Milk Goats

improvement through a breeding program

W. M. Regan

THE OBJECTIVE of the breeder of milk goats should be, not to produce better animals than we have today, but to reproduce the most useful that we have—uniformly and at will.

There are many objectives that may be chosen, such as rapidity of growth, longevity, breeding efficiency, disease resistance, and with milk goats we might even add intelligence and affection. Too many objectives are sure to nullify an otherwise excellent breeding program. If the fixing of high milk production in a true breeding state is the principal, if not the only goal, the possibility of its attainment is greatly enhanced.

Herd Management

The herd should contain at least 20 does of milking age in order to have significant records from which to draw conclusions. Feeding and management practices should be fairly well standardized and a good system of production and progeny records is essential. Fortunately all of these are considered as a necessary part of good goat-herd management.

The breeder of milk goats has at his disposal a method of estimating the genetic constitution of his animals that cannot be applied with equal facility to many classes of livestock. The keeping of accurate individual milk and butterfat production records on each doe is necessary.

When the animals are maintained under fairly uniform conditions, those records may be used for a basis for progeny tests. Direct dam and daughter comparisons offer an excellent means of making an assay of the genetic constitution of a given buck.

Investigations at the New Mexico Experiment Station used good purebred Toggenburg bucks on native does averaging 522 pounds of milk, and obtained daughters that averaged 1059 pounds. After three back crosses the resulting does—15/16 Toggenburg—produced 1444 pounds of 4% milk, slightly higher than that of the does in the purebred herd. This is a striking illustration of the importance of sire selection in a long-time program. The selection of a sire is the most crucial step that must be taken in the breeding of milk goats.

A large degree of the success or failure of a breeder hinges upon the certainty with which he is able to secure as herd sires, bucks that are relatively homozygous for those genes responsible for the transmission of high milk and butterfat production—and to some extent, those responsible for breed type.

Proven Bucks

The exclusive use of proven bucks is attended by certain practical difficulties. They must of necessity be at least four years of age when proven. Because many are disposed of before their real worth is known, they are scarce and high in price.

If proper attention is given to the progeny tests of the immediate ancestors, young bucks with excellent transmitting ability may be selected with a reasonable degree of accuracy.

Since the sire and dam contribute equally to the heredity of the offspring, it is possible to estimate the transmitting ability of a young buck without waiting for his progeny to be tested if the genetic constitution of both his sire and dam can be estimated. The buck is considered relatively homozygous when his unselected daughters—10 or more—are uniformly higher in productive capacity than are their dams.

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LEMONS BUDDED

were continued, and they indicated no change in the relative position of the cuttings and budlings.

The budlings consistently outyielded the cuttings. The difference varied from a fraction of a box to more than two boxes per year where all pickings were recorded.

As to the bearing habit, the two types behaved similarly; when the pick was heavy for one, it was relatively heavy for the other.

Findings

No data on fruit quality were obtained, but observers agreed that the cuttings produced a higher percentage of tree-ripe fruit than the budlings. This is understandable in view of the fact that the foliage of the cuttings was comparatively sparse and had a tendency to mottle.

No records were obtained from the Oxnard plot, but it was obvious even to the casual observer that the difference in quantity and quality was even more pronounced than in the Upland plots.

The Upland trees, now in their 16th year, do not show any indications that the cuttings will overtake the budlings in the immediate future.

The Oxnard cuttings show even less promise. In addition to these five plots, cuttings were scattered in about 10 orchards between 1928 and 1931. These plantings were under varying soil and climatic conditions, and they included many types of lemons, from early, everbearing, relatively weak types, generally classed as Eureka, to extremely vigorous ones which come into production rather late and which produce practically only one crop.

The latter, although vigorous, proved to be very susceptible to gummosis. It is an interesting fact that none of the Eureka cuttings and budlings in Upland developed this disease, although many trees on sweet stock in the same orchard were affected.

The reason for the inferiority of the Eureka cuttings is not clear, unless it is assumed to be due to inherent weakness which is partly overcome by budding on a rootstock of a different species. The theory that the absence of tap roots is a factor is untenable. Trees removed after the 1937 freeze showed that neither the grapefruit nor sweet orange rootstocks maintained a taproot system for more than five years.

The cuttings were as good as the budlings for the first few years when the latter still had a very pronounced taproot.

Nor is there any evidence that the number of roots was a factor. When planted in the nursery, the number of roots varied from one to 12, but this fact bore no relationship to the size and condition of the trees.

Of interest was the observation made when the cuttings were removed from two plots after the 1937 freeze. It was then noted that the number of main roots varied only from five to eight.

