

The Damascus (Shami) goat of Cyprus

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Introduction

The Damascus goat, also known as the Shami, is a native breed of Syria and other Near East countries. It was imported into Cyprus some 70 years ago to upgrade the local Cypriot goat population. For over 40 years it has been improved through genetic selection for milk and meat. The Damascus goat was one of the breeds that the Technical Consultation of FAO/UNEP on Animal Genetic Resources, Conservation and Management agreed should be given a high priority due to its qualities.

Appearance and Distinguishable Features of the Breed

The Damascus goat has a reddish brown coat colour consisting mostly of long hair. White spots on the body, legs and face, although not very common, may appear on the animal (Figure 1 and 2). The black coat colour is extremely rare and may appear as a result of the presence of a recessive gene in the population. The ears are long and pendulous measuring between 27 cm and 32 cm in length. It is a rather large breed measuring 78 cm at withers, with a body circumference of 97 cm to 99 cm and an adult live weight of about 65±5 kg for the female and 75±5 kg for the male. The head is long with a Roman nose and the presence of horns in both sexes is associated with inter-sexuality (Hancock and Louca, 1975). The breed carries wattles.

Main Management System

This improved breed, that lives and performs in Cyprus, requires an improved management and feeding environment to express its full genetic potential. Extensive grazing is not practiced and watering facilities are available only during the short grazing hours allowed. The goat can be managed in small or large-size herds. Housing, feeding and other necessary facilities are available. The most common herd size is 200 to 300 goats, but herds of 500 does or more are not rare. The breed is considered as one of the best dual-purpose breeds of the Middle East under semi-intensive or intensive production systems, combining high prolificacy with high milk production. Because of these qualities, its potential for high output and its nutrition requirements during the various phases of the production cycle, the Damascus goat has been extensively studied.

Management and feeding systems, such as suckling regimes, weaning regimes (age of kids at weaning, continuous or partial suckling, etc.), energy and protein requirements of the doe and the kid and fattening practices have also been investigated. The very nature of the production system in which the particular breed performs (semi-intensive to intensive) indicates that natural vegetation and seasonal variation, although important during certain parts of the production cycle, do not play a significant role in the management and nutrition of the breed. With regard to management practices, it is important to note that weaning of kids can be practiced at birth (zero suckling) or at six



Figure 1. A Damascus (Shami) ram.

to seven weeks post partum without serious adverse effects on the growth of the kids. The digestible nitrogen requirements for maintenance of a 65 kg goat (dry, non-pregnant) are estimated at 1.75 kg per kg metabolic ($W^{0.71}$) body weight (Hadjipanayiotou, 1987). The daily energy requirements for maintenance are similar to those of the Chios sheep, i.e., 15.7 MJ of ME during pregnancy (Economides, 1984).

Reproduction Characteristics

The Damascus goat is considered a seasonal breeder. The breeding season starts in late August and extends through mid-December (Mavrogenis, 1988 a). Age at first overt oestrus occurs between 220 and 270 days of age depending on the season of birth of the kids. Live weights at those ages range from 42 kg to 54 kg depending on the type of birth (Mavrogenis, 1988 b). This characteristic allows for the early breeding of kids and the initiation of the productive life at the young age of 13 to 16 months (Mavrogenis and Constantinou, 1983). The reproductive

activity of the goat is restored 43 ± 9 days following parturition (Constantinou, 1981). Fertility is medium to high (80% to 90%), a characteristic of most goat breeds with high milk production. The prolificacy of the breed is among the highest in the region averaging 1.80 kids per doe kidding (Constantinou, 1981; Constantinou *et al.*, 1981). The presence of horns is associated with inter-sexuality and sex ratio is distorted (Hancock and Louca, 1975; Constantinou *et al.*, 1981).

Production Performance

Under the semi-intensive system of production, the breed's performance is moderately high. Birth weights are high and range from 3.5 kg to 5.5 kg depending on the type of birth and the sex (Mavrogenis, 1985; Constantinou, 1989; Mavrogenis and Papachristoforou, 2000). The nutrition requirements for growth before and after weaning have been extensively studied (Hadjipanayiotou and Louca, 1976; Hadjipanayiotou, 1986). Kid carcasses are

less fatty than lamb carcasses, when they are compared at similar slaughter weights or similar slaughter ages. The dressing percentage of kid carcasses at 55% maturity is 50.3% (120 days of age) with a lean content of 55% and a fat content of 26.8% in the best and neck cuts.

Milk Production Potential

The Damascus goat is considered a dual-purpose animal (meat and milk). It is milked principally following weaning, but also during the suckling period, since a large quantity of milk remains in the udder without being utilized by the suckling kids. The practice in Cyprus herds is that only two kids are allowed to suckle as a routine practice. All extra kids from large litters are transferred to artificial rearing units.

