ANIMAL GENETIC RESOURCES INFORMATION 4

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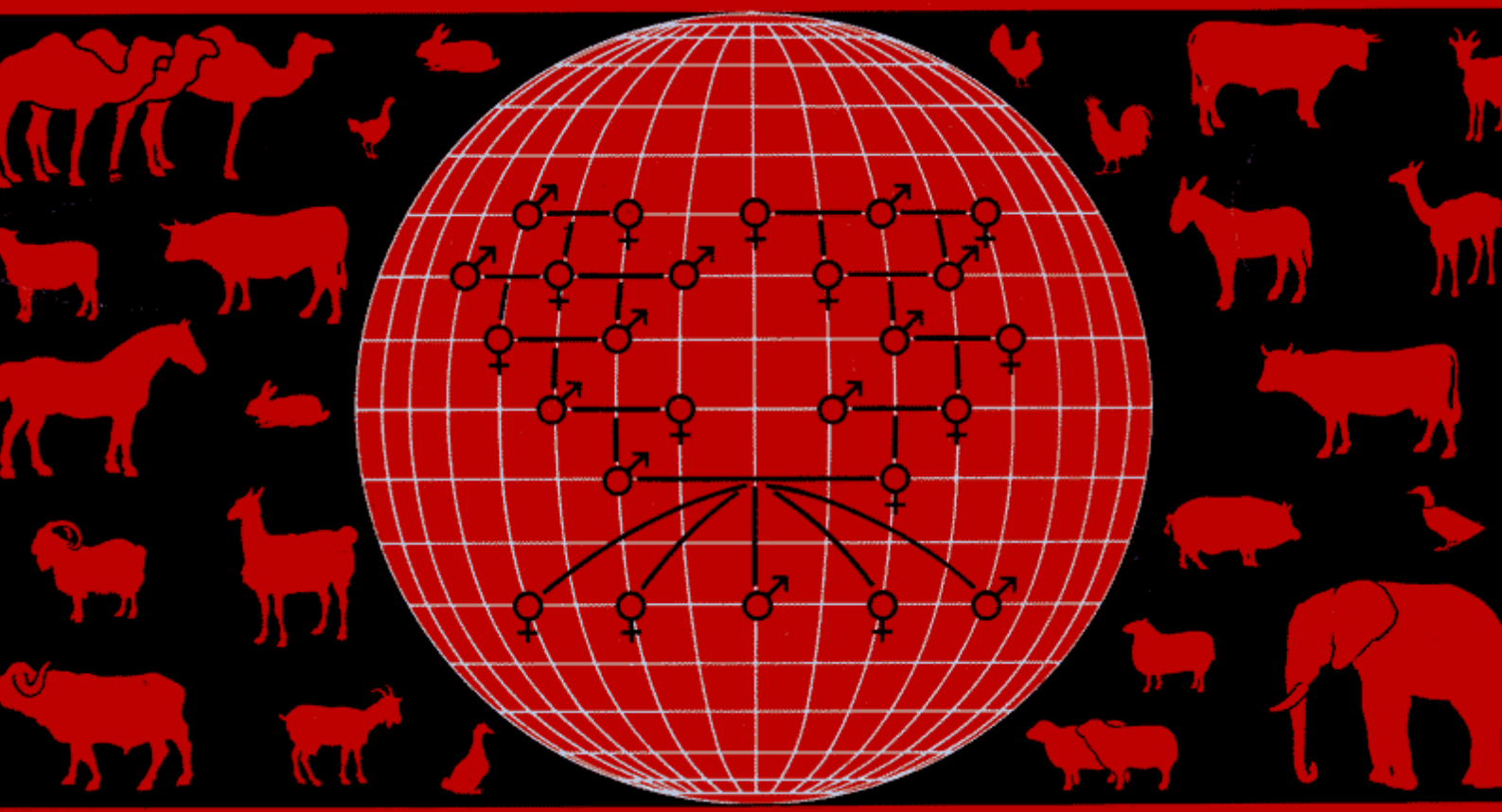

