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**ANIMAL GENETIC
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**BULLETIN
D'INFORMATION
SUR LES RESSOURCES
GÉNÉTIQUES ANIMALES**

**BOLETÍN
DE INFORMACIÓN
SOBRE RECURSOS
GENÉTICOS ANIMALES**



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Editorial - Report on Strategic Priorities for Action

The *Report on Strategic Priorities for Action for the Sustainable Use, Development and Conservation of Animal Genetic Resources for Food and Agriculture* is based on 141 country reports submitted to FAO until March 2005. Four major areas were identified for which action is required at national and international levels.

1. *Inventory and characterization.* This is the understanding of the status and characteristics of animal genetic resources to enable their sustainable use, development and conservation. Priorities in this area include breed inventories, comparative performance and monitoring; risk analysis and early warning systems; and phenotypic and molecular breed characterization.
2. *Use and development of animal genetic resources.* Main objective is the sustainable use of animal genetic resources in all production systems, in order to achieve food security and contribute to poverty reduction. Priorities in this area include long term breed development strategies, improving institutional and managerial capacity for conducting sustainable breeding programmes and international cooperation.
3. *Conservation of animal genetic resources.* This area refers to the establishment of national conservation programmes for animal genetic resources of actual and potential value. Priorities include developing national capacity to implement *in-situ* and *ex-situ* conservation measures and promoting regional and global cooperation to conserve animal genetic resources.

4. *Institutional development and capacity building.* This chapter deals with policies and legal framework for the management of animal genetic resources. Priorities include development of human resources, support to National and Regional Focal Points and strengthening research institutions. It also aims at increasing awareness of the roles and values of animal genetic resources in order to promote investments in this sector and facilitate interactions among donor, recipients and international organizations.

The *Report on Strategic Priorities for Action* has been the main subject of regional e-mail consultations covering 10 country groupings. Specific priorities of these sub-regions will be identified in *Regional Reports* to complement the *First Report on the State of the World's Animal Genetic Resources*. These reports will guide the development of a global follow-up mechanism that will raise awareness, provide countries with technical support for project preparation and attract financial resources for concrete actions in the field. They will be considered by the Intergovernmental Technical Working Group on Animal Genetic Resources and the Commission on Genetic Resources for Food and Agriculture in 2006. The final decision will be taken at the First International Technical Conference for Animal Genetic Resources to be held in Switzerland in September 2007.

The Editors

Editorial - Rapport sur les priorités stratégiques

Le *Rapport sur les priorités stratégiques concernant l'utilisation durable, le développement et la conservation des ressources zoogénétiques pour l'alimentation et l'agriculture* est fondé sur 141 rapports nationaux qui ont été soumis à la FAO avant Avril 2005.

Quatre domaines principaux pour une action urgente sont recommandées aux niveaux national et international.

1. *Inventaire et caractérisation.* Ce domaine aborde un ensemble de mesures stratégiques prioritaires qui visent à accroître les connaissances sur l'état des ressources zoogénétiques aux niveaux national, régional et international. Les priorités sont : l'inventaire des races nationales, l'analyse comparative de leurs performances, la surveillance des races, en particulier de celles en danger et leur caractérisation phénotypique et moléculaire.
2. *Utilisation et développement.* L'objectif principal est l'utilisation durable des ressources zoogénétiques au sein de tous les systèmes de production existants afin d'assurer la sécurité alimentaire et de contribuer à la réduction de la pauvreté. Les priorités sont le développement des stratégies d'élevage à long terme, le renforcement des capacités institutionnelles et de gestion dans ce domaine et le renforcement de la coopération internationale.
3. *Conservation des ressources zoogénétiques.* Il s'agit de mettre en place des programmes nationaux en faveur de la conservation des ressources zoogénétiques de valeur actuelle et future. Les priorités sont: renforcer les capacités nationales pour exécuter des mesures de conservation *in situ* et *ex situ* et promouvoir la collaboration régionale et mondiale en vue de la conservation des ressources zoogénétiques.
4. *Politiques, institutions et renforcement des capacités.* Ce domaine se penche sur la formulation des politiques et des cadres juridiques en matière de gestion des ressources zoogénétiques. Les priorités sont: le développement des ressources humaines, le renforcement des points focaux nationaux et régionaux ainsi que des institutions de recherche. Par ailleurs, l'attention est accordée à l'intensification de la sensibilisation de la population aux rôles et aux valeurs des ressources zoogénétiques afin de promouvoir les investissements dans ce secteur et accroître les possibilités d'interactions entre bénéficiaires, bailleurs de fonds et organisations internationales.

