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**SUMMARY** - Sheep population in Egypt is about 3 million. The three major Egyptian sheep breeds are Barki, Ossimi and Rhamani, representing 65% of the total population. They are well adapted to local conditions, small to medium size and have a twinning rate ranging from 1.05 to 1.30. A trial for improving prolificacy was carried out through crossbreeding with Finnsheep. On station, results indicated significantly higher prolificacy for crossbreds but on-farm trials with 1/4 Finnsheep, 3/4 local ewes showed no significant difference in either prolificacy or economic return. Although characterization of those local breeds has been established and genetic parameters estimated, no effective selection programme has been started.

**Key words:** Sheep, Egypt, crossbreeding, prolificacy, Finnsheep.

Ossimi, Rahmani and Barki are the major sheep breeds in Egypt. They are fat tailed, their fleece is a coarse wool, and they are considered small to medium size.

**Barki:** Origin in North Africa in the coastal Mediterranean zone. The breed is named after the Libyan province Barka (Cyrenaica). Its population size is about 300,000. The breed extends from west of Alexandria to the eastern provinces in Libya.

**Ossimi:** Origin in Giza, named after Ossim, a village near Cairo. The breed is the most popular among the Nile Valley and Delta breeds and is expanding at the expense of other breeds. Population of the Ossimi breed is over 1,000,000 head. The breed is most productive in middle Egypt and least productive in Southern Egypt.

**Rahmani:** Origin in Northern Syria and Southern Turkey. The breed was first introduced into Egypt in the 19$^{th}$ Century and is named after Rahmania, a village in Beheira governorate in the north of the Nile Delta. Population is about 250,000 head in the North and Middle of the Nile Delta. Some observations indicate the Rahmani breed is decreasing in the face of the expansion of the Ossimi.

The valley breeds, Ossimi and Rahmani, are raised mainly on small-holders farms with 2-5 small ruminants and 1-2 large ruminants (cattle and buffaloes). The agriculture in this sector is characterized by a very intensive cropping system, fragmental landholdings (95 percent of the farms have less than 2 hectares), and an economy that is moving rapidly from subsistence to monetization. Traditionally, main livestock activities revolved around the utilization of berseem (*Trifolium alexandrinum*), which is in relative abundance from October to May. Feed resources are very inadequate during summer, but the inadequacy during winter is less. Lately, summer fodder crops have been introduced on a relatively moderate scale.

In the North western Coastal strip where the Barki breed is raised, the sheep owners live in communities along the coast and their sheep graze along the coastal strip up to 20km to the south during the rainy season, October-April. Rainfall is meagre and erratic, 100 to 210 mm annually, and natural vegetation is generally poor, but varies according to amount of rainfall. Rams are usually run with the flocks all year-round, but the majority of the lambing takes place during the rainy season.

Sheep are looked after either by the owner or by hired shepherds at the rate of one shepherd for every 150 sheep. Smaller flocks owned by different people are combined into larger flocks as a grazing unit for easier management. The grazing unit ranges from 300 to 500 ewes, plus the young and the males. Many of the sheep owners have orchards of figs, olives and almonds; they also grow barley. The sheepholdings under this system are much bigger than those in the valley and owners have sheep flocks up to 2,000 head beside goats and camels. Sheep do not require much water during the grazing system, but in dry years they are confined near to near to wells and water collection points.

During the dry months, especially in the region adjacent to the Nile Delta, flocks move eastward and southward to the Nile Delta and valley for stubble grazing and to use other available feed resources. Also, barley straw is used during the summer months and the state allows sheep producers a small ration of subsidized concentrate feed.

All breeds are raised mainly for lamb production, followed by wool and milk.

Estimates for the performance of the three breeds are shown in Table 1.

Table 1. Performance of the three main Egyptian local breeds of sheep under the intensive system (3 crop/year).

| Breed | BW | WW | MW | EL/EE | LB/EE | LW/EE | LB/EL | LW/EL | KW/EL | MLK |
|---|---|---|---|---|---|---|---|---|---|---|
| Ossimi | 3.03 | 12.7 | 51 | .73 | .88 | .71 | 1.22 | .99 | 18.8 | 65.08 |
| Rahmani | 3.12 | 12.8 | 53 | .77 | 1.01 | .80 | 1.33 | 1.10 | 22.7 | 65.44 |
| Barki | 2.60 | 11.0 | 44 | .71 | .76 | .66 | 1.07 | .93 | 18.2 | 59.29 |

BW: birth weight (kg), WW: weaning weight (kg), MW: mature weight (kg), EE: ewe exposed, EL: ewe lambed, LB: lambs born, LW: lambs weaned, KW: kilograms weaned, MLK: milk yield (kg) of nursing ewes at the stage of 0-12 weeks of lactation.

