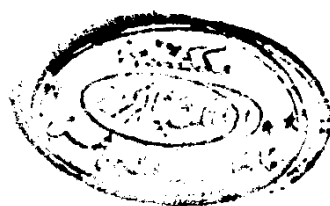


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Influence of management of different mixtures of alfalfa and perennial grasses on the yield, botanical and chemical composition



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I N T R O D U C T I O N

In U A R, due consideration was given to the establishment and growth of forage crops in lands under reclamation. The most promising crop in such lands is alfalfa which thrives well during the whole year, but its growth is low during winter months.

Among the advantages achieved by growing mixtures of grasses and legumes are : (a) securing a more rapid establishment of sward, (b) obtaining a better seasonal distribution of the forage production, (c) increasing the grazing season, (d) improving palatability of the mixed fodder plants, (e) increasing the total yield and digestability of plants, (f) erosion control, and (g) resistance to disease and insect injury or to weather hazards.

The species or strains to be included in the mixture, the quantity of seeds to be sown and the proportion of each in the mixture have to be given a great attention in blending mixtures. These factors have to be chosen on the basis of their suitability for (a) the desired duration of the sward, (b) the environmental conditions ,

and (c) the purpose and intended management of the grasses.

The common practice in U A R, is to grow alfalfa alone in soils under reclamation. This is faced with many drawbacks among which are : (a) the invasion of weeds and undesirable plants and (b) the liability of livestock to bloating.

This work was designed to investigate the effect of management on the botanical and chemical composition as well as the yield of pure stands of alfalfa, rhodes grass and harding grass and their mixtures.

REVIEW OF LITERATURE

Effect of Clipping Intervals on :

1- Fresh yield of forage plants :

Waters (1915) investigated the influence of the stage of maturity on subsequent yields and permanence of stands of timothy (Phleum pratense L.). He pointed that many farmers had noted that early cutting materially shortened the life of timothy meadows, decreased the density of its stand, retarded its regrowth in the spring and increased in weeds.

Aldous (1930) in Eastern Kansas found that removal of vegetation at short intervals caused a much greater decrease in density than did removal at longer intervals.

Graber (1931) pointed out that subterranean growth and total weight of herbage tend ultimately to vary inversely with frequency of defoliation but excessive defoliations were sometimes followed by reduction in growth persisting for several months.

Biswell and Weaver (1933) studied the effects of removal of tops of certain grasses on roots and yield of

top growth. The yield of top growth clipped at two-week intervals as compared to yield clipped at the end of season ranged from 14.5% in big blue stem to 63.1% in buffalo grass. The species with greatest reduction in yield of tops also had least root growth.

The effect of obtaining 2, 3, 5, 8, 9 and 10 cuttings on the production of native grass was studied by Gernert (1936). He demonstrated that as the number of clippings increased, the yield of forage decreased.

In green house studies of top and root development of perennial grasses. Harrison and Hodgson (1939) reported that the timothy and orchard grass were more injured by continuous close cutting than Kentucky bluegrass, quack grass and brome grass. These workers discounted the fact that orchard grass produced higher yields than brome grass, on the basis that the later was located in the shadier part of the green house as compared to the other grasses.

Brown and Mansell (1941) studied the effect of height and frequency of clipping on the yield of a ladino clover with orchard grass and found that the height of cutting had greater effect on first year yields of the clover than frequency of cutting. They showed that grazing five or six times per season and removing the stock

whenever the forage had been grazed to a height of 4-inches should maintain vigorous stands. However, they suggested that in good stands of orchard grass and ladino clover, frequent cuttings or grazing in the spring months might be necessary to prevent the grass from having a high nutritious and competitive conditions.

Bird (1943) indicated that stage of growth at the time of the first cutting determined the periods over which aftermath growth might take place. The four grass species used in his studies varied considerably as to the time at which they reached corresponding stages of growth in the spring. Blue grass was the first to reach the end of bloom stage and was followed by brome grass, timothy and red top in that order. Brome grass appeared especially sensitive to adverse conditions at the beginning of bloom. It was superior in yield to the other species if cut only at advanced stages of maturity, but not at immature stages. At the beginning of heading, brome grass produced significantly lower yields and red top significantly higher yields than the other species. However, brome grass was the highest yielding and red top the lowest yielding of the four species.

In Punjab, Dharmani and Atam (1946) determined the forage yield of berseem as affected by 15-, 30-, 45-,

and 60-day intervals between cuttings and found that the 45-day intervals was the most suitable.

Piedade (1946) reported that rhodes grass(Chloris gayana Kunth) is the most important of the exotic grasses introduced into Barazil, not only on account of its nutritive value but also because of the readiness with which it adapts itself to Barazil conditions. It is advantageous to grow it in association with other forage plants such as alfalfa (Medicago sativa L.). It may be used as a silage crop, giving six cuts a year for hay cut before flowering.

At Pulman, Washington, Comstock and Law (1946) determined the effects of different cutting treatment on various grass-alfalfa mixtures and on alfalfa grown in pure stands. They found that all plants produced higher forage yields under deferred rotation cutting or and cutting at the hay stage than under frequent cutting. Alfalfa in pure stands and alfalfa-orchard grass mixture produced the highest yields under the deferred rotation system. All other mixtures produced best when cut at the hay stage. Alfalfa-orchard grass and alfalfa-brome-grass-crested wheat grass were most productive under the hay cutting treatment when cut by a method simulating grazing (two

or three times during the season). Alfalfa-big bluegrass and alfalfa-brome grass-crested wheatgrass produced higher yields than any of the other mixtures tested. Frequent cutting reduced root yields in all cases.

Paci (1949) concluded that cutting pasture at early stages of growth increased its quantity and its quality. The slightly greater cost of the additional mowings was largely counter balanced by the greater quantity and improved quality of pasture obtained.

In trails to determine the effect of eight different cutting treatments on the yield of alfalfa-brome grass mixture. Dotzenko and Ahlgren (1951) found marked difference in total forage yield among the cutting treatments. Frequent and early cutting reduced the yields as did delaying harvest beyond the $\frac{1}{2}$ bloom stage. Maximum yields of alfalfa were obtained at the $\frac{1}{2}$ bloom stage, whereas brome grass produced its largest total yield at the full bloom harvest period.

At Lawes, in South-East Queensland, Christian and Shaw (1952) reported that the two strains of rhodes grass (Chloris gayana Kunth) differed markedly in growth form, rate of maturity and other characteristics. They added the two strains had the same value when grazed by cattle

under a system of intermittent grazing at a heavy rate of stocking. They also showed that lucerne could be maintained in a mixed pasture with rhodes grass, and that the presence of a small population of lucerne of density of 2 - 4 plants per square yard resulted in growth of rhodes grass and increased live-weight gains by the steers.

Wagner (1952 a) studied the effect of different clipping on growth and development of seedling grasses and legumes. He found that at early stage of growth, the daily increase in root weight was more than that of top growth. Plants cut twice generally produced less top and root growth than plants cut once. Production of brome grass was the most affected and orchard grass the least by clipping.

At Beltsville, Meriland, Wagner (1952 b) tested the general behaviour of four grass-legume mixtures under differential cutting treatments. He noticed that orchard grass-ladino clover proved to be outstanding in being more productive and superior in distribution of forage production as well as having a desirable grass-legume balance through the growing season. Brome grass-ladino clover was superior in productivity to the alfalfa combinations. Brome grass-alfalfa was found to be the least desirable of the four mixtures particularly under the more