Le *Rapport sur les priorités stratégiques* est le thème principal des dix conférences régionales électroniques. Des priorités régionales spécifiques seront identifiées dans des rapports régionaux qui s'ajouteront au premier *Rapport sur l'état des ressources zoogénétiques dans le monde*. Ces rapports formeront la base pour le développement global d'un système de suivi dont l'objectif est la sensibilisation, le support technique aux pays pour la préparation de projets et la mobilisation des ressources financières afin de réaliser des actions concrètes sur le terrain. En 2006, les rapports seront révisés par le Groupe de travail technique intergouvernemental sur les ressources zoogénétiques et la Commission pour les ressources génétiques pour l'alimentation et l'agriculture. La décision finale sera prise lors de la Première conférence technique internationale sur les ressources zoogénétiques qui aura lieu en Suisse en septembre 2007.

Les Editeurs

Editorial - Informe sobre las prioridades Estratégicas para la Acción

El *Informe sobre las Prioridades Estratégicas para la Acción, para el Uso Sostenible, Desarrollo y Conservación de los Recursos Zoogenéticos para la Alimentación y la Agricultura* ha sido preparado en base a 141 informes enviados por los países a la FAO hasta marzo de 2005. Se identificaron 4 principales áreas de acción a nivel nacional e internacional.

1. *Inventario y caracterización.* Significa comprender la situación y las características de los recursos zoogenéticos para facilitar su uso sostenible, desarrollo y conservación. Las prioridades en esta área incluyen inventarios, monitoreo de razas y análisis comparativos de su productividad; análisis de riesgo y sistemas de alerta; y caracterización fenotípica y molecular.
2. *Uso y desarrollo de los recursos zoogenéticos.* El principal objetivo es el uso sostenible de los recursos zoogenéticos para la seguridad alimentaria y la reducción de la pobreza. Las prioridades en esta área incluyen estrategias a largo plazo para el desarrollo de las razas y el fortalecimiento de la capacidad institucional y de gestión para llevar a cabo programas de mejoramiento genético, así como la cooperación internacional.
3. *Conservación de los recursos zoogenéticos.* Se refiere al establecimiento de programas nacionales de conservación de los recursos zoogenéticos que posean valor actual o potencial. Las prioridades incluyen el desarrollo de la capacidad de los países para implementar medidas de conservación *in-situ* y *ex-situ* y la cooperación mundial y regional para conservar los recursos zoogenéticos.
4. *Desarrollo institucional y creación de capacidad.* Trata de la formulación de políticas y del marco legal para la gestión

de los recursos zoogenéticos. Las prioridades incluyen el desarrollo de recursos humanos, el apoyo a los Puntos Focales Nacionales y Regionales y el fortalecimiento de las instituciones de investigación. Otro objetivo es destacar el papel y el valor de los recursos zoogenéticos promoviéndose las inversiones en este sector y facilitándose las interacciones entre los donantes, destinatarios y organizaciones internacionales.

El *Informe sobre las prioridades Estratégicas para la Acción* es el tema de 10 conferencias subregionales llevadas a cabo por correo electrónico. Se identificarán prioridades específicas en *Informes Regionales* que complementarán el *Primer Informe Mundial sobre los Recursos Zoogenéticos*. Estos informes orientarán la puesta en marcha de mecanismos de seguimiento para fomentar la divulgación, proporcionar soporte técnico a los países en la formulación de proyectos y atraer recursos financieros para concretar la ejecución de estas acciones. Los informes serán examinados por el Grupo de Trabajo Técnico Intergubernamental sobre Recursos Zoogenéticos y la Comisión de Recursos Genéticos para la Alimentación y la Agricultura, en 2006. La decisión final será tomada en la primera Conferencia Internacional sobre Recursos Zoogenéticos que se llevará a cabo en Suiza en Septiembre de 2007.

Los Editores

Portuguese Cachena cattle: a socio-economic, morphological and productive characterization of an endangered breed

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Summary

Today, Portuguese Cachena cattle are limited to a small population in northern Portugal, and while they are well-adapted to the adverse environmental conditions of this mountainous region, they are in a very vulnerable situation.

A socio-economic analysis of the members of the Cachena Breeders' Association showed most to be individual elderly farmers with a worryingly low educational level, mostly with small traditionally managed farms.

The biometric study showed Cachenas to be quite light animals, and small in all three dimensions – indeed, they are the smallest Portuguese breed and one of the smallest in the world. The biometric indices obtained revealed the characteristics of their adaptation to mountain resources.

