

P238

An 51

cc

6

ANIMAL GENETIC RESOURCES INFORMATION

BULLETIN D'INFORMATION  
SUR LES RESSOURCES GÉNÉTIQUES ANIMALES

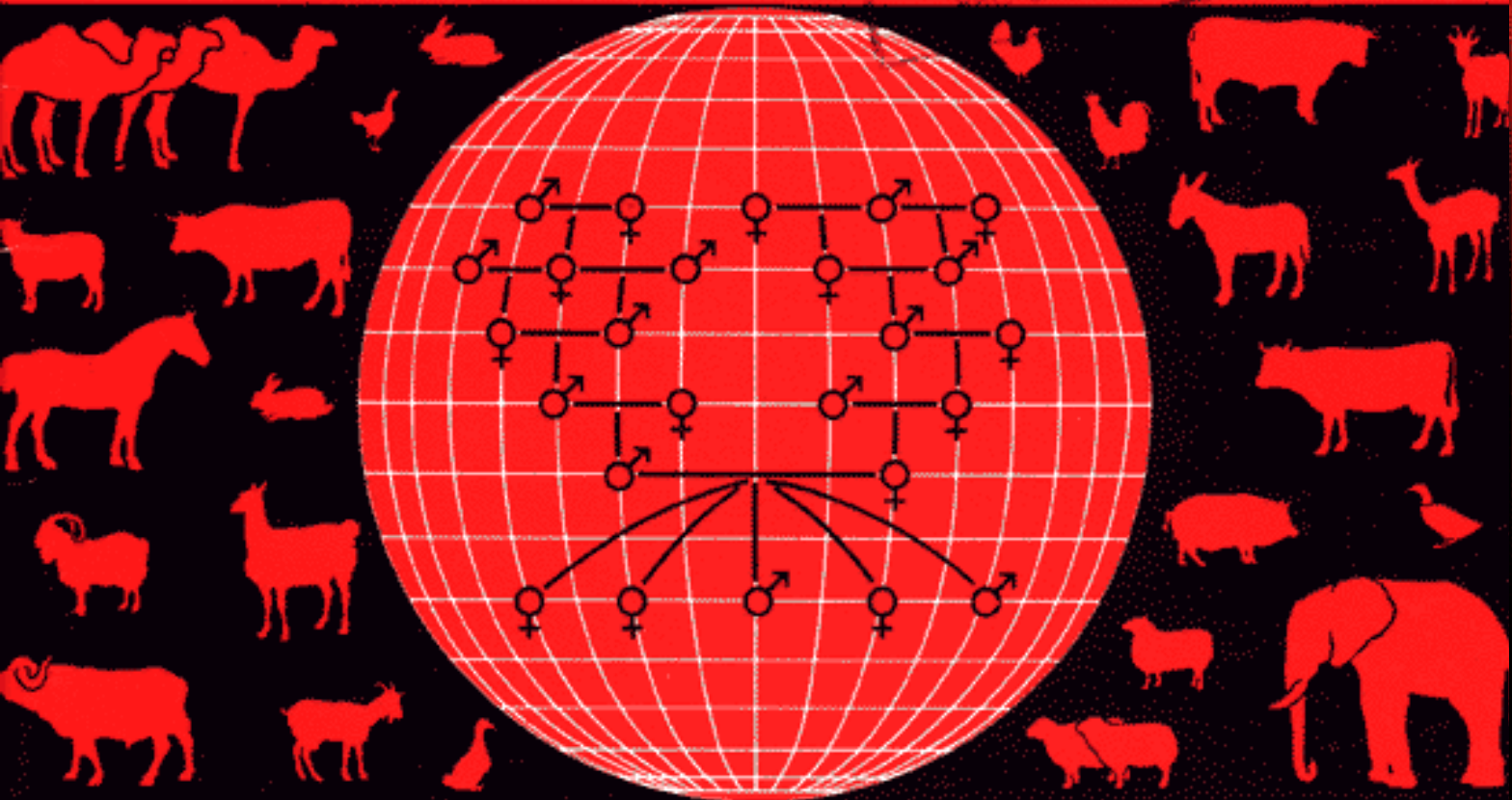
BOLETIN DE INFORMACION  
SOBRE RECURSOS GENETICOS ANIMALES

RECEIVED

3 MAR 1988

FAO LIBRARY

1987



---

# CONTENTS

<b>GUIDE TO CONTRIBUTORS .....</b>	<b>iii</b>
<b>THE FERAL CATTLE OF SWONA, ORKNEY ISLANDS</b>	
S.J. Hall & C.F. Moore .....	1
<b>STANDARD DE LA BENI AHSEN RACE OVINE MAROCAINEEN PERIL</b>	
Mohamed Bourfia .....	11
<b>CONSERVATION OF ANIMAL GENETIC RESOURCES IN THE USSR</b>	
N.G. Dmitriev .....	15
<b>OVINO CRIOLLO NEGRO EN BRASIL</b>	
A.H.A. Camargo .....	19
<b>MPWAPWA CATTLE OF TANZANIA</b>	
P.M.i. Katyega .....	25
<b>HISTORY OF HORSE DOMESTICATION</b>	
Sándor Bökönyi .....	29
<b>RECENT PUBLICATIONS .....</b>	<b>35</b>
<b>REPORT OF MEETINGS .....</b>	<b>39</b>
<b>NEWS ITEMS .....</b>	<b>41</b>

Animal Genetic Resources Information is published under the joint auspices of the Food and Agriculture Organization of the United Nations (FAO) and the United Nations Environment Programme (UNEP). It is edited in the Animal Production Service of the Animal Production and Health Division of FAO and appears twice yearly. It is available direct from FAO or through the usual FAO sales agents.

Le Bulletin d'Informations sur les ressources génétiques animales est publié sous les auspices conjoints de l'Organisation des Nations Unies pour l'Alimentation et l'Agriculture (FAO) et du Programme des Nations Unies pour l'Environnement (UNEP). Cette publication semestrielle est éditée par le Service de la Production Animale de la Division de la Production et de la Santé Animales de la FAO. On peut se la procurer directement au siège de la FAO ou auprès des dépositaires et agents habituels de vente de publication de l'Organisation.

El Boletín de Información sobre Recursos Genéticos Animales se publica bajo los auspicios de la Organización de las Naciones Unidas para la Agricultura y la Alimentación (FAO) y del Programa de las Naciones Unidas para el Medio Ambiente (UNEP). Se edita en el Servicio de Producción Animal de la Dirección de Producción y Sanidad Animal de la FAO y aparece dos veces al año. Se puede obtener directamente de la FAO o a través de sus agentes de venta habituales.

**Editor-Editeur: John Hodges**

### **Acknowledgement**

The editor would like to thank Professor V. Ouvanendran for his contribution to the production of this issue.

### **Remerciements**

L'éditeur tient à remercier le Professeur V. Buvanendran pour sa contribution à la rédaction de ce numéro.

