Preservation of pure breed sheep dam/sire in crossings from commercial stocks

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Abstract

Crossing is the solution which sets in agreement market requirements with the breeding possibilities using rams with traits requested by the market, which are known and stabilized genetically. Crosses turn, however, the breeds to which parents belong into vulnerable populations. This is why the basal parents have to be protected during the crossing programs. The adequate programs for the current market demands could be: a) production of lean carcasses (20 kg) with rams from Palas, Romney-Marsh or Jucu mutton lambs, or with British mutton breeds; b) milk production associated with lean carcass using milk producing F_1 hybrid ewes and Friesian, Awassior Palas milk line rams. These programs provide for the maintenance and stabilization of the parent stock.

Keywords: *sheep, breeding, pure breed protection, commercial stock.*

Crossing is a solution to put into agreement market requirements with the possibility of producing using rams with the traits required by the market, known and genetically stable. Crossing, however, transforms the basal breeding stocks into vulnerable populations. That is why the basal breeding stock has to be preserved by the breeding programs.

The programs adequate to the current requirements of the market could be:

a) production of lean mutton (20 kg weight) with rams from Palas meat breed, Romney-Marsh from Jucu or with English mutton breeds.

b) milk production associated with lean meat, using hybrid F1 ewes and Friesian, Awassi or Palas milk breed rams.

Both programs keep and stabilize the basal stocks of the breeding herds.

The programs of crossed reproduction are fitted for the rast adaptation to market requirements and for the preservation of the basal herds of commercial stocks as guarantee for stable results of the crossing design

Animal production depends on the manner in which the dam and sire stocks are used. Animal producers are willing to have available

dam/sire stocks whose productive traits are known and genetically stabilized. If production is intended for market, market requirements change. Production tailoring to market requirements is done by crossing the full or partial stock of dam/sire using male reproducers bringing the traits required by the market.

Such a situation is obvious if we consider the sheep. After 1990, strong shifts occurred in sheep production. Many large sheep herds were dispersed, their ewes/rams going to family farms that produce for self-consumption, they were slaughtered or exported as live animals. The state-owned sheep herds reduced their stocks and many disappeared all together.

The market for sheep products changed radically. The request for wool is non-existent, the milk lamb is hard to sell, the export of live animals is rapacious, domestic market demand for mutton is low. The highest interest of shepherds is the ewes' milk.

Major economic considerations focused, starting with the 60s when CAER market developed, on wool requirement. With huge efforts, 20-25 years later, large herds of fine wool Merino sheep were formed in field areas, accounting up to 40% of the overall sheep stocks. When the small agricultural worker received Merino sheep they tried to increase the milk yield of Merino sheep. Milk production is still lower, about 20-30 kg milk, less than half of the milk yield of Tsurcana sheep.

The reaction to this market situation determined either the reduction of sheep stocks, or crossing the Merino ewes with Tsurcana or Tsigai rams hoping to obtain ewes with a higher potential for milk production inherited from the rams. The breeds of fine wool became thus vulnerable and they are menaced with extinction. The current assessments say that ewes stocks decreased by 36.5% since 1989. Most of the decrease is accounted for by fine wool sheep.

The solution to this situation is the use of breeding programs which to produce animals supplying the products required by the market and to preserve the ewes for fine wool in lower numbers but with unchanged breed specificity (Drăgănescu, 1979).

Such a program for the production of line mutton, in fact lamb carcasses of almost 20 kg, may make use of rams or semen from British mutton breeds, in simple crossings in which all hybrid lambs are slaughtered (Breeding Programs, 1985). For this purpose the rams being created at the Palas Institute or Romney-Marsh rams from Jucu-Cluj station can also be used.

In order to protect the purity of the basal ewes the reproduction program has to distribute the ewes for mating with rams of the same species, to an extent which to keep the constant stock of the breeding ewes, and the other breeding ewes should be mated with rams from meat breeds.

