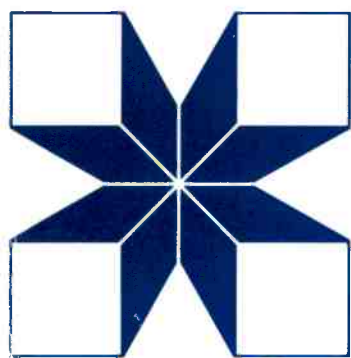


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**SMALL RUMINANTS
RESEARCH
AND DEVELOPMENT
IN THE NEAR EAST**

PROCEEDINGS OF A WORKSHOP

HELD IN CAIRO, EGYPT,

2-4 NOVEMBER 1988

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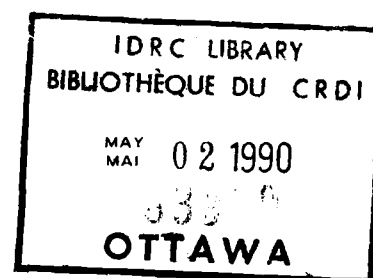
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POTENTIAL OF DUAL PURPOSE GOATS

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ABSTRACT

Dual purpose production with dairy goats is aimed at utilizing the potential for producing meat mainly by feeding surplus kids. Feeding of milk is economically critical because of high milk price, low price for slaughter animals and poor feed conversion. The cost of producing kids may be reduced by high reproductive rate; it can be increased mainly by measures of management (choice of kidding season, feeding). The quantity of milk deviated from sales may be reduced by early weaning and restricted suckling. Both practices do not impair milk yield and kid development. General nutritional principles apply to post-weaning feeding. Growth rate and carcass composition can to a very limited extent be influenced by selection, but they depend mainly on management. Analyses of dual purpose production systems are needed which would furnish the elements for optimizing resource allocation between milk and meat production.

Dual purpose milk and meat production systems

The term dual purpose is widely used in goat production (as it is in cattle production) to designate production of meat from animals mainly kept for dairy purpose or also the production of milk from animals mainly kept for meat. Since the combination of meat and fibre production has little importance in the Near East, the present discussion will be limited to milk and meat production. Which of the two is the primary production depends on the feed resources available and on the relation between milk and meat price. In the Near East almost always milk is the primary product with goats. Dual purpose milk and meat production with goats is mainly achieved by using the potential for meat production of the progeny which is not needed for breeding. All the males born may even be used for meat and some of them will serve as sires prior to being slaughtered. It is very uncommon that

surplus kids are not raised for meat but destroyed at birth although an economic evaluation would justify this practice under certain circumstances. In theory, the slaughter value of cull goats adds to the meat production component. Again, it is very rare that culls are not used for meat. In fact, there are no systems in which no use is made at all of the meat producing potential of dairy goats. Therefore, the term dual purpose production apparently needs to be more precisely defined. Tentatively I suggest the following definition for dual purpose production:

"a system in which some benefit by the primary line of production is sacrificed for improving the secondary production with the expectation that overall efficiency of the system is thereby increased. This effect may also be partly or completely a reduction of risk".

In a dual purpose breed some of the selection potential would then be dedicated to improve the secondary production, albeit at the expense of not fully realizing the potential for increasing the primary production or even reducing it.

The decision of herd management to use some of the milk produced for feeding kids depends on the efficiency of converting it to meat. In a first approximation the ratio

$$v = \frac{\text{liveweight gain} * \text{liveweight price}}{\text{milk consumption} * \text{milk price}}$$

equal to price relation milk/liveweight : feed conversion, gives an indication whether or not feeding of milk to kids is economical. if v is smaller than 1, milk is more economically used by selling than by feeding to kids. In the following table it can be seen that the liveweight price must be at least six times the milk price for milk feeding to be justified, even at the highest feed conversion rates.

