METHODS

Soil moisture was determined by the method recommended by Lyon and Buckman (7). Moisture determinations were made in plots growing rye, sorghum, or soybeans, and on plots of undisturbed and cultivated bindweed. Samples of the first, second, third, and fourth foot sections were taken at intervals of approxi-