

An international panorama of goat selection and breeds [☆]

Jean-Paul Dubeuf ^{a,*}, Jean Boyazoglu ^b

^a *INRA-SAD, F-20231 San Giuliano, France*

^b *Aristotle University, Gr-54124 Thessaloniki, Greece*

Abstract

The preservation of the biodiversity of animal breeds is an important condition to maintain the ability of animal production to adapt to the changing conditions of breeding and production systems in the future. The decrease of the number of animal breeds has been observed both for sheep, cattle and goats in relation with the standardisation and intensification of animal production systems.

Goats are mainly concerned by the situation as they have the biggest increase in livestock numbers in 20 years. A global overlook of goats worldwide is showing a contradictory situation: On one hand, small but well organised sectors have developed in a few countries for milk and cheese, meat and fibre production. On the other hand, most of the goats are mostly still used for auto consumption of milk meat and skin or fibres in village herds. The present goat genetic situation is the direct consequence of this evolution with the high specialisation of a small number of selected and well characterised breeds for milk, meat and fibres and a majority of not well defined populations and local breeds, generally without selection schemes and organisation.

A global panorama of the main families and breeds is presented. A special consideration is then pointed on the necessary financial and logistic conditions to achieve successively these selection objectives. After having observed that in many cases these conditions are not present, this report concludes by some proposals to control better the possibilities of success and express with more efficiency the genetic potentiality of this interesting species.

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1. Introduction

This communication is the introduction to the International Goat Association meeting on “local goat genotypes and their utilisation in management systems as means of conservation”. This subject has a special and strategic importance. [FAO \(2000\)](#) has estimated that the preservation of the animal breeds is a major stake for the world biodiversity. Among the 6379 identified

animal breeds from 30 species of mammals and birds, we have data for 4183 of which 740 have already disappeared and 1335 (40%) are threatened. In 1995, 35% of animal breeds have been considered in danger of extinction (25% previously). 400 breeds, only, are involved in selection programs. Besides, the preservation of local livestock genotypes is of major importance as is the conservation of endemic plants in the range lands and marginal lands. ([Hoffmann, 2004](#)).

Meanwhile, we discern, thanks to an always larger access to global though contradictory information, that the world is always facing more and more dramatic changes of which we identify hardly the dynamics. Nevertheless, we also become more and more aware that

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* Corresponding author. Tel.: +33 608 861 813.

E-mail addresses: dubeuf2@orange.fr (J.-P. Dubeuf), jean.boyazoglu@wanadoo.fr (J. Boyazoglu).

these changes will soon have important consequences on our daily life; in the demographic, economic, cultural or environmental aspect.

The situation and the role of goats are not independent of these introduction considerations. We will see what is the true significance of the present increase of the world goat population, what is the real situation of the selection of goat breeds and in what sense it is clearly related with the global world situation.

From this analysis, we can suggest some orientations for a more efficient governance of the goat livestock and their impact on the human welfare.

2. The growing goat species population and the role of goats in the society

2.1. A domesticated animal since the dawn of civilisation

If the site of Ganj Dareh (Iran of today) is the homelands of one of the first types of wild goats, the goat has been one of the first domesticated animals with first evidence as early as about 8000 BC in the Fertile Crescent. Goats were used for meat and milk at least 2500 BC in the Middle East and there is evidence of their domestication both in the Indus Valley, in China and probably in Meso America. (Boyazoglu and Hatziminaoglou, 2004). Domestication and breeding animals is a characteristic of civilisation and goats are clearly associated with this concept and their destiny with the fate of mankind. Goats played a great role in the ancient Egyptian, Chinese, Mongolian, Greek, Hebrew or Russian mythology. In India, the word “goats” means the unknown primary substance of the living world (Boyazoglu and Hatziminaoglou, 2004; Boyazoglu et al., 2005).

From these first traditional populations, goats disseminated all over the world with a large diversity of phenotypes and differentiation related to their utilisation by human consumers as described in the Mediterranean by Lauvergne (1988):

- high/small size,
- short/long ears,
- screw/vertical/sabre horns,
- spotted/speckled/black-white/piebald skin,
- short/long hair,
- ...

2.2. A changing and diversified role in the society

Goat's milk and meat from young or adult animals has been consumed for thousands of years. The skins of goats were used in many ways, for the wrapping of the

dead, parchment making (Egypt), as well as the making of clothes. Goat skin became the standard bottle to transport liquids (in countries where this had to be carried for long distances and in great heat. Goats were well adapted to harsh or dry conditions where cattle or sheep could not survive and were often carried on ships as a source of fresh milk by the early explorers to the New World or in Oceania. The Angora breed, known in the Middle-East since the time of Moses was introduced in Europe by Emperor Charles V. In the 18th century, the first definite breeds were differentiated from the initial Asian, African or European populations with a beginning of specialisation for milk (Alpine, Pyrenean breeds) (Boyazoglu et al., 2005).

