The hop plant, *Humulus lupulus* L., a long-lived, dioecious perennial, is propagated commercially from rhizome sections. New types and recombinations in hops may be obtained by producing plants from seed. This is desirable, since none of the varieties of hops now grown in the United States are immune to downy mildew, *Pseudoperonospora humuli*, which is of major importance to the hop-producing industry. The progress that may be expected in any breeding program with plants is dependent upon a number of factors, a basic one being the ease and completeness with which a lot of seed may be germinated. Hop seeds do not germinate easily. The objective of this investigation was to develop a technique for germinating hop seed with reference to a breeding program.

**REVIEW OF LITERATURE**

Investigations relative to the significance of dormancy in seeds, and the categories of dormancy such as hard coats, light, oxygen deficiency, and moist, low-temperature stratification have been reported for a variety of crops by a number of workers. Crocker (3) has published a book which is a critical summary of the researchers of this type carried on at the Boyce Thompson Institute and in which reference is made to related work outside the institute. Reviews have been published which can be cited. Only the general findings as they may apply to the present investigation will be noted without any attempt to give credit to a particular investigator.

Pope and Brown (7) forced young embryos in heads of normally very dormant varieties of barley to continue to enlarge and form seedlings in the green head by placing moist filter paper on the embryo portion of the immature grain. Harrington (4) suggested that dormant cereal grains could be hastened in germination by various means such as using 54° F germination instead of 68° F or higher. McKeever (6) indicated that treatment of black locust seeds for 10 to 120 minutes with several wax solvents, (ether, xylene, and acetone) was effective in hastening germination. Hutton and Porter (5) presented data which indicated that dry, hard seeds of *Amorpha* and *Lespedeza*, when shaken in a bottle, become water permeable at the hilum. Busse (2), working with sweetclover and alfalfa, found that freezing the dry hard seeds to —310° F softened the coats without injury to the seeds. Busse further reported that repeated freezing at this temperature did not injure the dry alfalfa seeds. Bresman (1) suggested treating hop seed for 10 days at freezing temperatures followed by scarification with a coarse emery cloth to stimulate germination. Smith (8), using four varieties of hops, presented data which indicated that 5 days' incubation in the germinator followed by 5 weeks' refrigeration at 5° C gave the highest germination in the treatments used. Smith also reported that storage of moist seeds at 5° C was greatly superior to storage at —12° C in stimulating germination. He also presented data which indicated that 3-, 4-, and 5-week storage periods at 5° C resulted in significantly increased germination as the length of...