Growth Intervals in Pasture

clipping experiments aim at finding the most suitable regrowth periods for California legume-grass mixtures

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Growth intervals of common legume-grass mixtures were investigated to determine the most efficient system of rotation grazing in California's irrigated pastures.

Three legumes were studied—alfalfa, ladino clover and birdsfoot trefoil. Each was seeded with a mixture of grasses consisting of rye grasses, orchard grass and alta fescue. A mixture of all three legumes with grasses was also tested.

Each of the four mixtures received four different clipping treatments which might correspond to rotation grazing schemes with different time intervals of regrowth. The lengths of the regrowth periods were two, three, four and five weeks. Each treatment was repeated six times for accuracy. In all, more than 2,000 yield determinations were made.

Increased Yields

All the mixtures gave increased yields for the two seasons of the experiment, with the time intervals for regrowth lengthened. Average seasonal yield of all the mixtures when clipped every two weeks was 4.69 tons on the hay weight basis. Yields were increased 20% by allowing three weeks of regrowth, 48% with four weeks, and 86%—8.70 tons—with five weeks of regrowth.

Some of the legumes were more sensitive to frequency of clipping than others. Ladino clover and grass was the most productive mixture when clipped every two or three weeks. Alfalfa-grass mixtures and mixtures containing all the legumes exceeded ladino clover in yields if clippings were spaced at four or five weeks. The alfalfa-grass mixtures were increased in yields by 154% by extending the growth interval from two to five weeks.

These yields can be converted to carrying capacities by assuming a daily feed requirement of 25 pounds of dry matter for each animal unit.

Clipping yields usually exceed the yields produced under grazing conditions by about 20%.

Reducing the yield figures of the clipping experiment by 20%, a 30-acre pasture should carry 33 animal units—mature cows—for eight months if it is grazed every two weeks; 39 cattle if grazed every three weeks; 49 cattle if grazed every four weeks; and 61 cattle if grazed every five weeks. Only volume of feed, not its quality, is here considered.

The proportion of the different species in the pasture is influenced by the way the pasture is grazed or clipped. Plots which contained all three legumes with grasses contained mostly ladino clover and grass when clipped every two weeks, 40% grass, 58% ladino, and 1% each of alfalfa and birdsfoot trefoil. Clipped every five weeks, the same mixture contained 8% grass, 4% ladino, 87.5% alfalfa, and .5% trefoil.

The proportion of grass in the mixture was consistently increased by frequent clipping. Alfalfa was unable to compete with ladino when clipped every two or three weeks but nearly eliminated the clover if clippings were extended to four or five weeks.

None of the grasses tested was able to compete with alfalfa when clipped at intervals of four or five weeks. Even alta fescue was present only to the extent of 3.5% to 12%. Yet it is desirable to seed alta fescue or orchard grass with alfalfa as it will improve the pasture sod and help control bloat in early spring and late fall when alfalfa grows more slowly than the grass because of cool temperature.

The effect of the clipping on feed quality was investigated by chemical methods.

The ladino-grass mixture was the most succulent, containing an aver- of 16.2% dry matter. A steer consuming 100 pounds of green feed was taking on about 84 pounds of water and only 16 pounds of dry matter. To obtain 25 pounds of dry feed the animal would have to consume 154 pounds of green feed. This test explains why use of some dry feed with the clover pasture might improve gains.

Alfalfa grass and trefoil-grass mixtures each contained about 19.5% dry matter. Consequently, the dry matter intake was considerably greater than in the ladino-grass mixture. The frequency of cutting did not materially influence the percentage of dry matter.

Although normally the percentage of dry matter increases as the grass becomes

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Electric fences are an economical means of subdividing pastures for rotation grazing.