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EDITORIAL

Mankind has been using animals to improve human standards of living from the early days of civilization. The original selection of certain species for domestication was only a start. Within most species there has always been large genetic variation, which man has used to develop different breeds for a variety of purposes and products. At a later stage in the history of animal improvement, man began to practise selection within breeds, where there is also extensive genetic variation. This within breed selection has become very intense in developed countries in the recent years of this century, aided by the new knowledge of quantitative genetics and by the techniques of artificial insemination and embryo transfer. The twentieth century has also produced an increase in the use of crossbreeding and of breed substitution to increase the production of food and fibre from animals. The process continues and there is already on the horizon, the prospect of molecular engineering by which individual segments of hereditary material will be transferred between animals and breeds and species. Today the prospects for even more rapid increases in animal production due to genetic selection have never been greater. Established techniques in the developed countries are being quickly adapted to the different conditions and environments of developing countries. At the same time, the prospects are increasing for a quantum leap in the application of genetics in high technology societies.

In this situation, what is the place of preservation? Few would disagree with the preservation of an endangered species of domestic livestock. In theory, few would protest the preservation of a breed in danger of extinction; however, when the cost of the preservation has to be found, it becomes more difficult to find supporters. There are those who, with the promise of molecular engineering, would argue that it is not breeds as such which need preserving, but simply the gene segments which code for the unique traits of the breed. Clearly we have not reached that stage yet, and if the method is to be successful when the technology is available, it will be essential that the breeds concerned are still around.

Meanwhile preservation has to be followed in the light of the uniqueness of the breeds at risk, and also within the bounds of economic reality. There is no value for example in preserving animals or semen from a breed with a unique name, which is in fact genetically the same as another breed in an adjoining country, with a different name. The aim of FAO and UNEP in the conservation and management of animal genetic resources is to ensure that present production and future prospects for production from animals for the benefit of mankind are maximized at minimum cost. Data banks for example are visualized as having immediate value for enhancing livestock improvement projects by making available essential information for breed substitution and crossbreeding programmes which are the centrepiece of much current livestock improvement work in developing countries. At the same time, data banks will identify truly unique breeds which are endangered, and which may therefore merit having semen or fertilized ova stored cryogenically and which is much cheaper usually than the management of live animals not contributing to economic production. The preservation of livestock should be secondary to, and the servant of production, rather than being an academic end in itself; and the process of identifying which breeds to preserve must be closely tied to the realities of food and fibre production for human benefit.

GUIDE TO CONTRIBUTORS

Animal Genetic Resources Information will be pleased to receive contributions up to 3000 words long in English, French or Spanish. If accepted they will be published in the original language with summaries in the other two. Reports, news and notes about meetings, conservation and evaluation activities, and techniques, would be appreciated. Manuscripts should be typed in double space and accompanied by a summary of not more than 5 percent of the original length. Photographs are acceptable but only high quality black and white prints. AGRI will also review new books on animal genetic resources. Correspondence is invited.

All contributions should be addressed to:
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ANIMAL GENETIC RESOURCES INFORMATION will be sent free of charge to those concerned with the conservation, management or utilization of domestic livestock. Anyone wishing to receive it regularly should send their name and address to The Editor, at the address on page v.

BULLETIN D'INFORMATION SUR LES RESSOURCES GENETIQUES ANIMALES sera envoyé gratuitement aux personnes intéressées par la conservation, 1'é1evage ou 1'exploitation du bétail domestique. Les personnes souhaitant recevoir cette publication régulièrement voudront bien faire parvenir leurs nom et adresse à 1'éditeur, à I'adresse indiquée en page v.

BOLETIN DE INFORMACION SOBRE RECURSOS GENETICOS ANIMALES sera enviado gratuitamente a aquellos quienes sean interesados en la conservación, gestión o utilización del ganado domésticos. Si se desea recibirlo regularmente, se ruega comunicar nombre, apellido y dirección al Editor a la dirección'indicada en la página v.

