Production characteristics of domestic Balkan goats

N. Memisić, F. Bauman1, S. Stojanovic2, B. Pavlov3 & S. Jovanovic4

1Institute for Science Application in Agriculture, 29 Novembra 69b, Belgrade, Yugoslavia
2Federal Institute for Plant and Animal Genetic Resources, Omladinskih brigada 1, Belgrade, Yugoslavia
3Galenika a.d., Batajnicki drumb bb, Belgrade, Yugoslavia
4Faculty of Veterinary Medicine, Bulevar J A 18, Belgrade, Yugoslavia

Summary

The paper presents milk production results in a domestic Balkan goat breed reared in the north-western region of the Sharplanina massif. A characteristic of the domestic Balkan goat is that it is reared under poor conditions where other domestic animals can not find enough food to survive. These goats have a strong constitution, are robust and resistant to contagious and parasitic diseases, tolerant to hot, arid climate, and have modest nutritional requirements. The entire body (except the nose, hoofs, and lower portion of the tail) is covered by hair. Hair color varies. Most often it is reddish or gray, but can also be black, as well as chestnut, brown, patchy, and seldom, white. Body size increases with age, due to the fact that the domestic Balkan goat matures late, reaching full size at about 4 years of age. Mean values for height at withers and body length in mature goats were 66 and 70 cm, respectively. Lactation duration was 238 days, total milk production 178 kg per lactation, milk fat 3.68%. An average of 1.2 kids are obtained per goat annually. Poor fertility of the domestic Balkan goat is caused by numerous reasons, mainly poor nutrition.

Résumé

Voici le résumé des résultats d’élevage des chèvres domestiques balkaniques. La chèvre balkanique est élevée dans la partie nord-ouest du massif montagneux de Šarplanina. Elles vivent dans des conditions les plus défavorables, dans les localités où les autres animaux domestiques ne peuvent pas trouver assez de nourriture substantielle. Ces chèvres sont d’une constitution robuste, elles sont fortes et résistantes, elles supportent bien la chaleur et la sécheresse et sont modérées dans l’alimentation. Le corps entier, à l’exception du museau, des sabots et du bout de la queue, est couvert d’un pelage dont la couleur est variée: le plus souvent le poil est rougeâtre ou gris, mais il est aussi noir, marron et multicolore. Le pelage blanc est rare. Le développement corporel de la chèvre est adéquat à l’âge de l’animal. Elle parvient à son plein développement physique à l’âge de quatre ans. La hauteur moyenne de la crête et la longueur moyenne du corps d’une chèvre adulte est 66 cm et 70 cm respectivement. La production de lait par jour est 238 kg et la production totale de lait est 178 kg par lactation. La richesse du lait en graisse est 3,68%. Pratiquement cela signifie que une chèvre chevreole 1,23 chevreaux annuellement. La fécondité basse est causée par bien des raisons : la cause la plus importante est l’effet de la nourriture.

Key words: Domestic Balkan goat, Genetic profile, Breed characteristics.

Introduction

Goats were among the first domesticated animals. They have been fulfilling basic requirements of many households, both in
hilly and in mountainous regions as well as in settlements located around urban centers. After a considerable period during which goat rearing in SR Yugoslavia was repressed and prohibited, there is a visible trend of growing interest in rearing this useful domestic animal in the last few years. Before the law forbidding the rearing of goats was passed (in 1954), SR Yugoslavia was renowned for the domestic Balkan goat, which was present in all mountainous and cretaceous regions, where animal feed was scarce. This goat belongs to the group of primitive Balkan goats originating from the *Capra prisca* family. A characteristic of the domestic Balkan goat is that it is reared under the most adverse conditions, i.e. in places where other domestic animals can not find enough food to survive. Two types of the domestic Balkan goat, differing in live body weight and the regions where they are reared, can be found, the lighter type in hilly and mountainous regions characterized by lower production, and the heavier (lowland) type which is reared at lower altitudes, richer in animal feed.