For a more exact evaluation of possible profits from fattening, additional costs (veterinary care, supplementary feeding, marketing), the value of the kid after having consumed the (non marketable) colostrum and kid losses during the fattening period have to be considered as well as the possibility of adding value to the weaned kid by further feeding it to higher weights on other feeds than milk. With restricted suckling (milking and suckling combined) it has to be considered furthermore that the quantity of milk obtained by milking is reduced with increasing length of suckling (Zygoyiannis, 1987).

Economic data on kid meat production are not available for Near Eastern countries. For Swiss conditions a gross margin

TABLE 1

Efficiency of milk feeding (v) as function of feed conversion and price relation.

Feed conver- sion	relation liveweight price : milk price									
	20.0	18.0	16.0	14.0	12.0	10.0	8.0	6.0	4.0	2.0
6.0	3.3	3.0	2.7	2.3	2.0	1.7	1.3	1.0	0.7	0.3
6.5	3.1	2.8	2.5	2.2	1.8	1.5	1.2	0.9	0.6	0.3
7.0	2.9	2.6	2.3	2.0	1.7	1.4	1.1	0.9	0.6	0.3
7.5	2.7	2.4	2.1	1.9	1.6	1.3	1.1	0.8	0.5	0.3
8.0	2.5	2.3	2.0	1.8	1.5	1.3	1.0	0.8	0.5	0.3
8.5	2.4	2.1	1.9	1.6	1.4	1.2	0.9	0.7	0.5	0.2
9.0	2.2	2.0	1.8	1.6	1.3	1.1	0.9	0.7	0.4	0.2
9.5	2.1	1.9	1.7	1.5	1.3	1.1	0.8	0.6	0.4	0.2
10.0	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6	0.4	0.2
10.5	1.9	1.7	1.5	1.3	1.1	1.0	0.8	0.6	0.4	0.2

per kid marketed at 53 days of age of Frs. 36.0 has been calculated (Künzler and Schmidlin, 1982). This equals 3½ times the value of the kid at 10 days of age. If milk replacer was used instead of whole milk the margin increased to Frs. 50.0.

Until weaning, kids are fed in addition to milk and grain only insignificant quantities of roughage. Roughage and grazing may not be unlimited available. All of it may be necessary to fully exploit the milk producing potential of the dairy herd, given that the other resources (labour, facilities, supplementary feed, veterinary care) are available. If meat animals are to be fed to an advanced age a decision needs to be taken whether some of the limited feed resources will be diverted from milk to meat production. Again, the decision depends on the efficiency of feed conversion for both lines of production. However, the situation as described rarely exists in the Near East and kids or young goats are fed to the highest weight that the market will accept.

The efficiency of meat production can be increased by

- improving feed conversion,
- increasing growth rate,
- improving carcass value.

These improvements can be achieved through management and through breeding.

Measures of herd management will aim at:

- number of kids weaned,
- milk yield to satisfy needs of kids born,
- quantity of milk given to kids,
- time until weaning,
- intensity of feeding after weaning,
- slaughter age.

Breeding will try to improve:

- reproductive rate,
- size and weight of kids at birth,
- growth rate,
- carcass composition,
- mature weight of goats,
- lactation performance.

Management

Management can markedly influence the number of kids weaned as well as the quantity of milk produced. Details of possible procedures shall not be discussed in this paper.

There are basically two methods of raising kids for meat, artificial rearing or suckling. With artificial rearing kids may either be separated from their dams immediately after birth and hand fed colostrum or left to suckle during the colostrum period and separated afterwards. If artificial rearing is possible (availability of milk replacer, facilities and skilled labour) the shortest possible suckling period will be appropriate.

When dams raise their kids these may suckle for the whole milk feeding period and be weaned off their dams; milking may start only after weaning or earlier combining milking and suckling. Length of suckling period will be geared towards striking a balance between the market value of the milk fed and the value of the extra liveweight produced.

