



DICHONDRA

DICHONDRA—A successful ground cover in warm areas in clean soils free of weeds.

rating includes grasses that will require more skillful and persistent maintenance to overcome the effects of climate on growth.



ZOYSIAGRASS

ZOYSIA—Forms a dense, emerald green carpet, somewhat shade tolerant and requiring heat for good growth.

*Better adaptable grass available* rating indicates weak growth permitting invasion of more adaptable grasses and weeds.

These lawns tend to deteriorate unless expert maintenance is practiced.

*Not adaptable* rating indicates the grass will not survive.

The turfgrass maps provide a guide in selecting the grass for a home lawn. Small areas exist within all of these principal climatic zones where micro-climates may alter selections. All climatic boundaries must be considered somewhat flexible. Home owners may obtain greatest satisfaction by selecting grasses climatically adapted to their areas, and learning how to manage them.

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All California breeders of purebred sheep are invited to study this program aimed at the production of meat-type lambs and to express their interest to the author—positive or negative—with suggestions for improvement. Meetings can be arranged with breeder groups to discuss details. If the plan is found feasible, assistance can be obtained in helping to set up a California sheep improvement association.

G. M. SPURLOCK

## MEAT-TYPE LAMBS

—goal of proposed  
sheep improvement association

**S**TUDIES OF ECONOMIC problems in the sheep business indicate two principal needs of the industry are: (1) to increase efficiency in production and marketing of wool and lamb, and (2) to encourage research on carcass quality of lamb and the application of usable results to live animal management and selection. The slaughter lamb of the future must be a meat-type lamb.

Milk lamb producers can market lambs at convenient weights (90 to 105 lbs), with a reasonable amount of finish (choice grade) and at a relatively early age (four to five months preferred) while still gaining well. But to accomplish this, it is necessary to "top out" the rapid-gaining, early-finishing lambs that should go to market early. Too many lambs are coming to market overweight, overfat, and overage. Some have been held too long and have lost their "bloom." This

situation results from pasturing on over-mature forage that has lost its succulence and where burrs and seeds cause discomfort and weight loss to the lambs. Buyers say such lambs are "dried out" and object that these will not grade or yield well, simply because they have been held too long.

Lightweight animals that are thin or in good condition and simply need more time to grow and finish are excellent for longer term feeding. However, California feeders more commonly prefer to buy rather heavy feeders (80 to 85 lb class) with a good or high-good live slaughter finish. With good feed and care these lambs finish quickly. If large-framed but thin lambs of relatively heavy weights (low-good or lower and 80 to 90 lb

weight), are fed out to choice grade, the result is overweight lambs which tend to damage the lamb market. Price discrimination and the longer feeding period will usually mean a loss of money.

This type of lamb might well go to slaughter at medium to high-good slaughter grade when the carcass will be lower in fat content and less mature. The effort should be to market fed lambs at not over eight to nine months of age. Lambs in the 10 to 12 month age range are heavier in weight. Since carcass grading standards require more feathering for choice grade in more mature carcasses, these lambs also average higher in carcass fat content. Recent studies have indicated little or no difference, however, in palatability of the edible meat of such carcasses.

### Carcass research

Research on measures of meatiness in live animals, carcass composition and meat quality is being conducted in a cooperative regional project currently involving 10 different experiment stations in the western states, together with the Agricultural Research Service of the USDA. The ram sketch shows the variety of measures being tried for live animal evaluation and indicates areas of the body involved in this portion of the investigations. Ultimately, we hope to find practical measures which can be combined to predict quality and composition of the carcass without slaughtering the animal. This would greatly facilitate the effort to establish lines of animals of improved carcass quality.

### Purebred program

Eventual production of the meat-type lamb is a task for the purebred breeder. The program outlined here would permit the selection of rams which transmit superior carcass characteristics. It was planned with the help of G. E. Bradford, Assistant Animal Husbandman in the Experiment Station together with Reuben

proving carcass characteristics. Carcass evaluation of progeny should be combined with selection for other economic characteristics such as growth rate.

The selection flow chart shows the details of a program for selection of rams based on their own growth rates and on carcass characteristics of their offspring. This program is visualized as one in which a number of breeders would participate. The chart shows the details of the proposed test for a single breeder's rams. To carry out the tests under ideal conditions, a disinterested party would be chosen by the organization. Such an individual should be one interested in the work, preferably with the needed experience with sheep, able to keep accurate records, and located at some central point in the state. The expense of the entire operation would be borne by individual breeder participants on the basis of the number of rams consigned for testing. The management details and system of evaluation would be subject to approval or change by association members.