In the region of the Sharplanina massif there has been an effort lately to orient goat rearing towards producing more milk. The domestic Balkan goat breeders earn significant profits required for their subsistence through milk production and primarily processing it into cheese (which is in very high demand on the local markets). However, the transition from the present extensive goat rearing practices to intensive practices, is by no means an easy task, since breeders still share a common opinion that the goat is an animal with modest requirements, and that as such it provides modest profits. There is no future in keeping goat rearing at a level of extensive production, which is a consequence of the traditional approach to rearing with very deficient nutrition.

Therefore, if adequate systems of rearing are developed and if production technology is changed in the process, primarily if nutrition and care are improved, goats could contribute to a profitable production of animal products, which are deficient in the nutrition of the people.

In November 1995, within the program to preserve genetic resources of old autochthonous breeds in Serbia and Montenegro, work on monitoring production traits of the domestic Balkan goat reared in areas of Sharplanina province (southern Kosovo and Metohia) was initiated. The information on different aspects of Balkan goats is very limited. This paper presents information on the breed characteristics related to demographical characteristics, management and production parameters recorded in field conditions.

**Habitat and Distribution**

In its original form the domestic Balkan goat is mainly reared in the region of the Prizren municipality, i.e. in the hilly and mountainous terrain of north-western Sharplanina. To a lesser degree, this breed can also be found in plains (settlements around the municipalities of Suva Reka and Orahovac) (Figure 1, Map of Serbia). In the north-western Sharplanina region, over one half (57.5%) of all territories are at medium altitudes or high mountains over 1 500 m. At such altitudes meadows and pastures are the basic types of vegetation, the other type being forests. Apart from meadows and pastures, this region of north-western Sharplanina has a rich hidrography, which contributed to the historical orientation of the population toward animal husbandry as the basic type of existence and economic activity. The primary development trend was towards sheep and goats, due to their comparative advantages pertaining to the use of natural resources and modest rearing conditions available in Sharplanina.
Figure 1. Habitat of the domestic Balkan goat (Sharplanina region).

Population

Today, the domestic Balkan goat forms about 35% of the total population of goats reared in the Republic of Serbia (total population is about 60,000 goats). Since much cross-breeding was done, the lighter type of the domestic Balkan goat is not so frequent nowadays (about 10%). In the field it can only be found in remote hilly and mountinous regions, such as Sharplanina.

According to statistical data (Regional Agriculture Office, Prizren, 1997) the number of domestic Balkan goats in the Sharplanina massif is estimated at 7,000–8,000 animals. The Balkan goat is mainly reared on private farms in small numbers (1-3 animals), however, herds of 100 or more goats can also be found in this area. Animals are mainly kept under extensive conditions, spending the best part of the year (March-November) on pastures and grazing. When climatic conditions allow, this is also true even during the winter in most cases.

Habitat Characteristics

The region of Sharplanina where the domestic Balkan goat is reared comprises the upper and middle course of the Bistrica river, which is one of the major tributaries of Beli Drim river. This is a typically alpine region with deep river valleys. The most pronounced border of this region is the border with Macedonia (to the south and south-east), with numerous mountain peaks over 2,500 meters. On climate zone maps, Sharplanina belongs to the continental climate of Central Europe. Depending on the altitude (ranging from 450 to 2,200 m), various types of mountain climate can be found. The average annual temperature on Sharplanina up to 1,600 m is above 5°C, while at altitudes from 1,600 to 2,500 meters it drops to 5-0°C.

Materials and Methods

Investigations were carried out in villages in the region of the Prizren municipality (north-western region of the Sharplanina massif), in herds of Balkan goats belonging to private owners, during several years (1996-1998). Investigation material consisted of four herds of Balkan goats, located at various altitudes and in various locations. An effort was made to include goats with reddish coats, as the authentic representative of the domestic Balkan goat. Animals were classified according to lactations, i.e. kidding sequence (lactations 1, 2, and 3; while lactation 4 and later lactations were monitored as one group).
Herd management

Feeding

Goat nutrition during the winter is rather modest, consisting of minimal quantities of meadow hay and concentrate. Concentrate mainly consists of bran, milled maize and salt which is regularly provided to goats. The spring-summer-autumn period is characterized by grazing only, with no additional concentrates, even during the breeding period. Private goat farms and pastures used for grazing are located at 620-1500 m altitudes.