Financial measures to support Cachena cattle should be considered, oriented through social policies and improvement plans, with a view to developing the current production system, supporting the breeders' association and favouring biological production in order to protect this indigenous breed of limited production potential.

noreste de Portugal y caracterizada por su adaptación a las condiciones ambientales adversas propias de esta región montañosa. Se presenta un estudio sobre esta población bovina de características únicas y que se encuentra en una situación de elevada vulnerabilidad.

El estudio socio-económico de todos los productores inscritos en la Asociación de Criadores de Cachena indicó un predominio de granjas individuales pertenecientes a granjeros de elevada edad y preocupante nivel de instrucción. Las granjas son fundamentalmente familiares, de pequeñas dimensiones y manejo tradicional.

El estudio biométrico reveló un animal de características peculiares, en particular su reducido peso, altura, longitud y anchura, señalando a esta raza como la más pequeña de los bovinos portugueses y entre las más pequeñas del mundo. Los índices obtenidos son un reflejo de sus características de adaptación a los recursos de montaña.

Deberían considerarse medidas financieras de apoyo a la raza Cachena, mediante políticas sociales y planes de mejora que favorecieran el sistema productivo, apoyando el cooperativismo de los criadores y el concepto de producto biológico con el objeto de proteger esta raza autóctona de limitado potencial productivo.

Resumen

La raza bovina Cachena está representada en el momento actual por una pequeña población de animales localizada en el

Key words: Portuguese Cachena cattle, Endangered, Characterisation, Production practices, Morphological characteristics.

Introduction

Portuguese Cachena cattle are farmed in a very restricted area, the 'Concelho' of Arcos de Valdevez, in the Peneda-Gerês National Park (García *et al.*, 1981) in north-eastern Portugal (Figure 1). This region, the first natural area to be protected in Portugal, is very rugged, with mountains between 800 and 1 400 m above sea level and deep valleys with a few plains where heavy rains accumulate to produce soils of medium agricultural quality.

Like other indigenous Portuguese breeds, Cachenas decreased sharply in numbers in the closing decades of the 20th century. The National Programme of Application of EU Council Regulation 2078/92/EEC on agricultural methods compatible with the requirements of the protection of the environment and the maintenance of the countryside (Agri-environment Regulation) included Cachena cattle as an endangered breed. Although the application of this program has resulted in a slight increase in the census in recent years (Table 1), the current Cachena population is close to 1 000 adult animals (Associação de Criadores de Raça Cachena, ACRC - The Cachena Breeders Association - 2003) and the breed is still endangered.

Cachenas were previously considered a subtype of Barrosã cattle, their own herd book becoming independent in 1998, while the ACRC, founded in 1993, now has about 85 members.

Measures directed to breed improvement such as artificial insemination or evaluation of reproducers are in their initial stages, the breeding situation being very close to the natural state, that is, with little human intervention.

Socio-economic Characterisation

A survey was made of all the members of the ACRC. Land use is characterized by a very small farm size (3.21 ha on average), with

67.7% between 1 and 5 ha, but the limitations caused by the small farm size are partially offset by access to good pastures such as fallow areas or 'vezeiras'. Land ownership is characterized by a high number of small plots per owner, over 60% having 15-25 holdings (Figure 1). Given the limited amount of land suitable for cultivation, farmers still keep to the tradition of cultivating as much land as possible, which they need not only for animal production but also for crops for home consumption. Most farms are run by three to six close relatives, 93.5% of whom are over 40 years old and almost illiterate, with no young people taking their place, which implies a low rate of innovation acceptance.

A high importance is placed on indigenous cattle production in the family economy and income not only derives from calf sales, but also from government subsidies. Besides producing meat, many animals are still used for work, as mechanization would be very difficult in such mountainous areas. Other animal species, particularly small ruminants mainly used for home consumption, are also economically important on these farms.

Commercialization has been one of the most significant bottlenecks in this productive system, a process generally effected through middlemen (42.4%) or traditional fairs. Attempts have been made to promote Cachena meat as organic produce (Silva, 1999) and to improve commercialization efficiency and thus bring higher profits to producers.

Tradition is one of the main reasons for the continued breeding of Cachena cattle. A high level of satisfaction with the breed was expressed by most of the producers (94.6%), with 54.6% of farmers planning expansion, probably as a result of subsidies and official support for the breed.

