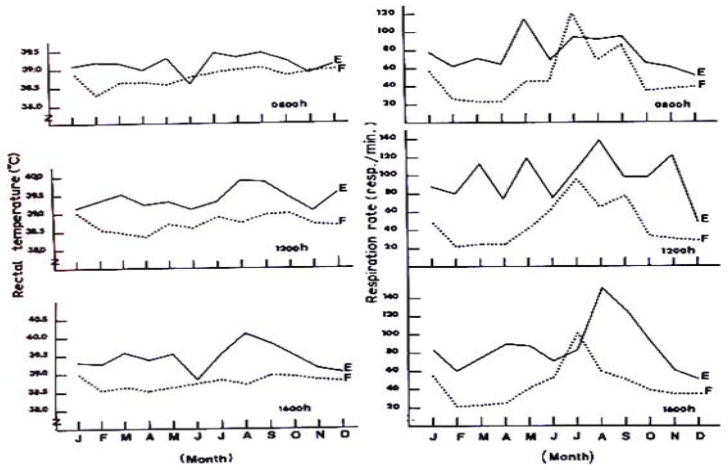
Utilization of Finn Landrace and Romanov short-trail sheep to improve prolificacy of fat-trail sub-tropical Egyptian sheep

A.Aboul-Naga

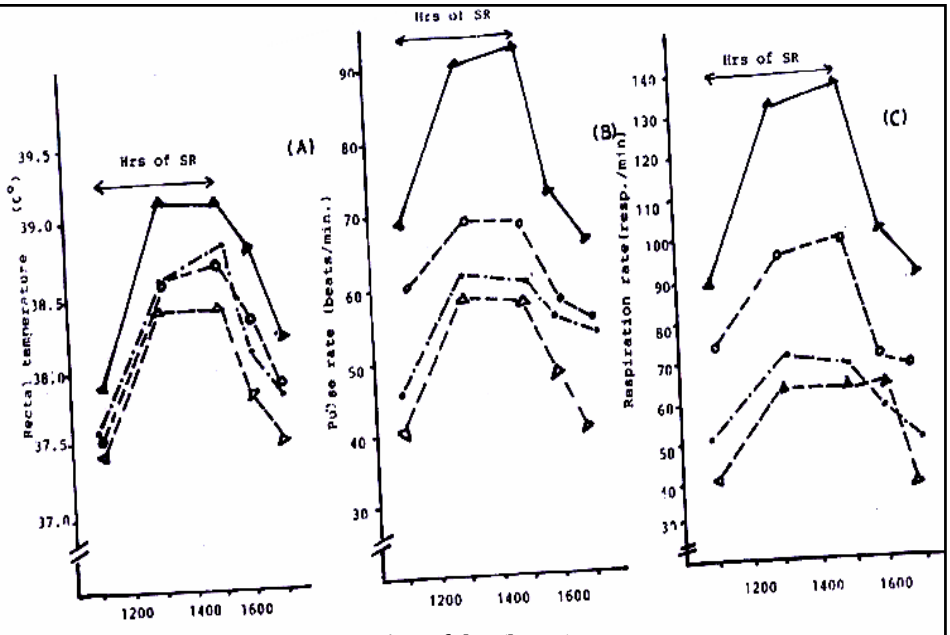
Animal Production research Institute, Cairo

Breeding plane:

- The trial with Finn-landrace (F) sheep started 1974 utilizing 4 rams followed by imported successive batches of F rams and ewes from Finland in the eighty (in collaboration with FINIDA), Sum up to 36 rams and 12 ewes + 60 embryos implemented in local ewes.
- The breeding plan was to cross Rahmani(R) and Ossimi (O) subtropical fat-tail sheep with the imported F rams to produce FR and FO, which was used to produce 1/4 FR and 1/4 FO. Other crosses were produced for experimental purposes.



Physiological Response of F ewes in Egypt & their half-sibs in Finland

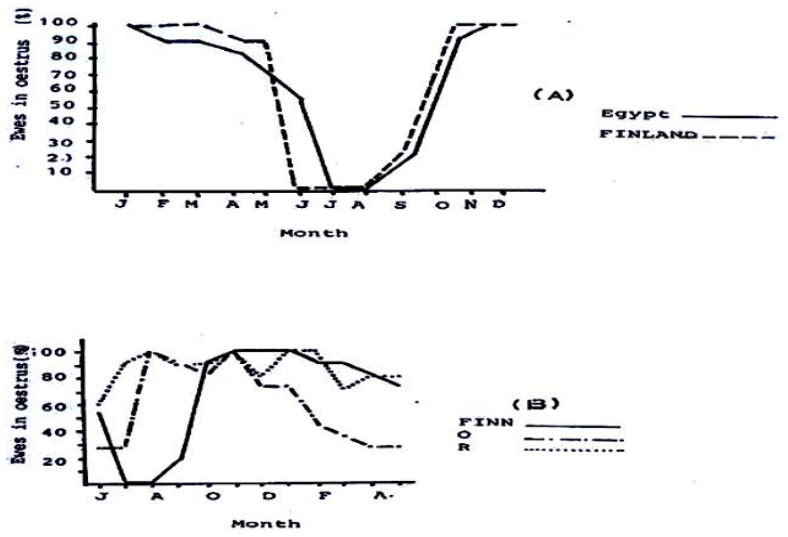


Time of day (hours)

