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Brazilian goat breeding programs☆

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ABSTRACT

Historically, several goat breeds and types have been introduced into Brazil with the intention of increasing goat production efficiency. Selection and multiplication of genotypes appropriate to several production systems found in the country have been important to the development of the goat sector in Brazil. Until 2002 there were no formal breeding programs for goats in the country. Attempts for genetic improvement were concentrated in animal importations and in isolated crossbreeding. This paper assesses the main aspects of goat production in Brazil and presents the establishment of breeding programs for meat and dairy goats. Breeding Program for Meat Goats and Sheep (GENECOC) were started in 2003 with the objective of supporting breeders on the utilization of the available genetic resources to optimize their production systems. Nowadays only seven flocks of goats are enrolled in this program. These flocks are located in States of Ceará (Northeast region), Paraná and Rio Grande do Sul (South region). In 2005, EMBRAPA (Empresa Brasilerira de Pesquisa Agropecuaria), the Brazilian Agricultural Research Corporation, started the Dairy Goat Breeding Program. The program aimed to structure the dairy goat national databank and conduct the progeny tests for the main dairy breeds raised in the country. Semen from five Saanen, three Anglo-Nubian and two French Alpine goats was collected and distributed among 15 collaborator flocks. Official Dairy Control Tests have been accomplished in eleven flocks in the states of Minas Gerais, Rio de Janeiro and São Paulo (Southeast region). Many difficulties were faced in the implementation of goats breeding programs in Brazil. The results are not readily available, but the perspectives are promising. Goat breeders' interest has been increasing and the actions have been expanded to other regions of the country, while a large number of institutions have shown interest in collaborating with these breeding programs.

1. Introduction

Goat stock in Brazil in 2007 was around 9,450,312 heads, being the world's seventh largest stock (FAO, 2009). Worldwide, goats are more concentrated in developing countries (more than 95% of stock) and tend to be more localized in dry tropical and subtropical areas of poor agricultural potential and even on marginal lands (Morand-Fehr and Boyazoglu, 1999). Similarly, goats in Brazil are concentrated in the Northeast (more than 93% of stock), a region with varying agro-climatic characteristics and large semi-arid areas. During the last years the number of goats has increased in all regions of Brazil between 1 and 6% (IBGE, 2009).

Historically, several breeds and types have been introduced in Brazil with the intention of increase goat produc-

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tion efficiency. However, the absence of integrated actions and sustainable development policies did not allow the achievement of the intended objectives. It is necessary to better understand the available genetic resources defining efficient methods for its conservation and improvement. Among actions to promote the growing and the development of the animal breeding activity, genetic improvement is one that deserves more attention. Selection and multiplication of genotypes appropriated from several production systems around the country are necessary for the development of the goat sector in Brazil. Until 2002 there was no formal goat breeding program in Brazil. Attempts of genetic improvement were primarily concentrated on importing animals and in isolated crossbreeding. Thus, national and regional breeding programs are very important to allow the sustainable development of the goat industry, paying attention to breeding objectives and market and environmental conditions of Brazil.

This paper assesses the main aspects of goat production in Brazil and presents the establishment of breeding programs for meat and dairy goats.

2. Genetic resources

Goats were introduced to Brazil by settlers after its discovery. At that time, animals originated from Portuguese and Spanish genetic groups (De Figueiredo et al., 1987). In more recent years, animals from Africa, Asia and Europe were introduced. The first goats passed through extreme natural selective processes. The harsh environment, particularly in the Northeast region, with variable and long dry seasons, contributed to the increase in resistance and the decrease in productive performance of animals. So, introduction of animals through importation occurred in an attempt to improve goat's performance. This process originated the group of breeds presently found in Brazil: exotics (imported), naturalized and crossbred (from exotics × naturalized crossbreeding). This last group is comprised of animals with known genetic composition and those with unknown genetic composition. These comprise the major goat group in Brazil (more than 65%), known as "Sem Raça Definida" (SRD) or Undefined Breed. According to Machado et al. (2000), Brazilian SRD goats are more closely related to Continental and Western European populations than to North African, Balkan or Insular Mediterranean populations.

The Brazilian naturalized goat group is comprised mainly by Moxotó (white or cream with black facestripes, back and belly stripe), Canindé (black with pale face and belly stripes), Repartida (black forequarters and brown or pale hindquarters and vice versa) and Azul (Blue Goat). Among these, only Moxotó and Canindé are officially recognized as a breed by the Brazilian Agricultural Ministry. There are others less important goat types like Marota (totally white), Graúna (black), Nambi and Gurguéia (chamois). The production performance of these breeds and types is similar of what was observed for the SRD. Goats in Brazil tend to be grouped by breeders based on colour characteristics, which originates the local appearance of several types of goats. However, these types do not constitute distinct genetic groups which are reinforced for similarity of productive aspects and reduced genetic variability among them. Probably all are colour types selected from SRD. According to Machado (2000), Moxotó, Canindé, Marota, Repartida and Gurguéia are autochthone breeds and Gurguéia already disappeared from Brazil due to crossbreeding.

The main exotic goat breeds in Brazil include Saanen, Brown French Alpine, Toggenburg, British Alpine, Anglo-Nubian, Murcia-Granada and Boer. Except for Murcia-Granada and Anglo-Nubian, these breeds continue being imported to Brazil, primarily Boer goats and to a lesser extent other breeds. Following the tendency of the Boer goat, the South African Kalahari and Savannah breeds have been brought to Brazil in recent years. Other breeds like Jamnapari, German White, German Brown (Erzgebirgziege), American Alpine and Mambrina (Damascus) were also brought in the past on smaller proportion and influenced Brazilian goat population. All these breeds were used as purebreds (reduced number) and in crossbreeding with naturalized and SRD goats. Outstanding breeds for milk production are Saanen, Brown French Alpine, Toggenburg and its crossbreeds, mainly in Brazilian Southeast region, where there are better environmental conditions. The Anglo-Nubian breed has a great genetic influence in the formation of the Brazilian goat population. It probably was and still is the most used breed by goat producers. However, this breed was selected for dual purpose (milk and meat), which reduced its productive specificity. Today, the use of the Boer breed is in fashion and breeders are expecting great improvements in meat production.

3. Production aspects

In Brazil, the aims of goat exploitation are concentrated on meat, skin and milk production. In 2007, production of goat meat and milk in Brazil was about 42,000 and 136,500 tonnes, respectively (FAO, 2009). This production is inexpressive when compared to the stocks in the country, mainly for milk, with the production per animal being about 30 kg/animal/year (Lôbo, 2002). A little more than 21 tonnes of goat milk produced in 2006 (IBGE, 2009) has its origin in two regions: Northeast (67%) and Southeast (25%) Brazil. Despite the low expression in quantitative terms, the goat exploitation has a socio-economic importance for employment and income generation in Brazil. The productive performance of crossbred, naturalized and exotic goats raised in Brazil are presented in Table 1. Recently, the market for goat milk has been experiencing a formal expansion in the Northeast, Southeast and South regions of the country.

The skin is another important source of economic input (Souza-Neto and de Baker, 1987). However, the skin industry in Brazil operates with idle installed capacity. This situation is caused by a great variety of climatic conditions and production systems. Additionally, there is a low use of technology.

4. Breeding programs

Before the creation of EMBRAPA (Empresa Brasilerira de Pesquisa Agropecuaria), the Brazilian Agricultural Research