RUMINANT LIVESTOCK GENETIC RESOURCES IN CYPRUS

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SUMMARY

Friesian cattle, Chios sheep and Damascus goats have become dominant livestock breeds in Cyprus. Chios sheep were found to be superior to the indigenous Cyprus FatTailed and the imported Awassi with respect to precocity, fertility and prolificacy. Awassi performed very well with regard to milk yield and lamb viability. Crossbreds were more or less intermediate. Crosses of Chios with Cyprus Fat-Tailed have contributed substantially to the improvement of milk and meat production from sheep in the country.

Damascus goats are very good in litter size and milk yield; a specific strain of the indigenous goat also appears to be a valuable genotype.

RESUME

Les bovins Frisons, les ovins Chios et les caprins Damas sont devenus des races dominantes à Chypre. Les ovins Chios se sont révélés superieurs à la rae indigène chypriote d'ovins à grosse queue et aux Awassi importés, en ce qui concerne la précocité, la fécondité et la prolificité. Les Awassi ont d'excéllentes performances du point de vue du rendement en lait et de la viabilité des agneaux. Les produits de croisement sont plus ou moins intermédiaires. Les croisements entre Chios et ovins chypriotes A grosse queue ont beaucoup contribué A améliorer la production de lait et de viande ovine dans le pays.

Les caprins Damas sont très intéressants pour la taille des portées et le rendement en lait; une souche spécifique de chévre indigène semble aussi atre un génotype intéressant.

RESUMEN

El vacuno frisón, las ovejas de Kios y las cabras de Damasco se han convertido en las razas de ganado que mgs abundan en Chipre. Se ha descubierto que las ovejas de Kios son superiores a las indigenas de rabo grueso y a las importadas de Awassi en cuanto a su precocidad, fertilidad y prolificidad. Las ovejas Awassi habian dado muy buen resultado en cuanto a la producción de leche y a la viabilidad de las crias. Los cruces presentaban caracteristicas mgs o menos intermedia. El cruce de las ovejas de Kios con las de Chipre de rabo grueso, ha contribuido considerablemente a mejorar la producción de leche y carne de las ovejas del país.

Aspectos muy positivos de las cabras de Damasco son el número de las crias y la producción de leche; existe una casta especial de la cabra indigena que parece ser también un genotipo valioso.

1. INTRODUCTION

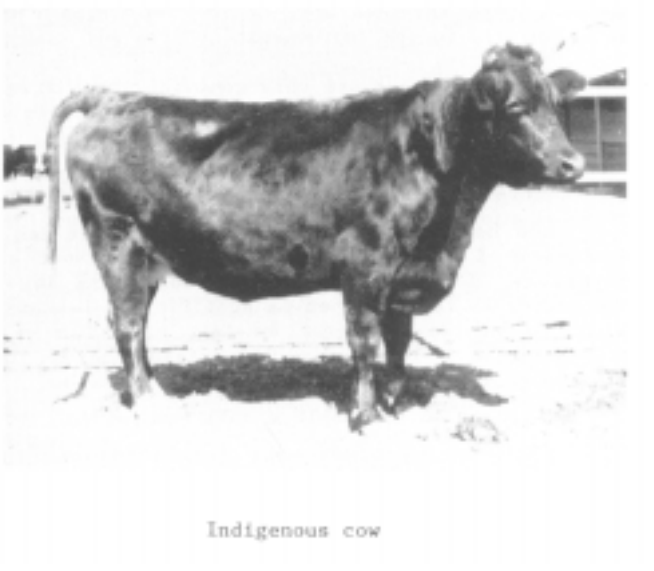
Within the framework of its national Livestock Improvement Programmes, Cyprus has imported a number of prominent breeds which are utilized for grading-up or replacing the indigenous breeds and for crossbreeding. Most of these breeds have been kept as pure and/or crossbreds in government stations for a number of years and have been compared under the same conditions. The purpose of this article is to summarize some results from these comparisons and to present a comprehensive list of the ruminant livestock genetic resources available in Cyprus. Physical characteristics of the breeds are not described.

