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PERMANENT IRRIGATED PASTURE PRODUCTION
WESTERN RIVERSIDE COUNTY

In 1974, there were 16,810 acres of permanent pasture with an annual value estimated by the Agricultural Commissioner's office of over four million dollars (or \$243 per acre). Permanent pasture production is often computed by Animal Unit Months (AUMs) carrying capacity. An Animal Unit Month (AUM) is the carrying capacity equivalent for a 900 to 1000-pound animal - or one horse, two 500-pound calves, five sheep. An AUM is also considered to be equal to .4 tons of hay. In Western Riverside County, a well managed pasture should provide between 18 to 20 AUMs pasture per acre per year. A typical annual distribution of AUMs by month for a Western Riverside County pasture is as follows:

Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
AUMs PER ACRE												
1.1	1.7	1.7	2.0	2.1	2.2	2.3	2.0	1.9	0.8	17.8		

SOILS: Although pasture will grow on a wide range of soil types, it is most efficiently grown on relatively high water holding capacity soils such as loams to clay loams because of the predominately shallow root system of many pasture species. Also, since pasture is a relatively low income crop and yet will produce reasonably well on problem soils -- for example, saline soils and shallow, hardpan soils-- it fits more economically on these lower value soils. Sandy soils, because of a low water holding capacity, also require very frequent irrigations unless a mix containing the relatively deep rooted species is grown. Such mixes, however, often result in lower feed quality.

IRRIGATION: For good production of high quality pasture, frequent irrigation is absolutely essential -- every 8 to 10 days, for example, on sandy loams to loam soils and six days or less on sandy soils. Although some species (such as Bermuda grass, tall fescue or Dallis grass) may survive on less frequent irrigation, production and quality will be lower. During the hot summer months, a total of 12 acre inches of water per acre are needed per month with an efficient irrigation design and up to 15 acre inches per acre with flood irrigation on nonuniform or sandy soils. Pasture should not be planted where there is less than 1/50 cubic foot of water per second for each acre on a nearly continuous flow basis. (1/50 cubic foot per second is equivalent to one Southern California Miner's inch or nine gallons per minute.)

On level soils of uniform loam or clay loam texture, border check irrigation is preferred where water is cheap (\$10 per acre foot or less). However, unless the border check system is very carefully engineered, this method will use more water than a sprinkler system. This is especially true on sandy soils or on soils which are nonuniform in texture (sandy spots alternating with loam or clay textured spots). Nevertheless, the additional cost for pressure to operate the sprinkler, combined with the extra cost of investment for a sprinkler system, increases the annual per acre cost. (See Costs, Page 5).

LAND PREPARATION AND PLANTING: A firm, well packed seedbed is necessary for pasture and this is best accomplished by a ring roller (Cultipacker®), sometimes even previous to using a ring roller planter for planting. Several light sprinkler irrigations (one inch of "rain" or less) may be necessary about five days apart unless natural rains are frequent at planting time.

Soil crusts which form after a heavy rain or a sprinkling must be kept soft by either frequent repeated rains or sprinklings until all species have emerged.

All legumes (clovers, trefoil, and alfalfa) should be inoculated with the proper nitrogen fixing bacteria for each specific legume with a fresh inoculum at planting time. The inoculum can usually be ordered by the seed company where you purchase your pasture seed.

TIME OF PLANTING: November 15 to December 15 is generally the best time to plant in Western Riverside County because fall rains are usually to be expected at this time of year. Plantings between December 15 and January 30 should be avoided because of sensitivity of some species to frost in the seedling stage. February is the next preferred planting date but plantings up through March are possible with sufficient sprinkler pipe to keep the soil moist until emergence.

VARIETIES: A typical mix for good conditions would include the following:

Perennial ryé grass	5 pounds/acre
Annual ryé grass	1 pound
Orchard grass	2 pounds
Ladino clover	2 pounds
Aphid resistant alfalfa (spotted alfalfa aphid)	2 pounds
Alta fescue	6 pounds
Bird's foot trefoil	2 pounds

Mammoth red clover, a short-lived perennial, at 2 pounds is occasionally added to this mix to provide adequate legumes in the mix until the longer lived perennial legumes become well established.

On salty soils, omit Ladino clover and red clover and substitute narrow leaved bird's foot trefoil. Ladino clover can cause bloat problems if it becomes predominant and is sometimes left out where careful observation of grazing cattle cannot be practiced. A rule of thumb worked out by livestock managers is that probability of bloat problem becomes high whenever the pasture contains 50% or more of trifoliolate clovers (Ladino clover, red clover, etc.). Nevertheless, experiments at the University of California at Davis show that a Ladino grass pasture is often considerably more productive than a trefoil grass pasture. Moreover, since it is a hot weather plant, the grazing season is short. Dallis grass at the rate of 2 pounds per acre is included in some pasture mixes but is unpopular because it tends to "take over" the pasture, tends to clump, and is low in palatability unless very carefully managed.