There is no planned selection at the national level. However, breeders select for a heavier weight, horns and certain color patterns, e.g. dark red or brown head and neck in the Barki. Breeders usually raise their own rams in the Barki flocks while they use a communal village ram in the other breeds. Mating is always natural.

In 1974, the Egyptian Ministry of Agriculture started a crossbreeding program to improve the productivity of two native sheep breeds (Rahmani (R) and Ossimi (O)) through crossing with Finnsheep (F). The breeding plan was to mate F rams to both

R and O ewes to produce halfbreds (F.R & F.O), respectively which were used to produce both reciprocal back-crosses, (R.FR & FR.R) and (O.FO & FO.O), respectively, that were inter se mated.

Flocks were raised under an accelerated lambing system of three crops per two years. The mating seasons were: May, January and September. At mating, ewes were randomly divided into groups, each of 30-35 ewes joined with the ram for a period of 35 days.

Two investigations were carried out to estimate genetic components in the crosses for ewe productive traits and lamb growth traits, according to Dickerson (1969).

**Available infrastructure**

Farms: 8 well equipped experimental farms, that deal with breeding as well as other aspects in different species of livestock.

Housing: Sheep are housed in open sheds.

Laboratories & offices:
- Biotechnology lab.
- Surgery room
- Wool lab.
- Climatic chamber
- Nutritional lab.

Computing: Computer center contains 5 mini computers in main office.

Software: Statistical package (SAS, Harvey's Mixed Model, SPSS) and General Utility Software.

Vehicles: 5 cars.

Manpower:
9 Ph.D.
18 M.Sc.
25 B.Sc.
30 with less qualification
200 labors

Scientific and technical support: the program gets technical and scientific support from the Egyptian universities, National Research Center and other Institutes within the Agriculture Research Center.

Organization: The Animal Production Research Institute, which is part of the Agriculture Research Center, is the organization responsible for on stations performance recording.

Financial support: comes through two sources; the major part from the Egyptian government, while a minor part by the Finnish government through the Egyptian-Finnish Sheep Breeding Project, which will be terminated by the beginning of 1996.

**Results obtained**

The results of the studies for estimating genetic components in the crosses for ewe productive traits and lamb growth traits are presented in Tables 2, 3 and 4.

Table 2. Estimates of genetic components for the fertility traits[1]

| Component[2] | ECJ | LBJ | L4J | KBJ | K4J |
|---|---|---|---|---|---|
| Finn-Rahmani : | | | | | |
| $g^{I}_{R} - g^{I}_{F}$ | .34 | .27 | .36 | 1.84 | 3.96 |
| $g^{M}_{R} - g^{M}_{F}$ | -.27 | -.49 | -.41 | -1.92 | -3.45 |
| $h^{I}_{RF}$ | .40 | .66 | .69 | 2.58 | 8.25 |
| $h^{M}_{RF}$ | -.27 | -.49 | -.41 | -1.90 | 3.47 |
| Finn-Ossimi : | | | | | |
| $g^{I}_{O} - g^{I}_{F}$ | -.80 | -1.99 | -1.45 | -5.59 | -8.34 |
| $g^{M}_{O} - g^{M}_{F}$ | .91 | 1.75 | 1.36 | 5.43 | 8.45 |
| $h^{I}_{OF}$ | -.76 | -1.59 | -1.07 | -4.88 | -3.81 |
| $h^{M}_{OF}$ | .83 | 1.75 | 1.37 | 5.45 | 7.91 |

[1] ECJ = number of ewes conceived, LBJ = number of lambs born, L4J = number of lambs at four months of age, KBJ = kilograms born and K4J = kilograms at four months of age, all being per ewe joined.
[2] $g^{I}$ = Average direct effects of the individual, $g^{M}$ = maternal genetic effect, $h^{I}$ = individual heterosis and $h^{M}$ = maternal heterosis. R = Rahmani, F = Finn and O = Ossimi.

Table 5 indicates that, as a result of crossbreeding with Finn sheep to produce the quarter Finn genotype, there is no any economic benefits.