Apparently those trees which originally had only one root developed at least four more main roots, while those with 12 lost at least four.

Eureka lemons on their own roots, after 16 years of recorded observations, proved to be less vigorous, less hardy, and less productive than progenies of the same parent trees budded on grapefruit and sweet orange rootstocks.

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The Dam's Progeny

Unfortunately, the above cannot be applied to the doe because of the relatively small number of daughters she may have. If the daughters of her sire—her parental half-sisters—are uniformly better than their dams, and if her record and those of her half-sisters are high, she may be considered relatively pure for high production. The chances are that a young buck with such a sire and dam will in turn sire high production.

Inbreeding

Having established a program that will insure a supply of proven bucks, the development of a true breeding state in the future female herd will be hastened through a system of inbreeding—sire to daughter mating.

Inbreeding is the most efficient tool in the hands of the constructive breeder. Since it promotes homozygosity, it offers the most rapid means of concentrating in the herd the blood of a desirable individual.

Unfortunately both the desirable and undesirable characters are concentrated with equal facility. Because it is a double-edged sword, intense inbreeding should be followed only by those thoroughly conversant with the laws of genetics.

The average breeder who has an excellent proven buck may breed him back to his daughters and to the daughters of those daughters with no detrimental effects other than the appearance of an occasional simple recessive defect. At the same time he may greatly enhance the production of his herd.

Outcrossing

Outcrossing or crossbreeding is opposite in its effect to inbreeding. Its use promotes heterozygosity and is usually attended by increased production, more rapid and efficient growth and fleshing.

The California sheep men are making use of hybrid vigor in a big way. Each year a half million spring lambs are shipped to Eastern markets. Usually a Corriedale ram is bred to a Rambouillet ewe to produce the range ewe which in turn is bred to a Hampshire or Suffolk ram. The resulting lamb is superior in rapidity of growth and quality of carcass to the lamb of any of the pure breeds.

The generally accepted explanation of heterosis or hybrid vigor is based on the fact that most of the desirable hereditary factors tend to the dominant while those less desirable are often recessive or hidden. Thus, high milk production, rapid growth, breeding efficiency, and sturdiness are dominant, while the factors of low production, slow growth, poor fecundity, and general lack of vigor are usually recessive.

Because the Nubians have been developed along certain lines, they have definite factors governing desirable traits that are dominant. The Toggenburgs, on the other hand, may have other desirable genes that are dominant. When the two breeds are crossed the resulting hybrid doe has the opportunity for and probably will carry more of these dominant genes than were carried by either parent.

Crossing Questionable

Because the hybrid does must be retained for herd replacement, the crossing between breeds of milk goats is a questionable practice. However, in my opinion the developing of inbred lines within a breed and subsequent crossing between these inbred lines offers possibilities for securing higher and more economical production.

In the New Mexico experiment referred to above, the production records of inbred does and their outcrossed daughters reveal that in 14 out of 15 pairs the outcrossed daughters exceeded the production of their inbred dams. The average for the inbred does was 999 pounds of fat corrected milk while that of the outcrossed daughters was 1472 pounds—an increase of 48%.

Many breeders, after a lifetime of conscientious effort, wind up just where they started because lacking a definite program, they have shifted from one popular line of breeding to another, losing through outcrossing any fortuitous condition that might have developed in their herds. Because of the long time and many hazards involved, one may seriously question the wisdom of leaving the responsibility of improving the genetic quality of our milk goats to an individual breeder.

It would seem more logically the task of organizations of breeders or agencies, such as universities or endowed foundations, where continuity of effort may be successfully established over a period of time greater than the life-span of one man.

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NEW PUBLICATIONS

EGGS AND CHICKENS

EGGS AND CHICKENS: SITUATION IN CALIFORNIA, 1947, by Edwin C. Voorhies. Cir. 374, December, 1947. (24 pages).

California's egg production has not kept pace with its growing population. At one time, the state exported eggs. Now, it cannot supply its own needs. The poultry industry must either expand, or continue to import large amounts of eggs.

Most of California's egg and chicken production is on specialized farms. Chicken-meat production usually has been a side-line to raising flock replacements. However, there are now a number of commercial-broiler enterprises in the state, and that number is increasing.

There is, apparently, general agreement that consumer buying power—the main influence on prices—will decline somewhat in the next two or three years.

It should be remembered, however, that the egg and poultry business has one important advantage—as an industry, it can adjust more quickly to changing economic conditions than can almost any other branch of agriculture.

The outlook for California poultrymen is discussed at length in this circular, now available at the College of Agriculture.

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