Bermuda grass is a satisfactory pasture but is relatively low in protein and often low in total digestible nutrients. Though often used for horses, it is less desirable for cattle unless supplemented with concentrate feeds. Coastal Bermuda grass -- which must be planted from stolons -- has been shown in some areas to have a higher productivity and protein percent than either common Bermuda grass or NK37®.

FERTILIZER: Grasses respond to nitrogen. For a pasture mixture with both legumes and grasses, a total of 100 to 120 pounds of nitrogen per year divided into 3 to 4 applications during the growing season can profitably be used per year under good irrigation practices.

A September or early October application of nitrogen has been shown in some areas to extend the grazing season slightly.

Bermuda grass has been shown to respond economically to up to 200 pounds of nitrogen or more per acre per year. Phosphorus is required by both grasses and legumes, but on borderline deficient soils, legumes are more likely to respond to phosphorus. Eighty pounds of $P_{2}O_{5}$ (35 lbs. P) per acre should be applied in early January or February.

SPECIAL MANAGEMENT PRACTICES: For good quality and uniform pastures, the pasture should be clipped (mowed) at least once, and preferably two times a year. Also, manure droppings should be dragged with a flexible (ring) harrow--often, as frequently as once a month. Control of winter and summer annual weeds which are most likely to be troublesome during the first year is best accomplished by mowing as the weeds flower. Serious perennial weeds often can be controlled with 2,4-D but this would eliminate red clover and alfalfa, and sufficiently heavy dosages to kill tough perennial weeds will kill trefoil and Ladino clover. "Spot" spraying with 2,4-D for serious perennial weeds before they invade the entire pasture is advisable.

PARASITE CONTROL: Animals to be placed on pasture should be wormed before they are turned into the pasture. After worming, the animals should be held in the drylot two or three days to avoid contaminating the pasture. By frequent scattering of manure in the pasture (as outlined above) parasites are exposed to sunlight which reduces the possibility of contamination of animals. Also, scattering the manure destroys the breeding medium for hornfly. (Ask us for the current publication, Control of External Parasites of Livestock.)

GRAZING: In general, pasture should be grazed rapidly down to a height of six inches and then allowed to recover a minimum of several weeks before pasturing again. In order to accomplish this it is desirable to have fenced subdivisions in the pasture, preferably five. This promotes a more uniform growth and greater total production than frequent or continuous grazing.

Early season grazing can be especially hazardous if Ladino clover starts out early and forms a canopy over the top of the grasses. Bloat of cattle is often most common in this circumstance. Mowing the pasture and allowing the Ladino clover to dry slightly before pasturing is one method of avoiding this problem. Newly registered bloat retardants are also now commercially available.

In any event, and especially on pastures containing a high proportion of Ladino clover, it is desirable to have feed racks filled with dry hay or straw scattered about the pasture within easy walking distance for the cattle. This not only helps in reducing bloat but also reduces "scours" on highly succulent "washy" pastures common in the early spring flush of growth.

To avoid soil compaction, pastures should not be irrigated while cattle are grazing.

BALANCING PASTURE PRODUCTION: Since no permanent irrigated pasture provides an even feed supply year around, growers must either lower the number of cattle during slack production periods and increase them during heavy production periods, OR supplement the pasture with hay, concentrates, or with annual pastures.

Pasture production is low in the late fall, winter, and early spring. One effective method for offsetting this low production is to plant winter cereals on land reserved for this purpose. Barley or oats can be planted as early as

September 1 if irrigation is available with additional plantings at about 15-day intervals until December 1. October plantings will provide pasturage by late November and early December. December 1 plantings will extend the winter cereal grazing period up to March and April, by which time the permanent pasture will be providing close to 2 AUM's per month per acre (see Page 1).

If more winter cereal is planted than needed, the excess can be sold for cereal green chop or can be made into hay for summer roughage supplement. Growers planning to market cereals for green chop should make advance arrangements with a green chop operator to assure a market.

The cultural practices for winter cereals for grazing are similar in most respects to that for cereal green chop production (ask for the leaflet, Cereals for Green Chop -- Western Riverside County, available at the Cooperative Extension Office, 21150 Box Springs Road, Riverside, California 92507 - Phone (714) 683-6491.

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