Often considered as marginal animals for subsistence of poor people, goats were often seen as damageable for forests and grazing; they were banned in many regions. Meanwhile in developed countries, and firstly in France an increasing interest for its dairy potential led to the creation of a specific dairy goat sector with an organisation for selection, processing and commercialisation. After May 1968, in Europe, the goat has symbolised (perhaps abusively and contradictory) ecological agriculture, diversification and high quality (Repères, Market Research and Opinion, 2001; Boyazoglu et al., 2005) but if most of the world population has access to goat milk, less than 5% of the total milk produced is marketed and the meat sector is very little organised while the fibre goat sector (Angora mohair wool and Cashmere hair) is more speculative (Dubeuf et al., 2004).

In spite of these changes, the capital role and potentialities of goats was underestimated. Nevertheless, mainly thanks to the crucial role of the International Goat Association (IGA), goats are no more only synonymous of underdevelopment and poverty. Without much financial means, the previously little considered scientific research on goats has been promoted and reached evident academic standards. The creation of Small Ruminant Research and its promotion by IGA, now known as a major scientific journal, has been of major importance. The organisation of an International Conference on Goats, each 4 years, also with the support of the IGA, has also contributed to the recognition of scientific studies on goats including works on selection, breeding and reproduction control (Boyazoglu et al., 2005).

But these positive changes do not hide the fact that the role of goats for rural development is still underestimated and misunderstood by the policy makers or heads of international organisations and sometime even by NGOs.

Table 1
Evolution of goat livestock from 1985 to 2005 (10^6 heads)

		2005		Index (%)		1985		Index (%)	
Europe		17.8		138 (2.2)		12.87		100 (2.65)	
	Western Europe		11.6			10.7			
	Eastern Europe		2.8			2.2			
Asia		519.6		184 (64.2)		282.4		100 (58.2)	
	Middle East		221.1			149.4			
America		33.7		104 (4.2)		32.1		100 (6.6)	
	Northern A.		2.5			1.6			
	Central A.		9.1			11.1			
	Southern A.		22.1			19.4			
Africa		232.9		157 (28.7)		147.9		100 (30.4)	
Oceania		0.87		79 (0.011)		1.1		100 (0.22)	
World		808.9		166		485.1		100	
World cattle livestock		1372		109		1258		100	

Source: FAOSTAT (2006).

2.3. The goat, an actual indicator of the splitting up of the world

The statistics and the livestock census are clear: the world goat population has increased 66% during the last 20 years as compared to only 9% for cattle (Table 1). The productions of goat milk, cheeses and meat cheeses have evolved in the same way (Tables 2 and 3). By comparing these data with previous ones (Boyazoglu et al., 2005), we have observed an acceleration of this tendency during the past 5 years. What is the true significance of such an evolution? Does it mean that the goats are no more only “the cows of the poor” and why is this?

Our opinion could be considered a little bit iconoclastic by indicating that growth does not mean necessarily development. In most of the continents and particularly in Asia and Africa, the gap between the richer and poor people has deepened and more and more people are living with scarce means and under the threshold of poverty. Recent data have estimated that more than 1 billion people are living in shantytowns without any water or power. The limits between the town and country sides have disappeared and more and more people are

now surviving in mega polis by cultivating their own garden or breeding small animals like poultry or goats. In these conditions we easily observe the relation between this situation and the growth of goat population. When dynamics of the dairy goat sector is developing with slowly growing numbers in developed countries, an uncontrolled goat population is growing all over the world for the subsistence of an always faster growing poor population. The world is facing new and dramatic stakes: demography of course but also access to clean water, environmental problems, crisis of energy, etc. Once again, the destiny of goats is related with the future of our civilisation. How this goat population could contribute to the future welfare of humankind?

3. The goat breeds and populations in relation to the situation of selection schemes

3.1. A majority of local uncharacterised populations and unselected local breeds

Although there are few references on goat breeds, and although many goat populations are not clearly characterised,

Table 2
Evolution of the estimated production of goat cheese (10^3 t) and goat milk (10^6 t) from 1985 to 2005

		2005		1985	
		Goat cheese	Goat milk	Goat cheese	Goat milk
Europe		180	2.5	132	1.7
Asia		99	6.7	113.7	4.1
America		17.8	0.37	33.96	0.48
	Northern Central A.	13.8	0.19	30.06	0.32
	Southern A.	4	0.18	3.9	0.16
Africa		122	2.8	35	1.8
World		437.8	12.4	343.32	8.4

Source: FAOSTAT (2006).