PIPE

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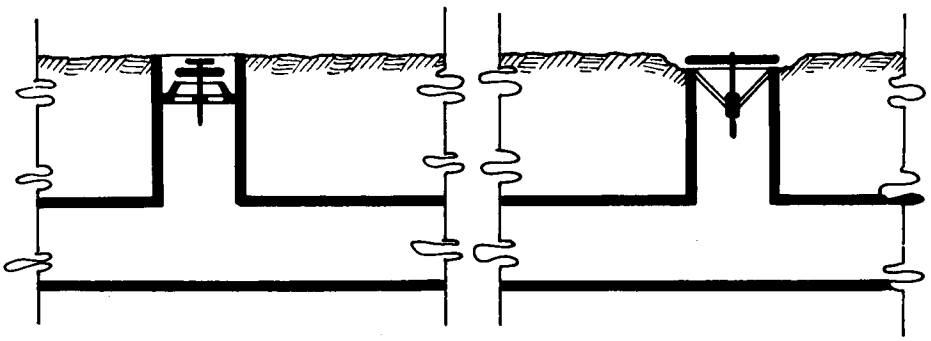
shrinks, even when it is in contact with somewhat moist soil.

Generally, rips and cracks can be largely prevented by always using moist soil for the initial backfill, following two to five lengths behind laying; designing systems so that air can not circulate through the pipes, and preventing air circulation during installation; and constructing all stands before the pipe is laid, and tying the pipe into such structure promptly after laying. Prompt filling of a new line with water is also desirable to prevent cracks.



Orchard valve hydrants—*left*—are commonly installed where alfalfa valve hydrants—*right*—should be installed for flooding irrigation. With the same size riser, the latter may permit almost three times the maximum flow of the former.

Concrete Qualities

General experiences and experimental studies point to the importance of density in concrete toward making for permanence.

Even if high strength is not needed in thin shelled plain concrete pipe, emphasis should be placed on high quality—density and imperviousness. Good grading of the mix, good compaction, and good lubrication of the mix—possibly through air entrainment—are important.

Farmers can use the absorption test to check the quality of pipe they are purchasing. Simply, in this test a fragment of pipe is boiled five hours in water, weighed wet, then dried to constant weight in a 110° C oven. The weight loss should not exceed 8% of the dry weight. Experiments showed that this simple test correlates absorption with bulk density of the concrete.

Hydrant Design

Of the two common hydrants for flooding irrigation, the alfalfa valve and the orchard valve type, the latter is neater—there is less erosion around the hydrant. However, this hydrant may have as little as one third the capacity of the alfalfa valve type of comparable size. If the alfalfa valve is placed low—several inches below the soil surface—erosion is usually not too severe. In easily eroded soils old tires or a short length of larger pipe can be buried around the hydrant and provide protection. Normally, the entire capacity of the pipe line should be available from each hydrant, and it would be short-sighted and false economy to underdesign hydrants.

Large capacity is becoming increasingly important as the trend is away from furrow and toward flooding irrigation to provide more water and avoid salinity problems. In arid regions rainfall is often inadequate to accomplish sufficient leaching, so irrigation must be used to control salinity.

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PASTURE

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more mature the legumes—higher in moisture than the grasses—increased proportionately as the clippings became less frequent. This about offset the expected differences in dry matter with increasing maturity.

The protein percentage was highest in alfafa-grass mixtures, lowest in the trefoil-grass, with ladino ranking in between. All mixtures showed a considerable decline in protein content as the clipping intervals became greater. This is not too significant because even the lowest protein percentage for the infrequent clippings is large enough to supply far more than the requirements of the grazing animal.

As the drop in protein percentage is associated with an increase in fiber content, the digestibility of the feed may be lowered. The question of how far yield should be sacrificed to increase quality is still unanswered.

It is not known at this time how livestock will gain under a rotation scheme which allows a considerable amount of topgrowth.

The concentration of enough stock on each pasture to graze it down quickly and evenly is an essential part of a rotation grazing system. If grazed down too slowly, much of the pasture's grass will be trampled and fouled by manure droppings.

Overgrazing will reduce pasture yield; undergrazing will permit some of the grass to become more mature, and this will result in losses in feed quality and livestock gain.

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Clover grazed at intervals of four or five weeks will attain a height of 12 to 15 inches. The stake in the picture is 15 inches tall.