### **Agradecimientos**

El editor desea agradecer al Profesor V. Buvanendran por su contribución en la Producción de este número.

## GUIDE TO CONTRIBUTORS

Animal Genetic Resources Information will be pleased to receive contributions up to 3000 words long in English, French or Spanish. If accepted they will be published in the original language with summaries in the other two. Reports, news and notes about meetings, conservation and evaluation activities, and techniques, would be appreciated. Manuscripts should be typed in double space and accompanied by a summary of not more than 5 percent of the covering length. Photographs are acceptable only high quality black and white prints. AGRI will also review new books on animal genetic resources. Correspondence is invited.

All contributors should be addressed to:

The Editor, AGRI, AGAP, FAO,  
Via delle Terme di Caracalla,  
00100 Rome, Italy

Le Bulletin d'information sur les ressources, génétiques animales souhaite recevoir articles en anglais, en français ou en espagnol, (de 3000 mots au maximum. Les communications publiées paraîtront dans la langue originale avec des résumés dans les deux autres langues. Les rapports, informations et notes concernant les réunions et les activités de conservation et d'évaluation et les techniques seraient particulièrement appréciés. Les manuscrits devront être dactylographiés en double interligne et accompagnés d'un résumé ne dépassant pas cinq pour cent de la longueur de l'original. Le Bulletin accepte les photographies à condition qu'il s'agisse de bonnes épreuves en noir et blanc. Le bulletin rendra également compte des ouvrages nouvellement parus sur les ressources génétiques animales. Un échange de correspondance est le bienvenu.

Adresser toutes les contributions à l'adresse suivante:

L'Editeur, AGRI, AGAP, FAO,  
Via delle Terme di Caracalla,  
00100 Rome, Italie.

El Boletín de Información sobre Recursos Genéticos Animales recibirá con mucho gusto colaboraciones de hasta 3000 palabras de extensión en español, francés o inglés. Si son aceptadas, las contribuciones se publicarán en el idioma original junto con resúmenes en los otros dos idiomas. Interesa recibir informes, noticias y notas sobre reuniones actividades de conservación y evaluación, y cuestiones técnicas. Los originales deberán presentarse mecanografiados a doble espacio y acompañados de un resumen que no supere el 5 por ciento de la extensión original. Se aceptan fotografías, pero únicamente en blanco y negro y de buena calidad. AGRI también publicará reseñas de libros sobre recursos genéticos animales. Se solicita correspondencia.