Table 3
Evolution of the estimated production of goat meat (10^6 t) from 1985 to 2005

	2005	1985
Europe	0.12	0.09
Asia	3.3	1.3
Southern America	0.83	0.59
Africa	0.86	0.53
Oceania	0.02	0.12
World	4.05	2.05

Source: FAOSTAT (2006).

136 breeds were identified in a rather complete directory (Gall, 1996). From this overview, it appears that the goat breeds in temperate climates, are exceeding most others in levels of productivity, especially in milk and dairy products.

Most of the goat populations belong to non-defined groups deriving from Asian European or African initial livestock as it has been shown for the Mediterranean (Lauvergne, 1988); used for local consumption with few economic implications, they belong to what we call traditional local and generally multi purpose populations! Besides, few of the identified breeds are involved in true selection schemes!

The information on the traditional breeds and their characteristics are rather scarce: For instance, the French “Chèvre du Rove” has not been identified under this name before 1973 and has been really defined in 1979 when an independent herd book has been created independently from the Provencale goat; the first testimonies of the Corsican goat have been discovered in the VIth Millenary BC and this breed has been few crossed with other populations (except the introduction of Maltese and Alpine goats) but it has been officially recognised as a breed only few years ago. There was the same situation in Sardinia with the introduction of Maltese goats and politics to define the Sarda goat breed is not yet clearly decided. In Southern Italy (Basilicate, Sicily, Calabria), the traditional populations are predominant, 1/5 of the livestock belonging to the Girgentina, Garganic, Ionic or Maltese breeds (Lauvergne, 1988).

3.2. Goat selection is nearly limited to dairy breeds and in developed countries

Initially most of the goat populations were selected empirically. In Bulgaria, the Balkan goats have been

Table 4
Some identified organisations and breeds involved in a selection scheme

	Organisations	Breeds involved	Milk, meat
<i>Europe</i>			
France	Caprigène, Capri IA,	Alpine, Saanen, Corse, Rove	Milk
Spain	Acrimur, others breed associations	Murciana,, Malagueña, Majorejera, Palmera,	Milk/meat
Cyprus	Ministry of Agriculture	Damascus	Milk
<i>America</i>			
USA	Nigerian Dwarf Goat Foundation Nubian breeders Association National Angora Record Association International meat registry	Nigerian Dwarf goat Anglo Nubian, Angora breed Boer goat	Milk Milk Fibre Fibre
Canada	Equivalent structures		
Brazil	Capritec		
<i>Asia</i>			
China	Guinzhou /Hubeir	Boer goat	Meat
Israel	Sheep and goat breeders Association		Milk
<i>Africa</i>			
South Africa	The Boar goats breeders Association of SA Stud book Association of SA and SA Angora goat stud breeders Association Mohair growers Association	Boer goat Angora breed Mohair	Meat Fibre Fibre
<i>Oceania</i>			
Australia	Boer Goat breeders Association of Australia Australian Cashmere goat society Angora breed society of Australia	Boer goat Angora breed	Meat Fibre Fibre

Source: IGA (2004), Berger (unpublished - personal communication).

selected for their long dark hair and used for raw fibres. In the Middle-East, the traditional local (baladi) goats have been selected for milk and meat to resist the periods of water shortages. The present boer goat is derived from the African populations of Namaqua hottentots; in the early 1900s, the ranches started to select a meat type with infusion of Indian and European blood. (Casey and Van Niekerk, 1988). The Angora goats, have been denominated in the Vth century BC; originally from the region of Angora (today Ankara), they have been selected for their long white fleece. This breed, has been the first goat breed exported worldwide thanks to an authorisation of the Sultan in 1820.

Goat selection is directly related to the economically significant and organised sectors; thus, the western dairy sectors and the few sectors involved in the meat trade (e.g. South Africa, USA and Australia).

IGA (2004) has published recently a directory of goat organisations around the world. A previous individual unpublished initiative has identified 1028 goat related societies mainly in Anglo Saxon and developed countries (Berger, in press). Information on organisations involved in genetic improvement are hard to get and few of them have been identified. Most of them are located in developed countries and dedicated to milk production (Table 4). The main breeding programmes are in France for Saanen and Alpine, in Spain where earlier selection schemes have been organised for the Murciana Granadina, Malagueña or Majorera breeds, and more recently on other local breeds or in the USA with the Anglo Nubian breed. In Italy, the selection on local breeds does not involve many breeders and heads and is dedicated mainly to research Centers and Universities (Rubino, personal communication). In the USA, the selection of the Anglo Nubian breed has

developed for milk and the Boer goat for meat in Southern Africa. The development of selection schemes begins to develop significantly in China mainly for the Boer goat.