In general, goats graze on pastures or forage within the zone of thermophilic oak forests, however, some herds graze during the vegetation period also at higher altitudes (1200-1850 m), i.e. at altitudes characterized by beech forest and above, where Nardus stricta dominates. During the suckling period, usually lasting 90 days, the basic ration for kids is goat milk. Until weaning (at 90 days), kids remain with does during a minor part of the day and during the night. During all this time, in a special enclosure made of mobile planks, kids have access to a mixture of feeds and to meadow hay. The concentrate portion of the ration usually consists only of milled maize, wheat bran and added salt.

Housing

Most goat breeders use a semi-intensive rearing system (stall-pasture), except certain breeders who keep their herds at high altitude mountain pastures located at 1520 m of altitude during the vegetation period (May-October). On cold and rainy days, goats are mainly kept in pens located in breeders’ courtyards. Goat pens are mostly made of solid material (but can also be constructed of mud bricks or stone) and covered with tiles or metal sheets. Pen size primarily depends on the number of animals reared, however there are no major differences when it comes to the quality of buildings. During the summer and other seasons (except winter) whenever weather permits, goats are kept in enclosures (with or without roofs) in front of the pens.

Statistical analyses

Statistical data processing of production performance data was done on a PC using the least squares method (Harvey, 1990).

Breed characteristics

External features

The Balkan goat is a small, light and lively animal. The head is of medium length with very mobile ears. Generally, animals have horns, which can be absent in some instances. The body is narrow, shallow, and somewhat wider at the hind quarters. Constitution is strong, animals are firm and resistant to diseases, tolerating arid and warm climates well, and with modest nutrition requirements. Legs are thin and strong, as are the hoofs. Udders are soft and elastic, but not particularly well developed and covered by somewhat coarse hairs. The entire body (except the nose, hoofs, and lower portion of the tail) is covered by hair, which is dense, coarse, and long except on the head and legs, where it is short (Figure 2). The fur coat is usually shorn, giving about 300-400 g per animal. Hair color varies, and is usually reddish or gray, but can also be black and chestnut, brown and patchy, and seldom white.

Body size

Table 1 shows data pertaining to body development of the domestic Balkan goat from Sharplanina. Body size increases with age, due to the fact that the domestic Balkan goat matures late, reaching full size at about 4 years of age. Average height at withers and
Body length in adult goats are 66 and 70 cm, while chest width and width at hips are equal (about 17 cm).

**Body weight**

Table 2 presents data on average body weight and average daily weight gain for kids of the domestic Balkan goat during the suckling period, as well as for adult goats (at one year of age). Average body weight of goats in the fourth lactation was 44.3 kg, which was higher than body weight for goats in the first lactation by about 14 kg. Lighter body weight, especially for goats in the first lactation, can partially be attributed to bad conditions of nutrition and care, especially for young animals, beginning to breed while still incompletely developed and with insufficient body weight, a characteristic maintained throughout their life span.

**Milk production**

Table 3 presents data on average milk production of the domestic Balkan goat, by lactation.

Average lactation duration in the domestic Balkan goat was 238 days, and total milk production per lactation 178 kg (including the quantity consumed by kids), with significant differences ($P<0.01$) among lactations. This, among other things, indicates the potential to lengthen the lactation and increase milk production by applying adequate breeding and selection. Average daily milk production was 0.743 kg.

Animals produced more milk by 17.1% in the second lactation, 22.9% in the third lactation and 28.7% in the fourth lactation, as compared to the first lactation. Average total milk yield for goats in the first lactation was lower by 56 kg, as compared to the yield for older goats (fourth lactation). Average milk fat content was estimated as 3.68%.