They have been documented elsewhere (e.g. Mason 1967; Constantinou 1981; Lysandrides 1981).

The main "exotic" breeds involved in the study are Friesian cattle, Chios sheep and Damascus goats. Following a long period of intensive exploitation, either pure or in crosses with indigenous animals, these breeds have now become dominant genotypes on the island (Department of Statistics and Research 1980).

2. MATERIALS AND METHODS

2.1 Cattle



Indigenous cow

The data on indigenous and Friesian cattle were collected over several years at the Athalassa Government Stock Farm in the vicinity of Nicosia. A small number of native cows have been kept there over the last 30 years for conservation purposes and for supplying villagers utilizing this breed for draught with bull calves for breeding purposes. Imported frozen semen from a number of countries (Greece, Israel, Canada, USA, Finland) has been used for inseminating the dairy herd. Animals were fed on concentrates, hay and straw. Roughage quality was poorer for indigenous than for dairy cattle. Due to shortage of roughages concentrate supplementation was rather heavy at times. Indigenous calves were suckled for about 5 months and then fattened on straw and barley, supplemented with soybean meal, vitamins and minerals according to National Research Council standards (NRC 1971). Friesian calves were weaned at 60-80 days and males were fattened on concentrates ad **libitum** with a limited amount of roughage.

2.2 Sheep and Goats

Sheep and goats were kept in a number of locations (Athalassa, Akhelia, Orites) and were managed semi-intensively. They were grazed on sown pastures from January to April and on cereal stubbles for 4-5 months thereafter. Hay was fed in late pregnancy and early lactation. During the period six weeks before lambing to 10 weeks after lambing concentrate supplementation was rather heavy. Free suckling was allowed to a maximum of two lambs per ewe for 4 weeks followed by 8 hours a day suckling for 14 days and complete weaning at 42 $\pm$ 3 days of age. Surplus lambs were reared artificially. Kids were weaned at 70 $\pm$ 3 days following two weeks of partial suckling. Lambs and kids had access to a creep feed during suckling and were fattened after weaning on concentrates and hay. Ewes and lambs were handled for recording purposes. Milk yield was recorded only after weaning and lactaction production was computed from monthly test-day records.

The data concerning the indigenous white goat originate from a preliminary field study carried out by the Agricultural Research Institute. Two private flocks were recorded in one year and basic information was collected individually.

3. RESULTS AND DISCUSSION

3.1 Cattle

Comparative data on the performance of indigenous and Friesian cattle are presented in Table 1. Cows of the local breed are smaller and mature later than Friesian cows. Calves are carried for an extra week and are smaller at birth. Commercial milk production is non-existent in native cattle whereas in Friesians production levels are fairly high. Growth rate of indigenous calves to one year of age was satisfactory and the difference compared with Friesian calves might have been smaller if native calves had also been fed ad **libitum.**

TABLE 1

*COMPARATIVE DATA ON THE PERFORMANCE OF INDIGENOUS AND FRIESIAN CATTLE IN CYPRUS**

Trait		Indigenous cattle		Friesian cattle	
		No. of records	Mean	No. of records	Mean
Cows					
Age at lst calving (months)		56	29	141	24
Weight at Ist calving (kg)		39	437	83	507
Adult cow weight (kg)		49	517	58	549
Calving interval (months)		193	13.2	161	12.2
Gestation length (days)		247	289	307	281
1st lactation 305-day yield (kg)			-	62	4833
305-day yield (later lact., kg)			-	118	6069
Fat (%)			-	112	3.8
Protein			-	111	3.4
Calves					
Birth weight (kg)	male	161	31	162	41
	female	131	30	145	39
Six-months weight (kg)	male	84	162	131	210
	female	70	149	not available	
Twelve-months weight (kg)	male	84	342	131	423
	female	70	307	83	324
ADG of bull calves from 6-12 months of age (kg)		84	0.99	131	1.17

Data on Friesian calves derive from fattening trials carried out at the Agricultural Research Institute, Nicosia.