There are many associations and projects dedicated to the conservation of local breeds but a small number of animals and breeders are generally involved (Table 5). In a publication on the “Analysis and definition of the objectives in genetic improvement programmes in sheep and goats in the Mediterranean” (Gabiña, 2000), only five of 18 papers were dedicated to goat selection. In Croatia, for instance, not much attention was given to the improvement of the local goat. A breeding program for milking goats has been developed, by incorporating pure or crossed Alpine and Saanen to Balkan local populations but the number of goats recorded was less than 8000 (Mikulec et al., 2000).

3.3. The difficulty to organise recording in goats

In several southern countries, many projects of genetic improvement have been developed under the western European intensive model and by incorporating selected more productive goat breeds. We can consider though that most of them have been failures and unsustainable. The first reasons were the lack of mid and long term financial support and the fact that these means and projects were not suited to the real needs (Dubeuf, 2005). Can we agree, without reservation, with Haenlein (1997) commenting the Gall directory and maintaining that there is a great deal of interest introducing new more productive goat breeds for cross breeding? The experience has shown that the decision of crossbreeding will depend on the objectives of the breeders and their management ability to accept them.

Table 5
Some identified organisations and breeds involved in a conservation scheme

	Year 2005	Breeds involved
<i>Europe</i>		
France	Caprigène, Capri IA, Associations	Rove, Provencale, Pyrénéenne, Corse
Spain	Associations of breeds	Payoya, Florida,...
Italy	Association of Rare breeds, Research centres	Local breeds
Suisse	Service consultatif fédéral des petits ruminants	Swiss local breeds (alpine, Saanen, valaisane, etc...)
United Kingdom	Many breeders Associations	Many goats for leisure purposes
<i>America</i>		
USA	Many breeders Associations	pigmy goat, Nigerian breed
<i>Asia</i>		
China	Nanjan Huang breed	Nanjan Huang breed
<i>Oceania</i>		
New Zealand	Rare breeds Conservation Society of New Zealand	

Source: IGA (2004), Berger (unpublished - personal communication).

In many cases, the production systems are more often extensive or based on range lands. These production systems have rendered performance recording very difficult to carry out except for a reduced number of experimental flocks like in Tunisia (Rekik and Ben Hammouda, 2000). The introduction of pure exotic breeds if considered, needs to be strictly restricted to the very intensive systems and the cross breeding alternative should be regarded only as “one step” of a fully organised production systems in the case of milk improvement for a specific market or objective. In many cases the local goats need to be improved in the difficult areas because of their adaptability to the local conditions (Rekik and Ben Hammouda, 2000). The comments are in agreement with the position of FAO (2004) considering that the major threat for the diversity of animal breeds is the export of very productive but not adapted to local conditions animals from developed countries to developing countries and the crossing with local breeds; these populations losing often the characteristics of adaptability.

4. Proposals for the future and conclusions

In the next 20 years, the total production of meat and milk will have to double (FAO, 2007). The auto sufficiency of populations of most of the continents is necessary both for social, economic and environmental reasons. The goats have increased so much in number because they are adapted to these conditions not because they are “the more productive and profitable species”. The solution will not be always more exports from countries with high technology towards the more underdeveloped countries. Such a scenario would not be sustainable on the long run although it seems to be always the dominant model for most of the deciders!

Priorities have to be inverted. An important work of communication has to be initiated to promote the real benefit of goats for the rural population in an always more overcrowded and divided world. The interests of the goat keepers in developed countries (although often smaller farmers) are not necessarily those of the other continents and the projects of cooperation can no more be built only for the benefits of the first (exporting genetics). In many countries, the public services have been nearly destroyed for more than 10 years because of the bankruptcy of the finances and corruption in many states. In many cases, the extension services are no more financed, the extension agents or the teachers, like other public officers are no more paid regularly and they work without any formal instruction. The future is burdened with this situation when very simple and not expensive solutions could have a very good impact.

The necessary proposals are probably more social and political than technical or scientific! A real financial and human effort has to be initiated by teaching the rural populations to improve the control and organisation of animal production by and for the breeders. UNESCO and other United Nations Organisations insist on the priority for education of new generations. This has to be applied to hygiene, health control and management of animal production, even in isolated villages and populations. A generalised selection and sanitary control within the flocks and improved nutrition, would be more useful than most of money spending and sophisticated breeding programmes to sustain breeding in conditions where recording of the animals is problematic. More effort has to be dedicated to previous but practical evaluation of the needs of the projects.

These proposals are not in opposition with the present selection programmes on milk and meat production that have to be still improved but it will be important in the future not to be misled and confused in relation to the objectives and means in which to invest.

These considerations can be seen as too much general and not easy to apply. It is true that much effort and communication will be required to resist the short term pressure of the lobbies of the genetic sector. The goats could possibly become “the cows of the future” if we are able to take up this important challenge for rural development.

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