*Figure 2. Domestic Balkan goat.*
Table 1. Least squares means (± S.E.) of body weight and size of adult domestic Balkan female goats (Memisi et al., 1998), number of observations is 327 for all traits.

<table>
<thead>
<tr>
<th>Traits</th>
<th>Least squares means (± S.E.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body weight (kg)</td>
<td>38.6±0.3</td>
</tr>
<tr>
<td>Height of wither (cm)</td>
<td>66±0.2</td>
</tr>
<tr>
<td>Body length (cm)</td>
<td>70±0.2</td>
</tr>
<tr>
<td>Chest width (cm)</td>
<td>17±0.1</td>
</tr>
<tr>
<td>Chest depth (cm)</td>
<td>30±0.1</td>
</tr>
<tr>
<td>Width of hips (cm)</td>
<td>17±0.1</td>
</tr>
</tbody>
</table>

Table 2. Least squares means (±S.E.) of mean body weight (BW) and average daily gain (ADG) of domestic Balkan goats kids at different ages (Memisi et al., 1998).

<table>
<thead>
<tr>
<th>Body weight</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth</td>
<td>2.56±0.02 (338)</td>
<td>2.50±0.02 (372)</td>
</tr>
<tr>
<td></td>
<td>123±0.7 (338)</td>
<td>118±0.7 (372)</td>
</tr>
<tr>
<td>1 month</td>
<td>6.27±0.03 (338)</td>
<td>6.05±0.03 (372)</td>
</tr>
<tr>
<td></td>
<td>119±0.6 (338)</td>
<td>114±0.6 (372)</td>
</tr>
<tr>
<td>2 months</td>
<td>9.84±0.04 (338)</td>
<td>9.47±0.04 (372)</td>
</tr>
<tr>
<td></td>
<td>111±1.0 (338)</td>
<td>106±1.0 (372)</td>
</tr>
<tr>
<td>3 months</td>
<td>13.08±0.05 (338)</td>
<td>12.62±0.05 (372)</td>
</tr>
<tr>
<td></td>
<td>117±0.5 (338)</td>
<td>112±0.5 (372)</td>
</tr>
<tr>
<td>12 months</td>
<td>-</td>
<td>30.9±0.5 (94)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>78±0.8 (94)</td>
</tr>
</tbody>
</table>

Figures in parenthesis indicate the number of observations.

Table 3. Least squares means (±S.E.) of milk production performance of domestic Balkan goats (Memisi, 2000).

<table>
<thead>
<tr>
<th>Lactation number</th>
<th>Lactation period (day)</th>
<th>Milk yield (kg)</th>
<th>Daily milk yield (kg)</th>
<th>Milk fat (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>229±2.02 (124)</td>
<td>146±3.2 (124)</td>
<td>0.638±10.39 (124)</td>
<td>3.54±0.05 (124)</td>
</tr>
<tr>
<td>II</td>
<td>230±1.85 (153)</td>
<td>174±2.9 (153)</td>
<td>0.747±9.51 (153)</td>
<td>3.65±0.05 (153)</td>
</tr>
<tr>
<td>III</td>
<td>236±1.92 (131)</td>
<td>187±3.0 (131)</td>
<td>0.783±9.85 (131)</td>
<td>3.76±0.06 (131)</td>
</tr>
<tr>
<td>IV</td>
<td>244±1.90 (170)</td>
<td>202±3.0 (170)</td>
<td>0.821±9.74 (170)</td>
<td>3.74±0.06 (170)</td>
</tr>
</tbody>
</table>

Figures in parenthesis indicate the number of observations.
Reproduction

Fertility of the domestic Balkan goat is rather low, and, in the absence of any serious expert activity to investigate or improve this trait, it has remained virtually unchanged to date. Average number of kids per doe was 1.23 annually. This can be regarded as low since the average number of kids per doe for other breeds of goats in Serbia (Domestic White, and crossbreeds) is considerably higher (approximately 1.8 kids annually). Poor fertility of the domestic Balkan goat is caused by numerous factors, the most pronounced being the effect of nutrition, as the most important nongenetic factor. Goat nutrition is very poor, especially during the winter, which can often be a period of semistarvation or starvation, undoubtedly having a negative effect on the expression of all production traits, including fertility.