**Goat development programme in Egypt**

The only ongoing genetic program in goat in Egypt is establish a flock of Zaraibi goat that would be used later to improve the breed.

Zaraibi goat is native of Egypt and shows a promise for high performance. Preliminary results shows that the breed can give 280 kg/lactation and has a litter size of 2.1.

Table 3. Estimates of genetic components for the prolificacy traits[1]

| Component[2] | LBL | L4L | KBL | K4L |
|---|---|---|---|---|
| Finn-Rahmani : | | | | |
| $g^{I}_{R} - g^{I}_{F}$ | -.09 | .05 | .70 | -.20 |
| $g^{M}_{R} - g^{M}_{F}$ | -.50 | -.29 | -1.37 | -.97 |
| $h^{I}_{RF}$ | .32 | .38 | 1.24 | 3.57 |
| $h^{M}_{RF}$ | -.51 | -.31 | -1.39 | -1.32 |
| Finn-Ossimi : | | | | |
| $g^{I}_{O} - g^{I}_{F}$ | -.19 | -.77 | -3.03 | 6.83 |
| $g^{M}_{O} - g^{M}_{F}$ | .55 | .45 | 2.14 | -9.21 |
| $h^{I}_{OF}$ | -.77 | -.37 | -2.52 | 11.08 |
| $h^{M}_{OF}$ | .66 | .55 | 2.55 | -8.58 |

[1] LBL = number of lambs born, L4L = number of lambs at four months of age, KBL = kilograms born and K4L = kilograms at four months of age, all being per ewe lambed.
[2] $g^{I}$ = Average direct effects of the individual, $g^{M}$ = maternal genetic effect, $h^{I}$ = individual heterosis and $h^{M}$ = maternal heterosis. R = Rahmani, F = Finn and O = Ossimi.

Table 4. Estimates of genetic components for birth (BW), weaning (WW), 4 ($W_4$), 6 ($W_6$), 12 ($W_{12}$) and 18 month ($W_{18}$) weights

| Component[1] | BW | WW | $W_4$ | $W_6$ | $W_{12}$ | $W_{18}$ |
|---|---|---|---|---|---|---|
| Finn-Rahmani : | | | | | | |
| $g^{I}_{R} - g^{I}_{F}$ | -0.16 | 2.26 | 3.26 | 9.77** | 3.18 | -0.38 |
| $g^{M}_{R} - g^{M}_{F}$ | 1.17** | 0.87 | 3.48* | 0.65 | -2.71 | 0.23 |
| $h^{I}_{RF}$ | -0.12 | 2.56 | 3.24 | 9.57** | 5.21 | -4.30 |
| $h^{M}_{RF}$ | 0.80** | -0.39 | 2.77 | -0.44 | -2.62 | 1.25 |
| $r^{I}_{RF}$ | 0.13 | 3.87** | 0.44 | 3.05* | 5.61** | -7.52 |
| Finn-Ossimi : | | | | | | |
| $g^{I}_{O} - g^{I}_{F}$ | 0.11 | -4.24* | 3.32 | 2.10 | -2.34 | -6.07 |
| $g^{M}_{O} - g^{M}_{F}$ | 0.92* | 6.45** | 2.99 | 8.00** | 1.19 | 0.77 |
| $h^{I}_{OF}$ | -0.13 | -3.63* | 3.14 | 1.55 | 0.16 | -6.08 |
| $h^{M}_{OF}$ | 0.65 | 5.88** | 1.33 | 5.96* | -0.47 | -1.30 |
| $r^{I}_{OF}$ | 0.42* | 4.47** | 6.34** | 7.74** | 14.72** | 10.53** |

[1] $g^{I}$ = Average direct effects of the individual, $g^{M}$ = maternal genetic effect, $h^{I}$ = individual heterosis, $h^{M}$ = maternal heterosis and $r^{I}$ = recombination loss in the individual.
R = Rahmani, F = Finn and O = Ossimi.
* Significant effect at (P<.05).
** Significant effect at (P<.01).

Table 5. Estimates of the annual gross income (AGI), the annual net income (ANI) of the flock, expressed in £E (=$0.30) per ewe and flock internal rate of return (IRR)

| Breed[1] | AGI | ANI | IRR |
|---|---|---|---|
| Overall mean | 151.1 | 34.5 | 13.83 |
| L | 150.7 | 34.8 | 13.89 |
| L.FL | 151.5 | 34.2 | 13.77 |

[1] L = Local and F = Finnsheep