Noting with M_T the total stock of breeding ewes, with M_O the number of ewes of a given breed to be mated and with M_C the number of ewes crossed with meat rams and taking into account a rate of re-mating (R_m), we can use the following equations:

$$M_o = \frac{M_T}{R_m} \quad \text{and} \quad M_C = \frac{M_T(R_m - 1)}{R_m}$$

The rate of re-mating expresses the number of young ewes generated by a female and which can replace it (Paraschivescu, 1991). In the variants in which R_m=1.8 and the herd has 180 sheep, sheep distribution will be:

$$M_o = \frac{270}{1.8} = 150 ewes; \qquad M_C = \frac{270(1.8-1)}{1.8} = 120 ewes$$

Assessing a load of 30 ewes per ram, the requirement will be of 5 Merino rams and 4 meat rams.

Such a program may also be set up to develop and keep a pure breed Merino breed and a herd of hybrid F1 sheep descending from milk rams. The sheep from this herd my produce hybrid descendents from meat rams for the production of lean mutton.

In our country the milk breeds are Tsurcana and Tsigai; Awassi, Friesian breeds are in lower numbers and currently a new population is created at ICPCOC Palas Constanta. The Awassi and Tsurcana sheep have the fleece formed of two types of fiber, some thick and with marrow, other finer and without marrow. The use of these breeds with Merino sheep will produce lambs with poor quality wool. The Tsigai, Friesian and Palas milk breeds have the fleece formed of uniform fibers, thicker in Tsigai and finer in the Friesian and Palas milk breeds.

The breeding program has thus three distinct objectives:

a) keep a pure breed Merino herd

b) form a herd of first generation hybrid sheep using rams from a breed specialized in milk production, which to keep uniform fibers in the fleece.

c) produce hybrid lambs for lean mutton.

Any breed used in the national breeding programs can be used: Tsurcana, Tsigai, Transylvania Merino, Palas Merino. The Friesian or Palas milk rams are preferred for Merino ewes, while Awassi and Tsigai are preferred for Tsurcana sheep or for other ewes with thick wool.

The breeding stock has to be formed of three herds:

M_0 = the breeding stock of protection for the pure breed, mated with rams of the same breed as the ewes;

M_1 = the breeding herd submitted to crossing, formed of ewes of the same breed with the basal herd, mated with rams from a breed specialized in milk production.
M_C = the crossing herd including F1 ewes originated from rams specialized in milk production; they are mated with rams from meat breeds.
The size of herds is determined with the following equations:

$$M_o = \frac{M_T}{R_m^2}; \qquad M_l = \frac{M_T(R_m - 1)}{R_m^2}; \qquad M_C = \frac{M_T(R_m - 1)}{R_m}$$

If we used the data from the first example where M_T= 270 heads and R_m=1.8, sheep distribution will be:

$$M_o = \frac{270}{(1.8)^2} = 83 ewes; \; M_l = \frac{270(1.8-1)}{(1.8)^2} = 67 ewes; \; M_C = \frac{270(1.8-1)}{1.8} = 120 ewes$$

Assigning 30 ewes for each ram, the requirement would be:
83:30 = 3 Merino reams for M_0 herd
67:30 = 2 rams specialized in milk production
120:30 = 4 rams specialized in mutton production
A correct formulation of such programs is conditioned by the correct assessment of remating rate, which takes into consideration: the length of reproductive life (f), the ratio of sexes, prolificacy (p), lamb livability (1-m %), mortality during growth (m) and conception rate in ewes (fg %).

$$R_m = \frac{f.p}{2}.(1 - m\%).fg\%$$

To asses the duration of the reproductive life we may adapt the procedure of calculating the average life expectancy by demographic surveys, replacing the death by the number of sheep leaving the stock according to age. The other indicators are usually known by the producers from their daily experience of production.
The length of the reproductive life is calculated with the following equation:

$$e_{(x)} = \frac{1}{l_{(x)}}\left[\sum l_{(x)} - \frac{1}{2}\sum d_{(x)}\right]$$

where
$d_{(x)}$ = the number of deaths
$l_{(x)}$ = the number of ewes joining the reproduction stock

To underline the similitude of procedure and to facilitate the use of this formula we used the symbols used by the demographic studies of life expectancy (Tufescu, 1981).
Such a working program eliminates all inconveniences of chaotic crossing used currently to improve milk production and may be applied on herds of any size.

Conclusions

The programs of crossed reproduction are a current solution for:
a) the rapid adaptation of animal production to market requirements;
b) the use of existing commercial stock (F1) hybrids;
c) the preservation of the basal herds of commercial stocks as guarantee for stable results of the crossing design.

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