3.1 Sheep

Data collected over five successive lambing seasons (1978/79 to 1982/83) on the performance of various sheep breeds and crosses are presented in Tables 2-5. A summary of performance characteristics of ewe lambs (yearlings) is given in Table 2 and performance of adult ewes in terms of fertility, prolificacy, milk yield and lamb growth is detailed in Tables 3-5.

Compared with the indigenous fat-tailed sheep and the imported Awassi, the Chios breed is much more early maturing and most of this precocity is transferred to its crosses with the other

two breeds. The Chios is also superior in terms of fertility (percentage of ewes becoming pregnant) and prolificacy (litter size). Litter size and milk yield of various crosses with Cyprus Fat-Tailed and Awassi sheep were intermediate but somehow lower than expected. Crosses of Chios with East Friesian Milk Sheep (imported from Germany) gave very good results in terms of fertility, litter size and lamb growth but they also increased body weight and consequently maintenance cost. The excellent performance of F, animals was not fully sustained in the backcrosses with Chios but a superiority ovee the Chios breed was still evident.

TABLE 2

PERFORMANCE OF EWE LAMBS (YEARLINGS) IN SHEEP BREEDS AND CROSSES

Breed/cross	No. of ewe lamb	% pregnant	Litter size at birth	Milk yield after weaning (kg)*	Days in milk
Cyprus Fat-Tailed (CFT)	131	28.2	1.15	41	68
Chios (C)	501	72.9	1.64	133	137
Awassi (A),	274	32.5	1.01	129	144
C X CFT (F_1)	49	59.2	1.21	68	80
3/4 C 1/4 CFT	69	55.1	1.44	67	83
C X A and A X C (F_1 s)	*177*	65.5	1.26	109	116
3/4 C 1/4 A	98	63.2	1.39	112	102
East Friesian (EF) X C (F_1)	158	31.6	1.61	160	168
3/4 C 1/4 EF	106	75.5	1.42	119	114

** Weaning of lambs was at about 6 weeks of age; first milk recording occurred no sooner than seven days after weaning.*

TABLE 3

FERTILITY AND PROLIFICACY OF SHEEP BREEDS AND CROSSES

Breed/cross	No. put to the ram	% barren	% aborting	% lambing	Litter at birth	size at weaning weight (kg)	Adult ewe
Cyprus Fat-Tailed	684	18.0	6.0	76.0	1.17	1.08	-66
Chios	1371	6.4	2.5	91.1	1.69	1.44	62
Awassi	918	12.9	0.9	86.3	1.11	1.03	70
C X CFT (F_1)	131	13.7	4.6	81.7	1.36	1.20	n.a.
3/4 C 1/4 CFT	106	5.7	2.8	91.5	1.51	1.27	62
C X A and A X C (F_1 s)	274	7.7	1.4	90.9	1.34	1.22	72
3/4 C 1/4 A	78	1.3	-	98.7	1.44	1.34	62
EF X C (F_1)	310	5.5	1.3	93.2	1.81	1.55	84
3/4 C 1/4 EF	87	3.4	4.6	92.0	1.76	1.55	69

n.a.: not available

TABLE 4
*MILK PRODUCTION AFTER WEANING OF SHEEP BREEDS AND CROSSES**

Breed/cross	No. of ewes	Milk yield (kg)**	Days in milk	Fat %	Protein %
Cyprus Fat-Tailed	453	63	98	.7.1	6.5
Chios	1066	161	174	6.7	6.5
Awassi	750	179	185	7.7	6.6
C X CFT (F_1)	91	94	113	6.7	6.3
3/4 C 1/4 CFT	85	102	107	6.5	6.2
C X A and A X C (F_1 s)	220	161	139	6.5	6.2
3/4 C 1/4 A	66	141	120	6.2	6.2
EF X C (F_1)	282	211	174	5.9	6.1
3/4 C 1/4 EF	80	177	144	6.2	6.2