Production Practices

The mean number of adult Cachenas per farm is 7.5 ± 4.1 cows of four to eight years of age and their calves.



Figure 1. A typical Portuguese environment where Cachena cattle are farmed, ('Concelho' of Arcos de Valdevez, in the Peneda-Gerês National Park).

Table 1. Evolution of adult Cachena cattle population registered in the herd book.

	1998		1999		2000		2001		2002	
	M	F	M	F	M	F	M	F	M	F
Animals registered each year	22	321	11	231	10	173	7	214	18	185
Total registered	22	321	33	552	43	725	50	939	68	1 124

Reproduction cycles start at about two years of age with the first calving at 36 months. The calving interval is over 18 months, most occurring between December and May corresponding to mating in the 'vezeiras', when one or more bulls join the herd in periods of adequate feeding resources after hard winters of marked shortage.

In general, in autumn and winter, adult animals graze in unfarmed areas near the

village and are gathered in at night. During spring and summer, the use of 'vezeiras' or fallow lands allows for a free grazing.

Feeding is highly dependent on green forage, with hay and straw as the main stored feed, used in periods of food shortage, and particularly coinciding with such physiological situations as calving and milking. Some surplus farm products such as maize, oats or sweet potatoes, among others, are used as supplements.

Body Weight Parameters

To characterize breed production, the body weight and condition of 64 animals were analysed once every two months, over two years (Tables 2 and 3). Body condition was measured following Lowman *et al.* (1976). Birth weight was remarkably low, averaging 23.7 and 20.3 kg for males and females, respectively. While a maternal effect on birth weight has been reported by different authors regarding cattle, according to present results in the Cachena breed, sex, age of dam and month of birth are not significant ($P>0.05$), which might be partially due to the management conditions and morphologic and productive characteristics of the breed. Weights at weaning (86 kg at 6 months of age) as well as birth-to-weaning daily mean gain (411 g/day) indicate slow growth. However as these values do not reach the minimums specified in Dantas & Leite (2000) and required for the Cachena breed Designation of Origin, there may be difficulties with the commercialisation of certain Cachena animals. Body weight measured at different ages was low in comparison with that of other indigenous

Portuguese breeds (Brito, 2002). Moreover, no significant differences between the sexes were detected which might be partially attributed to the small animal size and the harsh environmental conditions in which the extensive reproduction system has developed with no selection of reproducers. The low body condition scores from the age of 24 months on, between 1.5 and 2.5 (Table 3), demonstrate the scarce nutritional resources available and/or genetic potential of this breed, which negatively influence the productive and reproductive parameters.

An improvement in production efficiency could be obtained by the enrichment of pastures and by favouring a calving time closer to the beginning of spring (to coincide with higher forage production, which would allow a higher milk yield) or the beginning of autumn (when cows' body condition is better and forage is re-growing).

Morphological Characteristics

Cachena cattle (Figure 2 and 3) are leptosomic; mountain animals of high rusticity exhibiting semi-wild behaviour.

Table 2. Body weight parameters in Cachena cattle.

	Sex	N	Mean \pm S.E. (kg)	Coefficient of variation (%)
Birth weight	F	11	20.2 \pm 1.3	14.0
	M	10	23.7 \pm 1.3	9.5
6-month weight	F	20	82.6 \pm 3.9	21.2
	M	7	90.1 \pm 4.8	14.0
12-month weight	F	14	125.7 \pm 4.9	14.7
	M	10	140.2 \pm 8.0	18.1
18-month weight	F	16	170.8 \pm 5.0	11.7
	M	3	161.7 \pm 27.5	27.5
24-month weight	F	21	180.8 \pm 5.1	12.8
	M	6	207.1 \pm 15.5	18.3
Adult body weight	F	464	288.0 \pm 2.2	15.8
	M	79	255.0 \pm 5.3	18.6
Daily mean gain till weaning	F	12	0.39 \pm 0.03	29.7
	M	10	0.44 \pm 0.04	27.2

Contrasts between female and male values did not reach significance ($P>0.05$).

Table 3. Body condition in Cachena cattle.

Age	Sex	N	Mean±S.E.	Coefficient of variation (%)
24 months	F	21	1.88±0.08	12.3
	M	6	1.92±0.20	25.6
> 24 months	F	464	2.26±0.09	15.3
	M	79	2.19±0.07	19.9

Contrasts between female and male values did not reach significance ($P>0.05$).

Morphologically, they are brachycephalic animals (cranium shorter than it is broad) and brief-lined (length proportionally shorter than height or width).

