Two Types of Late Spring Frost Injury to Winter Wheat

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THE late frost that occurred on May 10 and 11, 1946, offered an excellent opportunity to observe two distinct types of frost injury to hard red winter wheat. An early spring had stimulated the development of the wheat plants in all counties east of the Panhandle so that they were heading from 3 to 4 weeks earlier than normal. Heads of the early varieties, Triumph, Wichita, Comanche, and Pawnee, were beginning to emerge from the boot. Injury to the plants in this stage of development was primarily to the heads, many becoming partially or completely sterile as a result. Wheat in the Panhandle counties, on the other hand, was growing more or less normally so that the plants were from 8 to 10 inches in height. The heads were in an early stage of development, well protected by the sheath and also by a thin layer of snow. There was only a small amount of injury to the heads of these plants, although there was considerable injury to the stems.

In view of the two distinct types of injury, the first portion of this paper is devoted to a discussion of the head injury and the second portion to the stem injury.

Ten varieties of hard red winter wheat had been planted in replicated yield test plots in 11 counties scattered throughout the southern half of Nebraska. These same varieties were planted also in non-replicated demonstration plots in Polk, Adams, and Harlan counties. Counties in which the yield plots were located, minimum temperature reached, and the approximate duration of the sub-freezing temperature are shown in Fig. 1. Detailed temperature records for three locations in the affected areas are listed in Table 1.

HEAD INJURY

Injury to the heads showed as sterile florets. Anthers in the early varieties were ready, and in some cases, starting to dehisce. Heads in this condition were apparently more susceptible to frost injury than later heads. The injury was very similar to that described by Suneson (2) who artificially emasculated wheat heads with frost treatments. He found that temperatures from 27° to 36° F for 15 to 24 hours caused injury to all floral structures when the florets had emerged from the leaf sheath but were not yet fertilized. Partial injury to the heads occurred when exposed to temperatures ranging from 27° to 36°

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3Figures in parenthesis refer to "Literature Cited", p. 544.