GRASS-ALFALFA YIELDS AND FOOD STORAGE OF ASSOCIATED ALFALFA AS INFLUENCED BY HEIGHT AND FREQUENCY OF CUTTING

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One of the problems encountered by forage producers in the North Central area is that of maintaining the desired proportion of grass in an alfalfa-grass mixture. The grasses as presently managed produce most of their yield in the first harvest. Height and frequency of cutting no doubt influence the yield and persistence of the grass as well as that of the alfalfa.

Yields of grass-legume mixtures generally decrease with increasing frequency of cutting, but the percent of grass generally increases (3, 4). Forage yields and food reserves of alfalfa vary with frequency of clipping (4, 7, 8), but not with height of stubble unless frequent defoliation is practiced (7). Productivity of many grass species decreases with increasing frequency of clipping (1, 2, 5). However, the magnitude of this response is not consistent among species because of the difference in growth habit. Tall-growing grasses generally are injured more by frequent and close cutting than short-growing grasses. Thus, the ability of certain grasses to compete with alfalfa will depend in part on the intensity of foliage removal (1, 3, 4).

The current study was initiated in the greenhouse to observe the effect of height and frequency of cutting on the productivity of three grass species, bromegrass (Bromus inermis Leyss.), orchardgrass (Dactylis glomerata L.), and timothy (Phleum pratense L.), when grown in association with alfalfa (Medicago sativa L.). Food reserves in alfalfa also were studied.

Materials and Methods

A clonal line of bromegrass, orchardgrass, and timothy from northern stocks was used as a source of plant material for the grasses. The alfalfa was taken from broadcast seeding stands of Vernal alfalfa established during the spring. Plants were established in pots in the greenhouse during late August of 1958 and during late September of 1959. Four plants of a grass species and 4 alfalfa plants were established in 8-inch, porous-clay pots containing a silt loam-sand mixture (2:1). The soil was fertilized at the rate of 600 pounds per acre of 0-7-37. Each year, the pots were placed in a randomized complete block design with three replications. The plants were cared for as needed during a 3-month period until they were uniformly established. At that time all herbage was removed to a 1-inch height. Six clipping treatments shown in Table 1 were then imposed during a 110-day experimental period. Clipping heights were based on the height of the alfalfa. At the completion of the 110-day period all herbage was removed at a 1-inch height and included in the total yields. All samples were hand separated into grass and alfalfa components before drying at 70° C.

The alfalfa and grass roots were washed free of soil at the end of the experimental period, separated, and dried at 70° C. Alfalfa roots were saved for total available carbo-

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