EFFECT OF MOISTURE, SEEDING DATES, AND FERTILIZER ON STANDS AND YIELDS OF CRIMSON CLOVER

CRIMSON clover (Trifolium incarnatum L.) is used in many sections of the southern United States as a winter annual legume because it is a heavy seed producer and adapted for pasture and green manure uses. Failure to obtain stands has limited the use of this legume. It is common practice in certain localities to plant the seed in the hull with the belief that better stands are obtained in this way. McKee1 obtained good germination from seed that had swelled and then dried for several days, if the radicle had not appeared. Injury increased with length of drying time when the radicle was showing.

Studies were initiated at Statesville, N. C., during the period from 1935 to 1942 to investigate the effect of using hulled and unhulled seed, time of seeding, soil moisture, and phosphate fertilization upon germination and survival of crimson clover.

The rate of moisture absorption of hulled and unhulled seed was studied in the laboratory. Oven-dry Cecil sandy loam soil was brought up to 2, 5, 10, and 15% moisture levels. In each of the four lots of soil, 100-seed samples of hulled and of unhulled seed were placed between 1/2-inch layers of soil, the seed being protected from soil contamination by single thickness of paper toweling at the same moisture level as the soil. The seed tests in each moisture treatment were placed in metal containers, each treatment in triplicate, and an upper sample was removed for moisture test from each container at intervals of 2, 8, 12, 24, 36, and 48 hours.

The rate of moisture absorption from the soil in the laboratory is shown in Fig. 1. The hulled seed absorbed moisture more rapidly than the unhulled seed at all moisture levels. The rate of moisture absorption increased with the level of the soil moisture. Maximum moisture absorption was reached in 24 hours at the 2% and 5% levels and in 36 hours at the 10% and 15% levels. The radicles started to emerge in less than 24 hours at the 15% soil moisture level. At the 10% level radicles from hulled seed started to emerge in 36 hours. Emergence did not occur in the other samples at the 2%, 5%, and 10% moisture levels during the 48-hour period. Between 5% and 10% soil moisture was effective in causing radicle emergence in hulled seed and between 10% and 15% for unhulled seed. It is evident that more moisture is required for germination of unhulled than hulled seed.

In a second laboratory experiment, moisture absorption of hulled and unhulled seed and hulls were compared. Each individual lot of seed or hulls was placed on blotter paper saturated with water in Petri dishes. The lots of seed or hulls were in triplicate for each period of 2, 4, 6, 8, 10, 12, 24, and 36 hours. The rate of absorption, as shown in Fig. 2, was similar and quite rapid for 2 hours. This rapid rate of absorption continued in the hulled seed for 8 hours. The absorption