Todas las contribuciones deberán dirigirse a:

91 Editor, AGRI, AGAP, FAO,  
Via delle Terme di Caracalla,  
00100 Rome, Italia.

ANIMAL GENETIC RESOURCES INFORMATION will be sent free of charge to those concerned with the conservation, management or utilization of domestic livestock. Anyone wishing to receive it regularly should send their name and address to The Editor, at the address on page iii.

BULLETIN D'INFORMATION SUR LES RESSOURCES GENETIQUES ANIMALES sera envoyé gratuitement aux personnes intéressées par la conservation, l'élevage ou l'exploitation du bétail domestique. Les personnes souhaitant recevoir cette publication régulièrement voudront bien faire parvenir leurs nom et adresse à l'éditeur, à l'adresse indiquée en page iii.

BOLETIN DE INFORMACION SOBRE RECURSOS GENETICOS ANIMALES será enviado gratuitamente a aquellos quienes sean interesados en la conservación, gestión o utilización del ganado domésticos. Si se desea recibirlo regularmente, se ruega comunicar nombre, apellido y dirección al Editor a la dirección indicada en la página iii.

---

# THE FERAL CATRLE OF SWONA, ORKNEY ISLANDS

S.J. Hall

Research Group in mammlian Ecology and Reproduction

Physiological Laboratory

Downing Street

Cambridge CB2 3EG

United Kingdom

C.F. Moore

Zoological Society of London

Regent's Park

London Nw1 4RY

United Kingdom

## SUMMARY

The feral cattle, currently numbering 33, which inhabit the Orkney island of Swona, are described. Their behaviour while foraging for seaweed is compared with that of sheep, and aspects of their social behaviour and population structure are compared with what has been observed among the Chillingham white cattle.

## RESUME

Cet article décrit les bovins sauvages, actuellement au nombre de 33, de l'île de Swona (Orcades). Il compare leur comportement lorsqu'ils cherchent des algues pour se nourrir, à celui des moutons, et certains aspects de leur comportement social et de la structure de leur population aux observations faites chez les bovins blancs de Chillingham.

## RESUMEN

Se describen las vacas salvajes de la isla Orkney, Swona, que en la actualidad son 33. El comportamiento de estos animales durante la búsqueda de algas marinas para alimentarse se compara con el de las ovejas y algunos aspectos del comportamiento social y de la estructura de la población de dichas vacas se comparan con el observado en la raza Chillingham de vacas blancas.

## 1. INTRODUCTION

Swona, latitude 58°04'51" N, longitude 10°30' W, is one of the most southerly of the Orkney Islands, lying 4 km off South Ronaldsay and 10 km north of the Scottish mainland. It is a small island having an area above mean high water ordinary spring tides (MHW) of about 113 ha. The people of Swona left the island in 1974.

The island is very exposed and there are neither trees nor shrubs. Shelter is provided by numerous stone buildings (secured against entry by livestock) and walls. The eastern and northern shores are precipitous and there are no sandy beaches. Of the land area, 13.5 ha were cultivated in the past and presently support a sward containing species of grazing value; the rest of the island is rough grazing, with a maritime character to the low-lying areas in the north and south. There are no sheep and few rabbits.

Draught oxen and cows were last used on Swona in 1946. Photographs taken about 1937 show that the cattle were not uniform in appearance; one individual had horns and this and some polled animals were entirely or almost entirely black. Another individual looked like a roan Shorthorn. Periodically, bulls were brought from farms on South Ronaldsay or elsewhere in Orkney for mating with the Swona herd and these were of either the Aberdeen Angus or Shorthorn breeds.

Since 1974 intensive husbandry has not been practised on the cattle. Some calves were marked by ear-punch as part of a subsidy scheme which was discontinued in 1978. Castration of bull calves was discontinued rather later, as was the practice of importing bulls. No hay has been given in winter since 1977. In October 1977, a number of cattle (estimated as 13 or 14) was removed for sale, and the entire Swona herd may well be removed in the near future.

