The Production of Forage Crop Mixtures Under Different Systems of Management, the Consequent Effect on Corn Yields, and the Re-establishment of Alfalfa

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Forage grasses and legumes either alone or in mixture have contributed a major share in the feeding of the nation's livestock, functioned as green manure crops to the advantage of the cash crops which follow in rotation, had a desirable influence on the physical condition of the soil, and aided in the protection of the soil against erosive erosion and leaching losses. When legumes are grown alone or in association with the grasses, additional benefits accrue from the activities of the nitrogen-fixing bacteria associated with the legumes.

The growing of grasses and legumes, alone or in combination, has long been considered as an essential part of a good crop rotation, but varied management and uses to which the forage crop is put, once it is established, does not assure a uniformly beneficial response on the part of cultivated crops which follow. The continued harvest of a forage for hay involves the removal of large quantities of plant nutrients from the soil. Unless large quantities of manure and commercial fertilizer are returned to replenish the soil with nutrients, its productivity may be seriously curtailed by forage crop production. The nature of the forage crop and whether it is used entirely as a green manure crop or removed as pasture or hay may have a decided effect on land management practices.

PLAN OF EXPERIMENT

In order to study the productivity of different forage crop mixtures under different systems of management and the resulting influence of forage use on soil productivity, an experiment was laid out at the Michigan Agricultural Experiment Station in 1938. Four different forage mixtures, one straight grass, one straight legume, and two consisting of both grasses and legumes, were made up as follows: (1) Timothy, Kentucky bluegrass, red clover, alsike clover, and white clover; (2) timothy, smooth bromegrass, perennial ryegrass, Kentucky bluegrass, and Canada bluegrass, (3) alfalfa, smooth bromegrass, red clover, alsike clover, and white clover, and (4) alfalfa, red clover, alsike clover, and white clover.

There were 12 square plots, each 1/24 acre in size, seeded to each mixture. Three systems of management were provided for each of the four mixtures as follows: (a) Hay harvest only, with one or two cuttings per season depending upon productive nature of the mixture; (b) hay harvest of the first cutting, with pasture of the subsequent growth; (C) pasture only.

This system allowed for four randomized blocks with each management practice being replicated four times on each of the four different mixtures.

In all cases where pasturing was carried on, grazing was discontinued on September 1 to give the plants ample opportunity for fall storage of root reserves.

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