Total milk production, including milk produced until weaning, ranges between 350 kg and 650 kg per goat per lactation (Louca *et al.*, 1975). The quantity of milk produced until weaning including that

suckled by the kid(s), is 190 kg to 240 kg, depending on the length of the suckling period (35 or 70 days). Milk production for commercial purposes is high (200 kg to 350 kg per goat per lactation) depending on the management system and the level of feeding (Louca, 1975; Hadjipanayiotou and Louca, 1976; Papachristoforou *et al.*, 1982; Mavrogenis, 1983; Mavrogenis *et al.*, 1985; Constantinou *et al.*, 1985; Mavrogenis *et al.*, 1989). Lactation extends from five to nine months following weaning, although lactations of up to a year are not rare. The fat and protein content of the milk are characteristic for high yielding breeds, ranging from 3.8% to 4.5% for fat and from 4.0% to 4.8% for protein (Economides, 1986). The milking goat responds positively to high protein diets with increased milk output and longer maintenance of lactation at a high level (Hadjipanayiotou, 1987).

Machine milking is progressively replacing hand milking. The practice of twice daily milking can be interrupted for a few days (mostly weekends) and once-a-day milking does not seriously affect total milk



Figure 1. A Damascus (Shami) goat.

production (Papachristoforou *et al.*, 1982). Most morphological traits of the udder can also be favourably manipulated genetically. (Mavrogenis *et al.*, 1989).

Genetic Evaluations

Systematic studies of the description and characterization of the Damascus goat were initiated as early as 1972. The first studies concerned mostly management problems and weaning regimes, since this particular breed required a better environment to express its full potential.

Genetic evaluation has been concerned with production and reproductive traits, such as part (60-day, 90-day and 150-day) and total milk production, lactation length, fertility and prolificacy of the goat as well as the total weight of the litter at birth and at weaning. Moreover, the individual performance of kids, from birth to the age of 140 days, was also investigated. Growth rates both before and after weaning were included in the genetic evaluation studies.

Management System under Private Farm Conditions

This farm established in 1929 is located in the south of the island of Cyprus near the village of Pissouri, some 45 km from the city of Limassol (Figure 3 and 4). It is established on a low hill area (altitude 50 m from sea level) and prevailing temperatures in the area range between 5° C and 20° C in the winter and 28° C to 35° C in the summer. Humidity in the summer months ranges between 40% and 60%.

The unit in 2004 comprised of 460 milking goats (Figure 5) that were milked twice daily at equal milking intervals (at 5:00 h and 17:00 h). The management system utilizes not only the seasonal character of the breed but also artificial induction of oestrus during the anoestrous period of the year. The main purpose of the practice is to provide the market with a more or less constant supply of milk which is sent to the nearby processing plant for the conversion of milk into the traditional Halloumi cheese. No artificial insemination is practiced on the



Figure 1. Damascus (Shami) goats in a shelter.



Figure 4. A flock of Damascus (Shami) goat.

farm. Mating is carried out through selected sires and the system used for the identification of parentage relies on a group mating scheme of assigning one male to 25 females.

The farm practices no suckling. All kids are removed from their dams immediately after birth and are transferred to the artificial rearing unit that is designed to provide colostrum (for two days) and/or a reconstituted milk replacement (Table 1) *ad libitum* for a period of 45 ± 3 days when kids are weaned. Creep feed and alfalfa hay is also provided *ad libitum*. Fresh water is available through automatic watering units. Following weaning all kids are transferred to rearing-fattening pens where they are fed on concentrates and barley hay *ad libitum* until the age of 120 days. Sexes are segregated at that age and males and females, selected for breeding (replacements), are separated and housed in lots of 25 to 30 animals. Feeding is again at will on both concentrates and barley hay. By four months of age female kids reach an average weight of 30 kg to 34 kg and males 33 kg to 36 kg. All animals selected for

breeding at four months of age enter an intensive immunization and veterinary control program. The mature (adult) body weight of the does ranges from 60 kg to 80 kg and of the bucks from 80 kg to 100 kg.

Young females are introduced to bucks early in pubertal life when they exhibit first oestrus (between 220 and 270 days of age) and continue breeding for an average of six years after which they are sold to other farmers or are utilized for meat. Bucks begin their reproductive life at circa nine months of age and remain in the production system for a maximum of two years. Related mating and consanguinity is minimized by separating males from females and only allowing mating between related individuals beyond third degree relatives.

All goats are milked immediately following parturition and the first milk (colostrum) is fed to the kids. They are subsequently milked for 305 days twice daily unless daily production drops below one kg per day when they are milked once a day. A completed lactation is one that lasted 305 days unless they become pregnant in

Table 1. Content of ingredients, trace elements and additives of milk replacer used on the private unit.

