THE EFFECT OF LATE SUMMER AND EARLY FALL CUTTING ON CROWN BUD FORMATION AND WINTERHARDINESS OF ALFALFA¹

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THE cutting of alfalfa in late summer and early fall in the northern sections of the United States is frequently practiced, especially when hay is scarce and high priced. A short growing season in this section generally limits the production to two cuttings, but occasionally three or even four cuttings may be taken. This at times results in a reduction of the stand due to winterkilling, a decrease in yield the following year, or a combination of both. In Michigan, the third cutting is generally removed in September or October and in southern Michigan where harvesting three cuttings is often the rule, a fourth cutting is sometimes taken late in the fall. It has been observed that these late cuttings have not always resulted in a reduction of stand or yield the following year.

In view of these facts an experiment was laid out to determine the influence of removal of the fall growth of alfalfa at different dates. The experiment dealt not only with the subsequent productivity of the alfalfa following late summer and early fall cutting, but also with the influence of such cutting treatments on crown bud formation and stem production, and the percentage dry matter, rate of respiration, and rate of hardening of the roots.

REVIEW OF LITERATURE

Granfield (4), Garver (2), Moore and Graber (8), Salmon (10), and Kiesselbach and Anderson (6) have shown in general that frequent cutting of alfalfa resulted in a rapid depletion of the stand. Willard, et al. (12), state that cutting in late September and early October is likely to be more injurious than cutting on November 1 when no exhaustive new growth can be initiated and after all root storage is complete. Graber, et al. (3), show that frequent cuttings reduced the size of the root, lowered root reserves, and reduced the number of crown buds and stems. Peltier and Tysdal (9) found a relationship in 2-year-old alfalfa plants between size of root and number of crown buds and stems and their ability to escape winter injury. Dexter, et al. (1), and Megee (7) found that the electrical conductivity method was useful in determining susceptibility of plants to low temperatures and as an indicator of the rate of hardening in alfalfa plants. Steinmetz (11) showed that total solids in the sap and the quantity of juice expressed from alfalfa roots have no apparent relationship to the winterhardiness of the plant.

No attempt has been made to include all the literature citations on low temperature relationships of plants. Harvey (5) has compiled a very complete bibliography on this subject.

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³Figures in parenthesis refer to "Literature Cited", p. 53.