Rectal temperature (A), pulse rate (R), respiration rate (C) of Finn, R and their crosses when exposed to solar radiation (SR)

Mating system:

- R and O sheep, as most of the other sub-tropical breeds can bred all the years around with some fluctuation in their oestrous and ovarian activity being the highest in the Autumn.
- The breeder run the rams with the ewes all the year around, which was developed to three mating each two year; September, May and January mating for 35 days, lambs weaned at 8-10 weeks with no artificial treatment (hormonal or AR of the lambs)
- All the F cross was bred under the same mating system, utilizing the advantage of the non seasonality they inherited from their subtropical parents.
- Pure F rams showed mild seasonal fluctuation in their semen performance.



Estrous activity of F ewes (in Egypt and Finland) and vs Egyptian ewes at different months

Reproductive performance of F crosses with R & O Egyptian sheep bred /8months.

Breed group	CR	LBJ	LWJ	KWJ	LSB		KWW
F	0.52	1.26	0.88	9.3	2.43		16.8
R	0.72	0.92	0.82	12.0	1.31		17.2
FR	0.77	1.27	1.10	14.8	1.68	-10	19.5
R x FR	0.80	1.11	1.00	14.6	1.42	-25	17.7
FR x R	0.80	1.11	0.99	14.1	1.44	-23	18.1
(¼F ¾R)²	0.76	1.06	0.93	13.3	1.40	-26	17.4
O	0.68	0.81	0.72	10.7	1.22		15.9
FO	0.75	1.11	0.98	13.9	1.52	-16	18.9
O x FO	0.72	1.00	0.89	12.8	1.41	-23	17.9
FO x O	0.80	1.02	0.91	13.3	1.34	-26	17.1
(¼F ¾O)²	0.55	1.26	1.05	14.7	1.42	-22	16.0

CR, conception rate; LBJ, lambs born/ewe joined; LWJ, lambs weaned/ewe joined; KWJ, kgs weaned/ewe joined, LSB, litter size at birth; KWW, kgs weaned/ewe lambed

Reproductive performance of F cross by season of mating.

Traits	Season of mating		
	September	January	May
No.	1743	1522	2225
CR	0.75	0.82	0.69
LBJ	1.23	1.10	0.93
LWJ	1.13	0.86	0.81
KWJ	17.10	11.80	10.10
LSB	1.70	1.40	1.42
KWW	23.60	14.60	14.30

Lamb performance of different F crosses.

Breed group	No.	BW	WW	W4
R	458	3.16	12.94	17.9
F.R	1069	3.15	13.22	18.1
R.FR	1397	2.82	12.50	17.5
FR.R	200	3.09	12.98	17.6
$(R.FR)^1$	857	3.00	12.83	17.4
$(R.FR)^2$	797	2.90	12.69	17.1
$(R.FR)^3$	83	2.87	12.70	16.9
O	287	3.20	12.72	18.1
F.O	697	2.92	12.62	17.5
O.FO	585	2.85	12.49	17.4
FO.O	213	3.01	13.07	18.7
$(O.FO)^1$	464	3.00	13.02	17.7
$(O.FO)^2$	138	2.97	12.93	17.9

Lamb Performance

- Birth weight of F cross was slightly less or close to the locals however their growth during suckling were generally higher.
- Milk production of F cross ewes was comparable to that of local ewes but less than other subtropical dairy sheep (Awassi and Chios).
- The drastic reduction in the fat tail of the cross disproportionate to % of F blood, represent lower marketability for the 1st & higher F cross.
- On the other hand, they showed significantly higher carcass fat % and have less lean than the local.

Genetic components on ewe reproductive traits of R&O and their crosses

Genetic Components	CR	LB	LL	KGB	LW	KGW
g^{I}_{RF}	-.02	-.36	-.04	-.45	-.33	-3.21
g^{m}_{RF}	.30	-.13	.08	-1.14**	-.01*	-1.72
h^{I}_{RF}	.16	-.04	-.02	.18	-.28*	-4.44*
h^{m}_{RF}	.20	-.13	.06	-.99**	-.11*	-2.34
r^{I}_{RF}	.42**	-.36	-.18	-.07	-.68	-8.74*
g^{I}_{OF}	-.24	-.16	.33	-.45	.14	-.74
g^{m}_{OF}	.24	.00	-.06	-.53	-.02	-.11
h^{I}_{OF}	-.11	.30	.15	.47	.43	1.79
h^{m}_{OF}	.25	-.01	-.17	-.49	-.07	.55
r^{I}_{OF}	.48	.28	.05	.90	-.03	-2.47

gI = Individual genetic effect, gm = Maternal genetic effect,
hI = Individual heterosis, hm = maternal heterosis, rI = recombination loss.