Table 4 shows fertility results for two years of investigation, including the number of kids born live and stillborn, as well as the percentage of conception goats in the investigated population of domestic Balkan goats. As a consequence of the fact that the breed is primitive, and the latitide and longitude of the region, mating and reproductive behaviour in both males and females is seasonal (mating in August-September; kidding in January-February).

Low kid mortality was also found in the investigated goat population, both during the first year (3 animals), and during the second year (6 animals). This indicates among other things, good organization of activities among the breeders at kidding time (receiving of kids, housing conditions, first suckling, etc.).

Conclusion

Performance of the domestic Balkan goat is satisfactory, in view of the conditions. However, on the whole, owing to their vitality, adaptibility to management changes, resistance to contagious and parasitary diseases, and modest requirements for nutrition and care, even today the domestic Balkan goat retains importance for the survival and sustenance of numerous households living in remote hilly and mountainous regions, such as the region investigated. Therefore, it is necessary to apply adequate rearing systems, as well as to change existing production practices and technology, primarily by improving conditions of nutrition and care (for adult as well as young animals), and establish appropriate methods of breeding and selection to further improve and stabilize production traits, primarily milk production.

Table 4. Fertility of domestic Balkan goats (Memisi et al., 2001).

<table>
<thead>
<tr>
<th>Traits</th>
<th>Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of serviced does</td>
<td>629</td>
</tr>
<tr>
<td>Number of does kidding</td>
<td>578</td>
</tr>
<tr>
<td>Conception %</td>
<td>91.9</td>
</tr>
<tr>
<td>Number of live kids</td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>428</td>
</tr>
<tr>
<td>Twins</td>
<td>282</td>
</tr>
<tr>
<td>Total</td>
<td>710</td>
</tr>
<tr>
<td>Number of stillborn kids</td>
<td>9</td>
</tr>
<tr>
<td>Number of kids born per doe kidding</td>
<td>1.23</td>
</tr>
</tbody>
</table>
List of References


The successful improvement of pig productivity has resulted in intensive use of a relatively small number of breeds. Whilst these practices have provided for the quality protein needs of the human diet in the last 50 years it has had a detrimental effect on genetic variation.

The changing consumer demands are resulting in a greater diversity of quality products and also encourage methods of production that are more suited to some of the local breeds that are still found within Europe. In addition, geneticists are recognizing the importance of maintaining breed diversity in order to conserve important genes related to quality, adaptation and reproduction traits.

This economic point of view has created in the last five years a special interest in the study of the world pig biodiversity, especially at the European Union level.

This volume presents the proceedings of the Symposium on Pig Biodiversity, which was held in the Cordoba (7-9 November 2002), organised to review the state of the art in the field. More than fifty researchers from 16 countries participated in the event. The papers represent two types of contribution made at the Symposium; firstly the main papers developed from the European Union funded project entitled “Characterisation of genetic variation in the european pig to facilitate the maintenance and exploitation of biodiversity (PIGBIODIV I)” in subjects of general interest such as the technical aspects of sampling, AFLP and microsatellite marker genotyping, the statistical analysis of genetic profiles and calculation of genetic distance; the organization, presentation and dissemination of data; and also the legal aspects of the intellectual property of the genetic material and its associated information. Then the second part consists of specific contributions from different initiatives looking at local breeds or related issues, in the format of short communications.

This issue represents a reference point for the future for all scientists, industry, NGOs and the National and International official institutions who desire to work in the new frontiers of pig production.
This is the first part of a series that deals with dairy and beef production. This part provides comprehensive lists and description of world cattle breeds and to some extent their non-domesticated relatives and buffalo breeds.