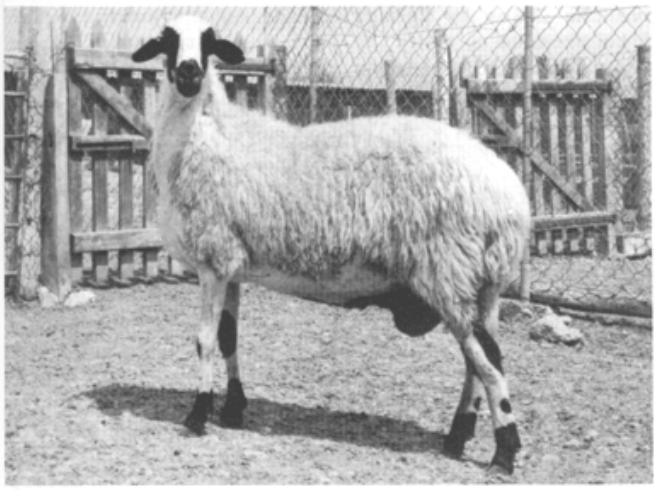
** CFT and all crosses are kept at Athalassa; Awassi at Orites; Chios at both stations. Fat % of Chios at Orites was 7.0% and at Athalassa 6.2%.*
*** Weaning of lambs was at about 6 weeks of age; first milk recording occurred no sooner than 7 days after weaning.*

TABLE 5
LAMB WEIGHTS OF SHEEP BREEDS AND CROSSES

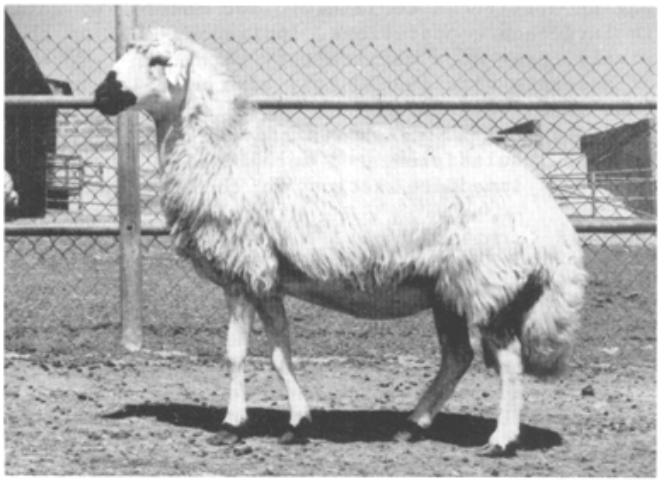
Breed/cross	No. of lambs	overall			lambs born as singles post			
		Birth kg	weaning kg	15 wks kg	birth kg	weaning Kg	15 wks Kg	weaning ADG (g)
Cyprus Fat-Tailed	459	4.5	14.9	26.1	4.7	15.2	27.2	190
Chios	2048	3.8	14.4	27.4	4.7	15.3	29.8	230
Awassi	738	4.8	16.9	30.5	4.9	17.6	31.1	214
C X CFT (F_1)	162	4.7	15.2	28.3	4.9	16.0	28.9	205
3/4 C 1/4 CFT	152	4.4	14.8	28.4	4.9	15.9	30.2	227
C X A and A X C (F s)	530	4.5	17.1	33.0	5.2	19.4	34.7	243
3/4 C 1/4 A	209	4.7	15.3	29.4	5.2	16.2	30.3	224
EF X C (F_1)	45	4.6	15.6	33.2	5.3	17.9	39.3	340
3/4 C 1/4 EF	289	5.3	14.8	31.0	5.0	16.6	32.0	254

Awassi sheep performed very well with regard to milk yield, fat percent in milk, percentage of ewes aborting and lamb viability to weaning. Awassi sheep, however, together with Cyprus Fat-Tailed, were the poorest with respect to ewe fertility and prolificacy. Awassi sheep combine small litter size with high milk yield; hence maternal components contribute substantially to lamb growth and possibly to other characters which manifest themselves later in life (Mavrogenis 1983; Constantinou 1984).