Dissemination of F crosses to the farmers in the Nile Valley takes two main lines

- groups of 3-5 1/4F ewes distributed to small holders, while making 1/4 F rams available in the village for mating.

- other line is to distribute 1/2 F rams to breeders having large flock and specialized sheberd to produce 1/4 F rams and ewes for their own and their neighbors; which later was developed to the distribution of locally produced pure F rams to interest breeders.

Preliminary analysis for flock productivity and financial performance of F cross under farmers conditions

Classification	No.	LW4	LW4/yr	GI	NI	IRR (%)
L	18	0.59	1.54	150.7	34.8	13.89
¼F.¾L	49	0.65	1.69	151.5	34.2	13.77
Flock size						
1-5	49	0.67	1.73	165.5	44.6	16.44
6-10	10	0.64	1.68	166.5	39.3	13.47
11-20	4	0.66	1.72	150.7	35.0	14.08
21-50	4	0.52	1.34	121.8	19.0	11.34

GI=gross income, NI=net income, IRR=internal rate of return

Breeding plane for Romanov:

- The trial with Romanov (V) sheep started 1983 utilizing 8 rams followed by the importation of successive batches of V rams and ewes from France in the eighty (30 ♀ +10 ♂).
- The breeding plan was to cross Romanov (V) rams with Rahmani(R) ewes (brown fat-tail sheep) to produce VR, which were used to produce back cross to local (R.VR).

Reproduction performance of R and its crosses with V under 8 months mating system (except V which mated once/yr.)

Genotype	Fertility, %	Prolificacy	Lambs survival %	Lambs weaning wt, kg
R	68.67[b]	1.20[c]	86.36[a]	13.26[a]
V.R	78.03[a]	1.63[a]	85.56[a]	11.63[b]
R.VR	76.09 [a]	1.45[b]	84.58[a]	11.72[b]
$(R.VR)^2$	75.3[a]	1.42[b]	82.63[a]	11.69[b]
V	79.69	2.31	70.01	15.36

Efficiency of lamb production of R and its crosses with Romanov V under accelerated lambing (3 lambing/2 yr.

Genotype	Bwt, kg	TLB, N	TLW N	WT, kg	Relative efficiency	Efficiency, %
R	44.6a	2.8c	2.4c	31.8b	0.72b	78
V.R	41.4b	3.9a	3.3a	37.8a	0.92a	100
R.VR	41.4b	3.3b	2.7b	31.9b	0.78b	85
(R.VR)[1]	41.4b	3.3 b	2.7b	31.0b	0.76b	83

Bwt= Body weight at breeding time, TLB= number of lambs born per ewe exposed, TLW= number of lambs weaned per ewe exposed, WT=weight of lambs weaned per ewe exposed.

Performance of F crosses vs V crosses under farmer condition.

	No. of farmers	No. of ewes	LB	L4W	K4M
R.FR	59	191	1.36[b]	1.13[b]	20.75[a]
R.VR	18	62	1.48[a]	1.32[a]	23.86[a]

LB=litter size at birth; L4W=litter size at 4 months of age and K4M=litter weight at 4 months of age.
Means within traits with the same letter are not significantly different

Reproductive performance of the present Finn crosses flock

BREED	No	CON	LB	LW	KgB	KgW
R	278	0.67	1.04	0.85	3.47	11.19
F	144	0.80	1.87	1.41	4.17	27.49
1/2 F R	1044	0.65	1.11	0.83	3.51	11.21
1/4 F R	435	0.71	1.15	0.84	3.65	11.50
3/8 F R	1250	0.67	1.08	0.82	3.49	11.29

General conclusions from Finn trials in NE

- From the long term Egyptian trial, and those in other NE countries (Cyprus , Israel, Lebanon , Iraq , lybia), raising purebred F sheep can not be recommended under subtropical conditions.
- On the other hand their crosses , especially 1st and lower F grades proved to be fairly well adapted to the subtropical conditions and can be utilized successfully to improve their reproductive performance (prolificacy).
- The crosses were able to produce each 8 month, it showed seasonality in their reproduction performance being the highest in Autumn and the lower in the Spring.
- Annul fecundity should be used as a better indicator than prolificacy in assessing their crosses as it combined prolificacy of F sheep with the ability of subtropical sheep to breed more than once/yr.
- LB/EL for the 1st cross was 18-75 % and 10-38% in the ¼ F than the local.
- LB/EL/yr ranged from 1.91 to 2.72 of the 1st cross and for 1.67 to 1.18 in the ¼ F either in experimental farmer with the breeds