The book provides information on 505 cattle breeds and many others of buffalo and non-domesticated cattle relatives. It also indexes all breeds mentioned in the text and gives references and breed photos. The book is quite useful to those who work on cattle and buffalo animal genetic resources and can read Arabic and is recommended for libraries. However, with so many breeds in numerous classifications, the hierarchal order of the breeds and the numbering are flawed in many instances. The transcription of breed names does not follow a fixed rule which could misguide the reader, example: Brown Swiss is transcribed as such while Jamaica Hope is translated to what ‘hope’ means in Arabic.
The papers in this book are based on presentations given at a conference held in Edinburgh in November 2002, which was co-organised by the British Society of Animal Science (BSAS), the Department for Environment, Food and Rural Affairs (Defra), the Rare Breeds Survival Trust (RBST) and the Sheep Trust.

A number of factors led the organization of the meeting:

1. The growing international effort, led by The Food and Agriculture Organisation of the United Nations (FAO), to co-ordinate conservation of Farm Animal Genetic Resources. The conference coincided with the publication by Defra of the UK Country Report on Farm Animal Genetic Resources, as part of this international effort.

2. The Foot and Mouth Disease outbreak in the UK in 2001 and 2002 brought into sharp focus the real threat to rare and geographically isolated livestock breeds, and the need for greater co-ordination of conservation efforts.

3. The growth in scientific knowledge in areas relevant to conservation, especially in quantitative genetics, helping to improve the management of populations at risk, in molecular genetics, improving our capability to characterise and prioritise populations for conservation, and in reproductive biology, providing more effective techniques for conservation.

The chapters in this book have been organised into four sections: Policy issues, Quantitative and molecular genetic basis for conservation, Reproductive techniques to support conservation, and Conservation in action – a series of case studies illustrating some of the techniques covered earlier in the book.

This publication will certainly provide a useful update for those interested in conservation and sustainable utilisation of farm animal genetic resources.
This beautifully produced and richly illustrated book is the result of a global survey, to which 75 contributors from 28 countries responded with descriptions of 210 traditional and new goat products, milk and yoghurt and ice cream (16), cheeses (141), meat (22), fibre and skin and fur (10), dessert (7), and other items such as music instruments, tools, medication and works of art.

The publication contains, sorted by continents and mostly on a single page each, a wide inventory of “whatever thing the goat can give us” in the words of the editors, including maps of origin, type of product, area of production, techniques and scale of production, trading of the product, uses, estimates of production volume and demand trends, even colour pictures of products and breeds of goats.

The book begins with an extensive discussion of typical products and typicality of the small ruminant sector, cheese, meat, fibre in various countries, their way of production and marketing. All contributors are recognized with their full address, which is very useful for further studies. The book ends with an excellent index of all products, but for some reason does not contain goat butter or goat ghee, possibly because no contributions had been sent in from India.

This points out also the fact that this very worthwhile book project under the auspices of the International Goat Association will be continued for at least one more edition to contain many more contributions from presently under-represented or not-represented countries. Nevertheless, this book is unique in its content and scope, giving for the first time a global account and atlas of a wide variety of goat products. It should be a welcome source and reference for students, practitioners, distributors, consumers, people with medical needs for goat products, government officials, goat farmers, and enthusiasts of goats and their many exciting and delicious products.

This book is highly recommended to all people with some connection to the goat world and its great potential as an industry in so many countries.
Nutrition and feeding strategies of sheep and goats under harsh climates (Stratégies de nutrition et d’alimentation des ovins et caprins en climats rigoureux)

H. Ben Salem, A. Nefzaoui & P. Morand Fehr (Eds)

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The 9th Seminar of the Nutrition Sub Network of the FAO CIHEAM Cooperative Research on Sheep and Goats, held at Hammamet (Tunisia), 8-10 November 2001, was organised, under the auspices of the Tunisian Ministry of Agriculture, by INRAT (Institut National de la Recherche Agronomique de Tunisie), FAO (Food and Agriculture Organization of the United Nations) and CIHEAM (Centre International des Hautes Etudes Agronomiques Mediterraneennes), in collaboration with ICARDA (International Center for Agricultural Research in the Dry Areas), IRESA (Institution de la Recherche et de l’Enseignement Supérieur Agricoles), OEP (Office de l’Elevage et des Pâturages) and GIVR (Groupement Interprofessionnel des Viandes Rouges).