Ingredients (%)		Additives (per kg mixed feed)		Trace elements	
Crude protein	23.0	Vitamin A	60 000 I.E.	Iron	72 mg/kg
Crude fat	20.0	Vitamin D3	6 000 I.E.	Copper	10 mg/kg
Crude fiber	0.3	Vitamin E	60 mg	Manganese	30 mg/kg
Crude ash	7.8	Vitamin C	270 mg	Selenium	0.15 mg/kg
Calcium	0.85	Vitamin K3	3 mg	Zink	32 mg/kg
Phosphorus	0.75	Vitamin B1	9 mg	Cobalt	0.25 mg/kg
Sodium	0.65	Vitamin B2	14.4 mg	Iodine	0.35 mg/kg
		Vitamin B6	4.2 mg		
		Vitamin B12	0.04 mg		
		Nicotinic acid	60 mg		
		Pantothen acid	30 mg		
		Choline chloride	375 mg		
		Biotin	0.2 mg		
		Folic acid	0.4 mg		

which case they are removed from the milk producing flock 60 days prior to parturition. No extension is carried out for shorter lactations, and longer lactations are standardized to 305 days.

The feeding system for lactating goats consists of a commercial concentrate feed

containing (per tonne finished feed) 350 kg barley, 150 kg corn, 110 kg soybean meal, 30 kg salt and limestone and 10 kg of a vitamin mixture (14% CP), and cereal hay and straw all fed *ad libitum* until daily milk production drops below 1.5 kg when concentrates are fed based on requirements for milk yield.



Figure 5. A flock of Damascus (Shami) goat.

Performance Evaluation at the Private Farm

Performance recording was initiated in 2000 when only 100 animals were recorded. Hence, evaluation on the basis of performance records for the years 2000 to 2003 as well as on the basis of parity is not uniform with respect to the number of observations. Milk production is presented in Tables 2 and 3 for year and parity effects, respectively (Figure 6). It is clear from the means listed in table 2 that milk yield increased considerably from 2000 to 2003. This is mostly attributed to proper culling and replacement practices through the years. The high milk production observed in this private unit reflects the fact that milking was practiced right from parturition. It appears that the suckling stimulus that was decisive in the early 1980's has diminished in importance. Louca *et al.* (1975) and other investigators (Louca, 1975; Hadjipanayiotou and Louca, 1976) observed high milk production in goats separated from their kids at two days following birth but which was

somewhat lower than that found in the present study. With respect to parity milk yield, this was highest at the third parity and tended to decrease thereafter. Similar findings have been reported (Mavrogenis, 1983; Mavrogenis *et al.*, 1985; Constantinou



Figure 6. Udders of Damascus (Shami) goats before milking.

Table 2. Milk production and prolificacy of Damascus (Shami) goats by year of production on the private unit.

Year of production	Milk yield (kg)			Prolificacy		
	N	Mean	SD	N	Mean	SD
2000	102	640.4	106.2	102	2.62	0.83
2001	334	668.0	100.6	336	2.39	0.77
2002	386	708.5	114.5	387	2.36	0.75
2003	459	731.9	144.0	459	2.27	0.73

Table 3. Milk production and prolificacy of Damascus (Shami) goats by parity of doe on the private unit.

Parity of doe	Milk yield (kg)			Prolificacy		
	N	Mean	SD	N	Mean	SD
1	80	635.2	165.2	80	1.92	0.57
2	168	674.9	123.1	168	2.09	0.63
3	606	726.9	120.2	611	2.31	0.72
4	427	686.5	117.5	427	2.60	0.81

Table 4. Mean birth weights of Damascus (Shami) kids averaged over parity of dam and type of birth on the private unit.

Birth weight (kg)	Sex of kid	
	Males	Females
N	428	372
Mean	4.37	3.91
S.D.	0.74	0.72

et al., 1985; Mavrogenis *et al.*, 1989) for the Damascus breed.

Kid growth data are very limited because of the small number of kids recorded following birth. The unit has only recently established a system of evaluation based on post-weaning growth of the kids and the milk production of their dam but data are limited and information other than birth weights is not provided. Live weights at birth, however, are satisfactory (Table 4) and consistent with previous reports of other studies (Mavrogenis, 1985; Constantinou, 1989; Mavrogenis and Papachristoforou, 2000). Males were heavier (4.4 ± 0.7 kg) than females (3.9 ± 0.7 kg) when averaged over type of birth and dam parity, and reflect current breed averages.

The Cyprus Damascus (Shami) goat is an excellent, highly adaptive and hardy goat. Experience from local farms and import countries confirm that it can be used both in purebreeding or crossbreeding programs to upgrade milk yields in local populations or dual purpose production systems. The farm has considerable experience exporting the Cyprus Damascus (Shami) goat to more than 15 Middle East and Gulf States over 20 years. Detailed studies in Libya demonstrate that the performance of purebred or crossbred Damascus (Shami) goats surpasses that of the local populations.

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