The choice between the different procedures depends mainly on does' milk let-down and the level of milk production. Studies with dairy goats have shown that lactation performance is not affected by the suckling stimulus and intensive or extended suckling is not required for realizing milk production potential. As a rough indication, maximum milk requirement of kids is about 10 per cent of their body weight. Thus, if milk yield exceeds this quantity milking is warranted. Moreover, it has been shown that milk intake may be restricted if supplementary feed is available (good quality roughage and compound feed). Thereby development of

the reticulo-rumen is accelerated, intake of feed enhanced and feed conversion improved. Systems of restricted suckling were developed with Damascus goats in Cyprus (Hadjipanayiotou and Louca, 1976). Suckling 8 hours per day was compared with continuous suckling in 44 goats. Seventy day milk yield was 260 and 250 kg, 70 days marketable milk was 144 and 67 kg, weaning weight was 15.8 and 17.7 but 71 to 150 days post-weaning gain was 210 and 190 g per day. Likewise in Cyprus, it was shown that kids could be safely weaned at 7 weeks of age. Restricting suckling may also increase reproductive performance in a system where does are re-bred about 7 weeks post partum (Guimaraes Filho, 1983; Lawson et al., 1984).

Traditionally in dairy goat operations kids are sold as early as the market will accept them. Doubtless this reflects the fact that feed conversion is poor and price relation between liveweight and milk is narrow resulting in a coefficient v far below 1.

Breeding

Most goat breeds of the Near East are capable of producing twins if environmental conditions and management are adequate. Little response is to be expected from intra-breed selection (Constantinou and Mavrogenis, 1987). Therefore, selective breeding for increased reproductive rate will not be warranted in most cases. Crossbreeding would have to try and import the genetic disposition for high reproductive rate and for growth. Milk production potential would have to be sufficient to cater for the additional kids' needs. Data from literature indicate that growth rate or weight for age would respond to selection (Mavrogenis et al., 1984). However, growth rate of kids depends largely on mature weight of the breed. There is little information available on the extent of variation in growth rate independent of mature size. If selection for daily weight gain would lead to larger animals at mature age this would be acceptable as long as milk yield would be correlated with size and would increase concomitantly. Furthermore increased size would be acceptable only if the animals could be fed and managed and if they would not be less well adapted. Experience with other species would suggest that not all these expectations are justified. Shelton (1978) has speculated that the goat owes its good adaptation and fertility to the fact that man has not attempted to alter its growth rhythm.

The economic importance of carcass composition is debatable. Most goats are sold outside regulated market channels. Grading of carcasses is an exception kid carcasses are valued for their whitish meat, fat cover and, since they

are sold entire not cut, for the quality of dressing (Morand-Fehr et al., 1980). Carcasses of older goats are graded mainly by the extent of fat deposits. Since this is mainly a function of age and feeding there is little room for genetical improvement. The desirable subcutaneous and muscular fat is probably only 25 % of the total body fat. Increasing total body fat will primarily result in more fat in the body cavities which is little appreciated; only at high and costly degrees of total carcass fat can the external depots be expected to develop. Variation of the proportion of weight of various cuts to the whole carcass weight seems to be mainly caused by differences in fat deposition; it is not apparent in fat free carcass. However, the available data on carcass composition are based on quite different experimental methods and are therefore not readily comparable.

CONCLUSIONS

Kids born in excess of the number needed for replacements are a potential for meat. Inputs in the form of feed and possibly labour and housing are needed to develop this resource. Milk production competes for these resources. Rational resource allocation requires optimization of resource use. To date this optimization has not been done for goat production systems. So far it has been demonstrated that kids can be raised by nursing does who are milked at the same time. Since milk yield is impaired very little with restricted suckling this seems to be a valid method. Increasing the number of kids and their growth rate may improve efficiency of meat production but the effect of these measures on the overall production system still needs to be assessed. There seems to be little scope for increasing the efficiency of meat production through improved carcass quality.

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