COLD TOLERANCE IN FLAX

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THIS article reports the results of experiments carried on at Arlington Farm, Va., near Washington, D. C., during the three seasons of 1938-39 to 1940-41, inclusive. The purpose of the experiments was to determine (a) whether there is any significant difference in the cold tolerance of distinct varieties of flax, (b) to what extent the stage of growth determines the cold tolerance of flax plants, and (c) to develop strains having superior cold tolerance. The tests included 12 varieties, representing a wide range in agronomic types and including both seed and fiber varieties. The varieties were planted on three or more successive dates in order to have plants at different stages of development when freezing occurred. The plantings were made in the open, unprotected, except as explained later, and were subjected to the seasonal temperatures which might affect hardening of the plants previous to freezing temperatures. The results should be of interest to agronomists in states where flax is grown as a fall-sown crop.

Previous observations have shown that freezing injury to flax plants varies with the stage of growth. In the seedling or cotyledon stage, they may be damaged or killed by temperatures of 18° to 26°F, the extent of damage often depending on weather conditions immediately following the freezing. Such damage in the cotyledon stage sometimes occurs, although rarely, in the northern states where flax is grown as a spring-sown crop. In the blossom and green-boll stage injury may result from a light freeze of 30°F or slightly lower. At this stage freezing kills the flower buds and the immature seeds in the green bolls. Such damage occurs in the northern states when late-sown flax is not yet mature when frost occurs. Damage has been observed, also, in California and southern Texas, where flax, sown in early October, was in blossom in late February when a sudden freeze occurred. Because of frost hazard, mid-November seeding is recommended in those states. Flax sown in November will rarely reach the blossom stage until after danger of frost is past.

Flax in the vegetative stage of growth, that is, from the few-leaf stage to the flower-bud stage, appears to be most resistant to cold. In that stage commercial flax fields in California suffered little damage during two exceptionally cold periods in January 1937, when minimum temperatures of 14° to 17° F were recorded. In some localities flax was injured, but on the whole, there was relatively little damage to the California crop that year.

Other pertinent observations have been reported by agronomists. A. C. Arn. Agronomist, University Farm, St. Paul, Minn., in a letter of November 5, 1923, wrote as follows:

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1 Contribution from Division of Cereal Crops and Diseases, Bureau of Plant Industry, U. S. Dept. of Agriculture. Received for publication April 1, 1941.
2 Associate Agronomist.
3 Figures in parenthesis refer to "Literature Cited", p. 799.

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