The results presented in this study with respect to the performance of various sheep breeds and crosses underline the philosophy of sheep improvement policies in Cyprus, namely: to continue using the indigenous fat-tailed sheep where social, economic and physical conditions allow in order to utilize poor feed resources that would otherwise be wasted (15 percent of sheep still belong to this breed); to gradually improve local sheep by crossing them with the Chios, in line with intensive efforts to improve management and feeding practices; to keep Awassi as a



Chios ewe



Cyprus Fat-tailed ewe (local)

stand-by sire breed for use whenever there is a discrepancy between level of managment and level of genetic improvement; to introduce pure Chios sheep to areas and to people that can provide good management and feeding (presently 20 percent of the national flock, i.e. about 40 000 head are pure Chios); to further improve the Chios by selection and crossbreeding (with the East Friesian Milk sheep) in order to produce a genotype that would respond to even better management (for example in irrigated areas with indoor feeding).

3.3 Goats

Only goats of the Damascus (Shami) breed are currently kept in government stations. A summary of performance characteristics of this breed is given in Table 6 along with some preliminary data concerning the indigenous white goat. The latter forms a distinct strain of the local br ‘ eed and is mainly concentrated in a mountainous area where the Makhera monastery kept a large breeding flock over many years. The breed is considered endangered both in terms of population size (currently about 750 head) and purity.

Damascus is a relatively early maturing and prolific breed which was imported to Cyprus from Syria some 40 years ago (Constantinou 1981). Lactation performance of this goat is very good if one considers that an additional 250-280 kg of milk are produced during the suckling period (Constantinou 1980). Growth rate to weaning is satisfactory but after weaning it is variable

and in this study it was poorer than typically found for the breed (Hadjipanayiotou and Louca 1976; Constantinou 1.981). This inconsistency may be attributed to insufficient control of environmental factors affecting kid growth in large-scale operations. Indigenous kids on the other hand, which were managed extensively, grew at a satisfactory rate both before and after weaning. This breed, which is of moderate size (40-50 kg), also excelled itself in fertility, fat ' content in milk and lamb viability and may not be inferior to the Damascus in terms of live weight of kid sold per unit of metabolic body weight of the dam. These data are strictly preliminary and the results presented here require further verification but they do demonstrate the need for immediate action to conserve and futher evaluate this promising genotype.

ACKNOWLEDGEMENTS

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TABLE 6

PERFORMANCE CHARACTERISTICS OF GOAT BREEDS

	Damascus (Shami) goat	Indigenous white goat*
YEARLINGS		
No. of goats	499	n.a.
% pregnant	46	(>60)
Litter size at birth	1.41	n.a.
Milk yield after weaning** (kg)	171	n.a.
Days in milk	155	n.a.
ADULT GOATS		
No. put to the male	1677	*170*
% barren	12.8	4.0
% aborted	2.3	3.0
% lambed	84.9	93.0
Weight at kidding (kg)'	65	(40-50)
Litter size at birth	1.90	1.60
Litter size at weaning**	1.65	1.50
Milk yield after weaning (kg)	283	120
Days in milk	191	150
Fat %'	3.7	6.0
Protein %	3.6	n.a.
KID WEIGHT (KG)		
At birth	4.4	3.5
At weaning'	17.5	(~18.0)
At 20 weeks	27.3	(~28.0)

** Data concerning this breed originate from a preliminary field study carried out by the Agricultural Research Institute, Nicosia, Cyprus.*

*** Damascus kids weaned at 10 weeks; indigenous kids at about 13 weeks.*

n.a. = not available

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