Comparisons of Floral Response of Seed Lots of Dollard Red Clover, *Trifolium pratense* L.

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TWO GENERAL types are recognized within the species *Trifolium pratense* L. Medium or double-cut varieties have been commonly used in the U. S. Single-cut or mammoth varieties have been used extensively in Northern Europe and areas of Canada. Use of mammoth varieties in the U. S. has been restricted largely for green manure.

The accumulated evidence (1, 2, 4, 5) suggests that one of the basic physiological differences between the two red clover types is that the medium varieties are capable of developing flowering stems without a period of exposure to near or sub-freezing temperatures. In contrast, the mammoth types apparently require exposure to low temperatures before floral stems will elongate and mature.

Germ plasm of both types is being utilized in red clover breeding programs and varieties have been released that combine both types resulting in a varietal population with a diverse genetic base. Dollard red clover is an example of such a variety. Consequently, a diversity of plants ranging from completely rosette types to completely floral types can be found during the seedling year in the varietal populations. Bird (1) described five plant types based on the degree of floral stem development that can be found within the varietal population of Dollard during the seedling year. Smith (5) called attention to such plant type diversity as it may affect the maintenance of a variety through successive generations of increase.

Steppler and Raymond (6) reported that a LaSalle seed lot, harvested from a seeding year stand, contained a higher percentage of floral-type plants than a seed lot harvested from the second year production of this seed field. They observed that plants producing seed during the seedling year usually failed to survive the following winter. Smith (5) working with Wisconsin common red clover also found a lower survival rate for the "flowering-types". Therrien and Smith (8) reported that the percentage of winter killing during the first winter was higher for the flowering plants than for the nonflowering plants of Dollard red clover.

The question arises as to whether varietal populations derived from the combination of single-cut and double-cut germ plasm can be maintained through successive generations of seed increases. This question becomes more important when these increases are accomplished in vastly different environmental regimes such as those that prevail in the north central area of the U. S. where these varieties are adapted and those in the seed producing areas of the western U. S.

In an attempt to obtain information as to whether changes are induced during seed multiplication, a varietal breeder seed lot of Dollard red clover was split among three locations in the western U. S.

MATERIALS AND METHODS

Seed production plots were established at: Prosser, Washington, 46° N latitude and 840 feet elevation; Tehachapi, California, 35° N latitude and 3975 feet elevation; and St. Mary’s, 35° N latitude and 350 feet elevation from breeder Dollard red clover seed (F. C. 32815) produced at Macdonald College, Quebec, Canada.

The spring-seeded increase plots at Prosser were made at 1, 3, 6, and 12 pounds per acre. Seed crops were harvested from second- and third-year stands. In addition, plots were made at Prosser and Tehachapi at 1, 3, 6, and 12 pounds per acre. Seed crops were harvested from second- and third-year stands to superimpose clipping treatments, each of which was sown in triplicate. During the second and third clipping treatments (zero, early (pre-bud), and late (blossom)) was applied to each plot.

Duplicate plots were sown at Shafter on October 2, January 28, and March 29 at 1 and 3 pounds per acre. Seed crops were harvested from second- and third-year stands. Seed increase plots at Shafter were made at 1, 3, 6, and 12 pounds per acre. Seed crops were harvested from second- and third-year stands to superimpose clipping treatments, each of which was sown in triplicate. During the second and third clipping treatments (zero, early (pre-bud), and late (blossom)) was applied to each plot.

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Isolation was maintained among the different plots by growing them under a 12-inch high cage of 1/2-inch and 3/4-inch galvanized steel conduit and 14 X 18 mesh lumite screen. The shading of the cages reduced light intensities about 40% in the cages. Light measurements at noon on clear days in May, June, and July at Shafter, and Tehachapi averaged approximately 12,000 ft.-c. inside the cages and 7,000 ft.-c. inside the cages and 7,000 ft.-c. inside the cages.

Differences in temperature and humidity inside the isolation cages were negligible. Wind velocity was reduced inside the cages.

Hives of honeybees, *Apis* sp., were placed on the flowering period. Each seed increase plot was harvested when most of the heads had bloomed. Seed crops were harvested from second- and third-year stands. Seed increase plots at Shafter were made at 1, 3, 6, and 12 pounds per acre. Seed crops were harvested from second- and third-year stands to superimpose clipping treatments, each of which was sown in triplicate. During the second and third clipping treatments (zero, early (pre-bud), and late (blossom)) was applied to each plot.

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