The seminar focused on topics related to sheep and goat nutrition and feeding strategies under harsh climate conditions. Sessions were on:
1. use of rangelands by sheep and goats under arid conditions;
2. effect of under nutrition on sheep and goat digestion and performance;
3. nutritional evaluation of non conventional feedstuffs; and
4. adaptation of small ruminants to non conventional feeds.

Furthermore, six round tables were organised to discuss pertinent up to date topics related to sheep and goat nutrition and feeding systems. The topics covered by these round tables were: a) mineral nutrition; b) feeding behaviour; c) feeding and product quality; d) methods to improve non conventional feedstuffs; e) databases - a working tool for networks; and f) cooperation research project - conception and funding. The seminar was attended by 68 participants from 16 countries and representatives or scientists from CIHEAM, FAO, IAEA and ICARDA. A total of 64 papers were presented and discussed including introductory papers, oral presentations and posters in the four main sessions. Thirty seven papers have been selected to be published in these proceedings.
In Spain in the last years, domestic sheep breeds reached such a relevance due to their characteristics that they are now exported in many countries of the European Union and also in south American and Mediterranean countries. The expectations for the exports are encouraging and, within such prospects, the publication aims to offer a reference atlas of the local Spanish breeds.

The structure of the present book is arranged in two parts: the first one has a general content and is divided in 3 chapters:

1. the first chapter contains general information about the origin and differentiations among the various sheep breeds;
2. the second chapter reports the situation of the sheep sector in Spain, with description of number of heads, geographical distribution and economic relevance for each breed;
3. the last one accounts for the classification criteria as established in the national herdbook, approved by the Real Decree in 1997.

The second part of the book reports the individual studies and description on national breeds, their morphological description, production characteristics, history, production systems, selection and breeding. About 44 Spanish sheep breeds are deeply described, taking into account not only the morphology but also the local products and their influence on the national economy.

Such structure may easily create involuntarily repetitions, but at the same time it facilitates the queries and the analysis of the breeds.

Great relevance is dedicated to the pictures of the breeds and more than 520 figures (divided by sex) clearly illustrate the characteristics of the animals.
The World Association for Animal Production produced this book that is a reference tool for the animal scientific community and for policy makers worldwide. Sixty authors from the six continents contributed with thirty outstanding manuscripts.

This volume is the first of a series that is expected to be produced every year. The objective of this project is to establish a reference volume for livestock system and research development, for the use of international organizations, research institutes, policy makers and animal industries, worldwide.

This book is particularly interesting for those wanting to get a deeper knowledge on the "state of the art" of livestock systems in the six continents. This aspect is illustrated in the first section of the volume, while the second section describes the development of research activities in nineteen specific fields of animal science. Furthermore; the readers will certainly be interested by reading the "contemporary issues" manuscripts belonging to the third section. The articles of this section were selected to accomplish the most "urgent" topics in animal industry.

The volume is also completed with relevant statistics, furnishing information and data in a homogenous and easy to read structure. The changes that have happened in animal industries in the last decades are clearly illustrated in tables and graphics. These data, together with the interpretation of the articles of the previous sections, will render easier the prediction of future scenarios.
The aim of this thesis was to analyze methods in order to efficiently conserve biodiversity. In particular the study aimed at defining suitable methods for estimating the risk of losing diversity, for assessing the present diversity and its development, for conservation of the diversity and for optimal allocation of the limited funds available. The methods were then applied to African cattle breeds divided in 26 taurine/sanga and 23 zebu/zenga breeds.

With a newly developed scheme, it was estimated that about half of the 49 cattle breeds are at risk of extinction within the next 50 years. It was also shown that if no action is taken only about 50% of today’s genetic diversity between breeds will be maintained.