A large number of breeders of each breed should participate in the program to obtain maximum benefits. Each breeder would consign 5 to 15 ram lambs to the performance test when the lambs are weaned at four to five months of age. The lambs would be individually identified with birth dates noted. Such lambs should be chosen on the basis of conformation and weight for age at the time of consignment and should represent individuals that appear to have sufficient merit to go into purebred flocks (stud or near-stud quality).

The rams would be fed for a period of 45 to 60 days, all on the same ration and at the same location. A growing ration, either high roughage pellet or chopped hay with a small amount of grain, is recommended. At the end of that period, the best rams (for example the top 20 per cent within each breed) would be chosen for progeny testing. Those remaining would be returned to the owners.

### Selection of ram lambs

Criteria for selection of ram lambs from the performance test must be agreed to by participating owners. Weight for age from birth to the end of the trial would be a major item to consider with perhaps some emphasis on a conformation score. Weight for age is recommended rather than rate of gain during the test, because it is felt that the feeding period of the test would tend to counteract any differences due to variation in pre-weaning management between the various

breeders' flocks. It is probable that such differences would be reflected more in variation in condition than in muscular growth.

Efficiency of gain or pounds of gain per pound of feed consumed is an important characteristic, but one that might be added a year or two following the start of the program rather than at the beginning. A decision must also be made as to whether rams selected for the succeeding progeny test should be the top 20 per cent of all rams of a breed consigned or the top 20 per cent of each breeder's rams. Since the search is for genetic differences in gaining ability, a wide range of animals from which to choose is important, and the first method (selection of the top 20 per cent of all rams on test irrespective of flock origin) should result in more improvement for the breed as a whole.

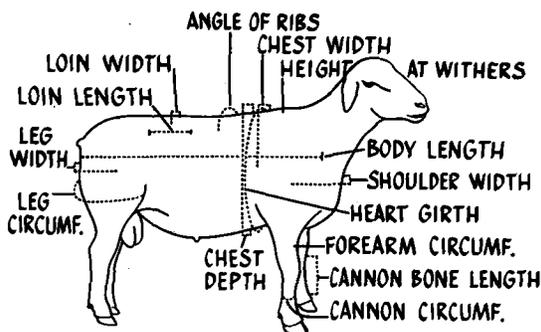
### Progeny test

In the progeny test, each ram lamb would be bred in a separate pen to 10 grade whiteface ewes. The ewes should be relatively uniform in size, type and age and preferably should all have come from one flock. Ear tag and breeding records for each ram and ewe are necessary. After a 45-day breeding period, black-face test rams can be replaced by white-face rams and vice versa to insure that all possible ewes will lamb. This would decrease the cost of testing.

The tested ram lambs can be returned to the owners following breeding and the ewes all kept together in a flock at the testing station from lambing through weaning. Records at birth should include sire, dam, date and type of birth (twin or single), since this information will be useful in evaluating weight gains of lambs. Grafts can be made as usual, providing records of the operation are kept.

All lambs should be grown out together, the males castrated and both ewes and wethers sent to slaughter as they reach 90 to 105 lb live weight. Arrangements should be made to identify individual carcasses through the slaughter process at a cooperating packing plant. After chilling, the lamb carcasses should be broken into fore and hind saddles. Carcass evaluation should be done by two or three disinterested persons and on the basis of the carcass alone. The recommended points for evaluation are those listed in the selection flow chart. This system was developed at Davis and has been used effectively for two years for the lamb carcass contests at the California State Fair.

Rams whose progeny are superior on



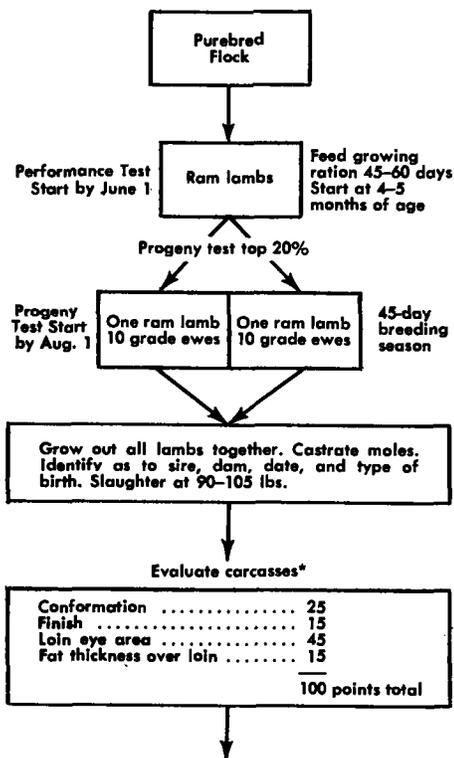
### MEASUREMENTS

Body areas involved in measures for live animal evaluation in the meat type lamb studies. Miscellaneous measurements include: shrunk live weight, creatinine excretion, ultrasonic reflection, natural radioactivity of  $K^{40}$  loin and leg biopsies, antipyrene injections, tritium injections, specific gravity of the live animal, probing techniques, conformation score, condition score, live slaughter grade.

