

## DELAYED GERMINATION OR SEED DORMANCY IN VICLAND OATS<sup>1</sup>

ALVIN SCHWENDIMAN AND H. L. SHANDS<sup>2</sup>

IN the fall of 1940 several instances of delayed germination were noted in freshly harvested samples of Vicland oats, a new variety recently described by Stanton (10).<sup>3</sup> Certain samples when tested at room temperature germinated only 65% in two weeks. However, germination was increased to 95% or better when the seed was pre-chilled. As this variety was about to be released for commercial production,<sup>4</sup> it seemed important to determine the extent and nature of the delayed germination. The immediate need for such a study was occasioned by the necessity of establishing a satisfactory testing procedure for making germination tests in order to judge freshly harvested seed as to requirements for certification.

The main aspects of the physiology of delayed germination in small grains have been reported in the work of Harrington (5) and Johnson (6). Harrington was able to increase the germination of wheat, oats, and barley by artificial drying, opening the coat structures over the embryo with incidental wounding of the scutellum, cutting off the distal end of the caryopsis, removal of the lemma and palea from oats and barley, weakening of the coat structures over the embryo of wheat by the use of sulfuric acid, increasing the oxygen pressure in the atmosphere, and germination at 12° to 16°C.

Johnson (6) was also able to show an increase in the germination of *Avena fatua* by the use of an increased oxygen pressure, lowered germinating temperatures, and by the use of potassium nitrate. Both of these workers are in agreement in stating that the dormant condition is imposed by coat structures impermeable to oxygen.

Johnson (6) considered that the after-ripening process may consist of a series of changes in the tissues of the seed coat which results in an increased permeability to oxygen. Harrington (5) also stated that the improved germination of nonafter-ripened cereals brought about by various treatments appears to result from increasing the permeability of coat structures to oxygen.

Toole (11) and Whitcomb (12) were primarily responsible for the development of the prechilling method for improving the germination of freshly harvested cereals.

Lewis (9) explained the response to low temperatures by nonafter-ripened seed to be most likely a matter of reducing the speed of all processes in germination to that of a limiting factor.

Other phases of the problem of delayed germination in cereals have been dealt with in the literature as indicated by the following conclusions reported in various papers: Cutting immature grain increases the amount of delayed germination (8, 12); low storage temperatures prolong the after-ripening process (6, 8); more delayed germination occurs after cool, wet harvest years (3, 9); more delayed

<sup>1</sup>Contribution from the Department of Agronomy, Wisconsin Agricultural Experiment Station, Madison, Wis. Published with the approval of the Director as paper No. 190. Received for publication April 5, 1943.

<sup>2</sup>Instructor in Agronomy and Seed and Weed Specialist, Wisconsin Department of Agriculture; and Associate Professor of Agronomy, respectively.

<sup>3</sup>Figures in parenthesis refer to "Literature Cited", p. 687.

<sup>4</sup>First released in 1941.