Cachenas have a long straight-profile head, twice as long as it is wide (measurements based on orbital salient angles). The large horns have a round cross section and are of a screw or corkscrew shape. Other characteristics are a short neck, slightly salient withers and fairly long and

drooping chest. The dorsal-lumbar region appears short, thin and horizontal, and well attached to a drooping rump. The abdomen is capacious and a high tail ends in a regular dark switch. Poorly developed and weak legs finish in small, dark, round hooves. The skin is soft but quite thick and the hair is short and fine in summer but long and strong in winter. Hair is light brown tending towards a straw or sherry-like colour. Adult bulls are always darker, while calves have a paler coat.



Figure 2. Cachena cattle.



Figure 3. Cachena cattle.

Measurements as well as functional indices, obtained in a sample of 53 adult cows registered in the Herd Book and grouped according to age, are shown in Table 4. Results show animals older than two years of very small size (110.5 cm withers height), decidedly short (130.9 cm trunk length), narrow (33.5 cm chest width) and of short perimeters (161.1 cm thoracic perimeter) revealing a markedly tiny animal, in agreement with other authors (Dantas & Leite, 2000), who consider Portuguese Cachenas among the smallest cattle in the world. Estimates for biometric indices such as cephalic (0.65), thoracic (0.57), pelvic (0.44) and corporal indices (0.81) were also lower than those of other Portuguese cattle (Brito, 2002).

With regard to what are considered functional indices, the breed has a low 'chest depth/withers height' index (0.54), relating to a low efficiency for meat production. The 'withers height/trunk length' index (0.84) defines the Cachena breed as small and

weak, limiting its aptitude for work, while the 'shin perimeter/withers height' index (0.16) demonstrates the strength of the legs, relevant to adaptation to pasturing in areas of difficult access. Finally, the 'shin perimeter/thoracic perimeter' index (0.11), which was initially used for the evaluation of milk aptitude, indicates the ratio between metacarpi and thoracic capacity (greater in pasturing animals) and shows that Cachenas are well adapted to extensive mountain systems.

Conclusion

Cachena cattle farming is strongly associated with mountain ecosystems based on populations adapted to adverse environmental conditions. This production system can be included within the context of sustainable agriculture and involves other important considerations such as ecological, cultural and social aspects, allowing for the

Table 4. Measurements and indices in Cachena cattle females.

Parameters	2 years old (N=10)	> 2 years old (N=43)
<i>Height (cm)</i>		
Withers	106.2±3.7	110.5±6.5
Back	105.4±4.0	108.9±7.0
Rump	107.8±3.4	113.2±6.1
Chest Prof.	55.3±2.8	59.3±5.7
<i>Length (cm)</i>		
Head	31.7±2.0	34.5±4.1
Trunk	117.6±5.9	130.9±10.5
Rump	37.5±2.0	40.0±3.5
Perinea	27.0±5.6	28.1±7.4
<i>Width (cm)</i>		
Head	20.6±1.0	22.3±3.3
Horn Base	17.6±1.8	18.1±2.4
Chest	31.4±4.6	33.5±4.9
Biliac	37.0±3.1	41.2±3.6
Biisquiatic	17.1±1.8	17.4±3.0
<i>Perimeters (cm)</i>		
Thoracic	146.0±7.4	161.1±11.0
Abdominal	148.0±6.7	165.6±12.8
Shin	16.5±1.1	17.5±2.1
Spiral	142.1±5.7	153.5±12.2
<i>Indices</i>		
Cephalic	0.65±0.04	0.65±0.09
Thoracic	0.57±0.06	0.57±0.08
Pelvic	0.46±0.04	0.44±0.06
Corporal	0.81±0.02	0.81±0.06
IPRP ^a	0.52±0.03	0.54±0.07
ICR ^b	0.90±0.05	0.84±0.07
IERCA ^c	0.16±0.01	0.16±0.02
IDTOR ^d	0.11±0.01	0.11±0.01

a) Index "Chest depth/withers height".

b) Index "Withers height/trunk length".

c) Index "Shin perimeter/withers height".

d) Index "Shin perimeter/thoracic perimeter".

maintenance of a rural population. Besides, the peculiar characteristics of Portuguese Cachena and the small current population make protecting these indigenous cattle interesting from the point of view of biodiversity. Taking into consideration the limited productive efficiency of this breed,

financial support policies are necessary, such as subsidies to producers and measures to improve the production system, the commercialization of produce and the association of producers and others, in order to protect this indigenous breed as well as the rural population involved in its production.

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