Albaugh, and Horace Strong, Extension Animal Husbandman, University of California, Davis.

Purebred breeders could organize a sheep improvement association similar to the California Beef Cattle Improvement Association formed by cattlemen in 1959. Such an association would have as its objective a cooperative breeding program for selection of rams. Progeny testing is necessary in a selection program for im-

## SELECTION OF RAMS ON PERFORMANCE AND PROGENY TEST



Select top ram from several such comparisons on progeny carcass score for use in purebred flock. Repeat annually.

- \* Conformation: 25 points. Average of two independent scores.
- Cover: 15 points. Even and complete cover desired, without being excessive. Average of two independent scores.
- Loin Eye Area at 12th rib: 45 points. Measured by planimeter and adjusted to basis of 50 lb carcass wt. 3.0 sq. in. = 45 points. 1 point deducted for each .05 sq. in. below this.
- Fat Depth over loin eye at 12th rib: 15 points. Average of 3 measurements at 12th rib, in millimeters, adjusted to basis of 50 lb carcass wt. 5-6 mm. (1/8-1/4 inch) = 15 points. 1 point deducted for each mm. thickness above 6 mm., and 2 points for each mm. below this.

the carcass score thus obtained would be selected for use as flock sires among participating breeders' flocks. Benefits from using progeny-tested rams will only result to the extent that these rams are above the average of all rams tested. Hence at least the lowest 50 per cent, or preferably the lowest 75 per cent, on progeny carcass score should not be used in purebred flocks. On the other hand, the very best rams from within the selected group should receive heaviest use. Even though the freezing of semen and control of the heat cycle in sheep needs further research, artificial insemination using fresh semen could greatly extend the use of a superior sire. Breeders may ultimately use this procedure to make maximum use of particularly outstanding sires.

If the top performing rams, irrespective of the flock from which they come, are progeny tested, some breeders will have more rams in the progeny test than will others. Even with equal numbers tested from each breeder, some breeders will have more of the top rams on progeny carcass score. This situation would necessitate a definite agreement in advance for distribution of costs of the progeny test and use of the superior tested rams so that all participating breeders will benefit from the program. Sires and half brothers of top rams from the progeny test as well as the proven sires would form a highly desirable source of breeding stock.

### Self-help program

Such a program would constitute an active self-help effort by the breeders themselves, subject to their own approval. The system is amenable to change as improved methods become available. It would offer California purebred breeders a chance to put the progeny test to work on a cooperative basis. It is probable that such programs will be set up in different places, and that breeders who are the first to take the step will reap greatest benefits.

The University of California can offer help through the Department of Animal Husbandry and the Extension Service in organizing such a program. If costs of the program as outlined above make it impossible for many breeders to participate, at least two alternatives are available: (1) the performance testing of ram lambs and progeny testing of top ram lambs on grade whiteface ewes at the breeder's ranch, and (2) performance testing ram lambs at home and putting out the top performers with commercial operators willing to cooperate by mating these rams separately to different ewe flocks, so that this will constitute a valid progeny test.

By comparison with the plan of testing all rams from all breeders at one location, these alternatives are less desirable because they allow careful comparison only of animals from within one breeder's flock. This means a slower rate of improvement. Secondly, at least three or four rams should be progeny tested to allow a greater chance of locating animals with superior progeny. However, even these alternatives offer a great improvement over present breeding efforts to increase carcass merit in sheep.

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Symptoms of severe copper deficiency were visually diagnosed in a 27-acre grapefruit orchard near Hemet, California, in February 1958, and again in a nearby orchard in 1962. Typical symptoms were dieback of young twigs, chlorosis of terminal leaves, and misshapen, rough fruit with brown necrotic spots on the outside and gum pockets in the albedo or white portion of the rind. Leaf samples from the orchard contained less than 0.75 ppm copper on a dry-weight basis, thus confirming copper deficiency. The annual application of a copper spray has corrected the severe symptoms of copper deficiency. A minor element study of southern California citrus orchards suggests that approximately 20 per cent of the orchards may possibly respond to a copper spray program.

## Severe Copper

**A**LTHOUGH COPPER DEFICIENCY is not a new problem to the citrus industry of California, the diagnosis of a severe case of copper deficiency in a grapefruit orchard near Hemet, California, in 1958, and again in a nearby orchard in 1962, together with the analysis of trace-element survey data completed over the past 10 years, suggest that more attention should be given to the importance of including copper as a part of the trace-element spray program for citrus.

Leaf samples gathered in February

### CALIFORNIA AGRICULTURE

Progress Reports of Agricultural Research, published monthly by the University of California Division of Agricultural Sciences.

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