INDICATIONS THAT AVAILABLE NITROGEN MAY BE A LIMITING FACTOR IN HARD WINTER WHEAT PRODUCTION

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The presence of small, well-defined areas, usually 2 to 4 feet in diameter, of taller and darker green plants in grain fields in the central and eastern states is a common observation in early spring. Similar conditions have been reported from the Pacific Coast. In Kansas such a spotted condition is very striking in wheat fields, even in western sections of the state where there is limited rainfall.

Under Kansas conditions the pasturing of winter wheat seems to be especially conducive to the appearance of such spots, and since solid manure is without effect on the current crop if dropped subsequent to planting, they may logically be attributed to deposits of urine. In many instances, however, their origin can be definitely traced to other conditions.

The dark green color and vigorous growth always observed in such areas suggests the possibility that available nitrogen may play an important rôle. Their repeated appearance upon soil of high potential fertility, together with the wide-spread opinion that nitrogen is not a limiting factor in wheat production in this region, would militate against such an explanation.

However, in efforts to secure information from as many different angles as possible in general nitrogen studies of western Kansas soils, it was felt that a study of the possible relationship, if any, of nitrogen to such spots was worthy of investigation.

Accordingly, samples of growing grain and soil were collected from typical spots and the immediately adjacent surrounding area in 38 wheat fields in 20 counties of central and western Kansas. Two

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