EFFECTS OF VERNALIZATION ON CERTAIN VARIETIES OF OATS

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In the southern United States, fall-sown oats are uniformly more successful than are spring-sown oats and winter-killing of suitably adapted varieties is not a common occurrence especially in the Gulf Coastal region. However, winter-killing of oats occurs more frequently as one progresses northward in the United States until finally fall-sown oats usually fail to survive satisfactorily or not at all. Oats of the *Avena byzantina* species, i.e., the red oat varieties, Red Rustproof and Fulghum and their various strains and hybrids, are best adapted in most of the southern half of the United States and they can be grown from both fall and spring seeding.

Numerous field experiments have demonstrated that Fulghum and especially Red Rustproof oats, varieties of *Avena byzantina*, require early spring seeding for satisfactory growth and normal maturity. Stadler (5), in date-of-seeding experiments in Missouri, demonstrated what probably is a difference in the temperature requirements of the Fulghum and Kherson varieties of oats. When seeding was delayed one month, Fulghum suffered a reduction in grain yield of 45%, whereas Kherson, a variety of *A. sativa*, was reduced only 10%. Kherson is classed as a true spring variety, whereas Fulghum may be considered intermediate, i.e., it does not have a complete winter growth habit but requires a period of cool temperatures before normal heading can occur.

The process of satisfying this low temperature requirement either by natural or artificial means is known as vernalization or irarovization, and the economic possibilities of this phenomenon in cereal production have been the subject of some interest and controversy among investigators in recent years. Experiments on artificial vernalization of oats were conducted at the Arlington Experiment Farm, Arlington, Va., from 1933 to 1937, inclusive, and the results are reported here-with.

PREVIOUS WORK

Only a few previous reports on vernalization of oats have been made. Borodin (2) presented results of his vernalization studies of oats in the United States. He obtained definite responses from several winter oat varieties and discussed the practical possibilities of vernalization of oats in America. He was more sanguine of the utility of artificial vernalization than was Martin, who reviewed some of the literature on vernalization and pointed out several limitations to its practical use. Martin stipulated that for vernalization to be practical yields produced from vernalized seed must exceed those resulting from ordinary spring seeding by a sufficient margin to justify the added risk and expense. He further called atten-