A survey revealed that indigenous cattle breeds of Eastern and Southern Africa are mainly kept because of their superiority with respect to climate adaptation, tick resistance, trypanotolerance and their ceremonial use.

Four conservation programs were designed and their cost and effects assessed: herdbooks combined with promotion of the breed (HB), in-situ conservation with a sire rotation scheme (IS), cryoconservation of semen (CC) and in-situ plus cryoconservation (IC). Reduction in extinction probability was higher for conservation programs involving breeders strongly and giving them part of the responsibility for the conservation of the breed. IC proved to be the most efficient conservation program with regard to effective population size conserved.

However, if cost per reduction in extinction probability was considered, in-situ conservation or herdbooks combined with promotion of the breed or cryoconservation were superior to IC. Therefore, it is suggested not to use cost per effective population size as the only criterion for decisionmaking on the appropriate conservation program for a breed.

The newly developed algorithm revealed that allocation of resources only to a subset of breeds is optimal. This number depends on several factors such as conservation cost of each breed and the amount of funds available. It was estimated that with US$2 000 000 the expected diversity of the zebu and zenga group of breeds could be augmented by 13% compared to the expected diversity if no action is taken. Thus, 64% of the present diversity could be maintained over 50 years.
Short presentations

LIFE Newsletter

LIFE is a group of organizations and individuals who promote community-based conservation and development of indigenous livestock breeds and species.

Issue #1 of the People and Livestock newsletter focuses on threats to free access to animal genetic resources. The issue is available at: http://lifeinitiative.net/index.php/archives/category/news/

For more information, please contact LIFE coordinator Dr Evelyn Mathias
Weizenfeld 4, 51467 Bergisch Gladbach, Germany, tel. +49-2202-932921, fax +49-2202-932922,
E-mail: evelyn@mamud.com

Global Workshop for National Coordinators on the preparation of the first Report on the State of the World’s Animal Genetic Resources (SoW-AnGR) and Third Session of the Intergovernmental Technical Working Group on Animal Genetic

The AGA division in FAO recently produced a CD-ROM that summarises the documents presented at the Global Workshop for National Coordinators on the preparation of the first Report on the State of the World’s Animal Genetic Resources (SoW-AnGR), held in Rome 30 - 31 March 2004.


National Coordinators of each country were invited to summarize the most crucial message and provide information on the current situation of each country’s animal genetic resources and priority issues that have to be tackled in order to further develop, use and conserve animal genetic resources sustainably. FAO designed a template for uniform and attractive presentation of the information. More than 70 posters have been created by the countries to contribute to increased awareness of the functions and values of animal genetic resources, stressing the need for continued efforts to better inform and involve policy-makers in the implementation of priority actions identified in Country Reports. Such posters are also included in the CD-ROM. A copy of it can be requested to FAO/AGA division at DAD-IS@fao.org.
Farm AnGR - Safeguarding national assets for food security and trade

This small booklet of 54 pages, jointly published in 2004 by GTZ, FAO and CTA, summarises the concepts and ideas developed in a series of four workshop on farm AnGR held in the Southern African Development Community (SADC). Some basic concepts are clearly presented, in particular:

- Community based management of farm AnGR.
- Incentive measures for sustainable use and conservation of agro-biodiversity.
- Legal frameworks for the management of AnGR (or sustainable use, development and conservation of AnGR).

The publication is provided by a CD-ROM that illustrates the documents of the workshops, International regulations and legal frameworks and FAO material developed for the conservation of the AnGR.

Copies can be requested to FAO/AGA at: DAD-IS@fao.org.

Where nature and culture meet:
People, food and biodiversity

Jointly published in 2004 by GTZ and Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung, this 48 pages booklet was published to complement the exhibition "Where nature and culture meet: People, food and biodiversity". It highlights the links between biological diversity and food safety. The publication wishes to show that biodiversity conservation is an issue of global relevance and serves worldwide food security and poverty reduction.