INFLUENCE OF LOW TEMPERATURE TREATMENTS ON
THE GERMINATION OF SEEDS OF SWEET
CLOVER AND SMOOTH VETCH

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GERMINATION percentages of sweet clover (Melilotus alba Desr.) and of smooth vetch (Vicia villosa Roth.) seed samples are reduced more or less by the presence of hard seeds, that is, seeds with coats impermeable to water. The hard seed content of sweet clover seed samples grown in western Oregon is often more than 45%, while that of smooth vetch seed samples is often more than 15%. Experiments were designed to find the influence of various low temperature treatments on the softening of hard seeds and on the germination of seed samples of sweet clover and smooth vetch.

REVIEW OF LITERATURE

A number of workers, including Harrington (1), Helgeson (3), Jones (4), Leggatt (5), Lute (6), Midgley (7), Schmidt (9), and Whitcomb (10), have studied the influence of various storage conditions and storage in the soil on the softening of hard seeds of cultivated legumes. The results indicate that when seedings are made in the spring nearly all hard seeds of alfalfa and hairy vetch will germinate and produce plants during the first season. The majority of the hard seeds of red clover and sweet clover will not germinate until the second season after the seeds have passed the winter in the soil. In case of red clover many of the hard seeds which become permeable during the winter do not produce plants because of being killed by the freezing weather of winter. Hard seeds of alfalfa and hairy vetch do not stand freezing readily after they have become permeable. Freezing weather is quite effective in the softening of hard seeds especially when the seeds are moist as they are in the soil.

Harrington (2) and Morinaga (8) have conducted experiments which show that the germination of some seeds are favored by favorable temperature alternations. Seeds of Bermuda grass, Canada bluegrass, cat-tail, Kentucky bluegrass, and orchard grass are examples of seeds favored by alternating temperatures.

As a result of these investigations, it was believed that a low temperature treatment might be found which would cause seed samples to give higher germination percentages than samples which had been stored dry at room temperature.

MATERIALS AND METHODS

Samples of locally grown sweet clover and smooth vetch seed were selected for carrying out the experiments. The various samples were given moist and dry treatments under the following storage conditions: (a) Room temperature aver-