These cattle (Plate 1) now represent one of the very few feral herds of *Bos taurus* anywhere in the world. Only a few such herds have been mentioned in the literature. These include the herds on islands off New Zealand - the Auckland Islands (Taylor, 1975) and Campbell Islands (Dilks & Wilson, 1979), the latter herd having been exterminated in 1984 (Rudge, 1985) - on Amsterdam Island, in the south Indian Ocean (Petit, 1976), on Felicite Island, in the Seychelles (Suttie, Suttie & Scriven, 1981), and of the Basque country (Darrigade, 1979). The numerous and relatively accessible feral cattle of Hawaii (Rouse, 1973) have not been studied (Smith, 1983) and neither have those of the Falkland Islands (Strange, 1983), and contemporary reports on the other herds (in Colombia, Japan and Spain) mentioned by Epstein & Mason (199A) are not apparently available. Of the feral cattle in the Aleutian Islands, the best known are those of the Shugamin Islands where there are three herds each of about 100 polled animals of mixed origin including Scottish Highland; ways are being sought to remove these animals because of the harm they appear to be doing to the habitat (Henson, 1985), and the Amsterdam Island cattle are similarly under threat (Stonehouse, 1985).

Ecological genetic and behavioural investigations on these herds have not been extensive but it is clear (Epstein & Mason, 1984) that cattle of several different varieties have succeeded in re-establishing themselves in the wild in many different types of habitat, without reverting to a common type, and body size appears to have remained the same or to have diminished, but not to have increased.

It is possible, nevertheless, to compare the behaviour of the Swona herd with that of the Chillingham herd, which has been husbanded for several centuries (Hall 1979, 1985) and which, unlike the Swona herd, is given hay in winter. Accordingly, six days were spent on Swona (3-9 April 1985) and a study made at a time when herbage was in short supply, the spring flush not having begun.

It was anticipated that at this time the cattle might depend upon seaweed. On Swona, access to the intertidal zone (where seaweed is plentiful) is apparently possible for cattle at many points. Droppings and tracks were present in three small areas of foreshore but were nowhere numerous.

Some seaweed plants may have been bitten off by cattle but otherwise no evidence of grazing in the intertidal zone was found. Large masses of seaweed had been washed up along the high tide mark in only one place, a small bay in the north-east of the island, near the house where we were staying.

The Swona herd shows a range of colour patterns (Table 1).. Similarly coloured cattle can be seen elsewhere in Orkney, where the presence of white belly markings on black cattle is taken to indicate the influence of a Shorthorn bull upon Aberdeen Angus COWS. The brown colour is understood to imply purer Shorthorn descent. The three mature brown bulls were individually distinctive, as two had horns apparently no more than 5 cm long, and one of these animals had a black face. These bulls were in equally good condition and were probably of the same age. All bulls on Swona were entire, i.e. had not been castrated. Four cows had ear marks and were therefore born before 1978. No cows had horns.

One carcase of a mature cow, which lacked ear marks and was therefore less than 7 years old (a deduction supported by her general appearance) was examined; shoulder height was 110 cm and body weight was estimated as about 320 kg. This individual, which was black with white belly markings, appeared to have died in February or March 1985 and had been in good condition; close to her carcase was that of a male calf, presumably hers, of about one month of age. All other cattle were in good condition.

## 2. BEHAVIOUR

The island was toured by SJGH alone and the location of each animal was noted at about 08.00 h and 20.00 h on most days. All times are given as BST; tables gave times of high and low water. A 1/2500 map was used.

The cattle were always disturbed on these occasions and their response, usually initiated by one or other of the mature cows but occasionally by one or other of the subadult bulls, was to group. The cattle never became accustomed to being watched at close quarters (unlike the Chillingham herd) so behaviour could only be watched opportunistically. The time it took for cattle to resume grazing after SJGH's approach to within 50 m depended on the time of day. In the mornings the cattle quickly resumed grazing, heading away from the observer; in the afternoons, some individuals, most noticeably the mature cows, never returned to grazing while being observed. The cattle must have been very hungry in the mornings as observations made after nightfall and before dawn with an image intensifier showed that they did little or no grazing at night. mature bulls were much less nervous than females and subadult bulls, continuing to graze even when approached to within 20 m.

One behaviour, very rarely seen in the Chillingham herd, was recorded on Swona; one mature bull was seen to lick the face of another. Chillingham-bulls frequently paw the ground with the result that in Chillingham Park there is a large number of pits dug in the turf. No such pits were seen on Swona. Though a cow was seen to paw the ground, and presumably the bulls do so as well, perhaps this activity is less important a part of their behavioural repertoire. Chillingham bulls made a high pitched hooting call which was not heard on Swona, where the bulls were heard to roar repeatedly.

During our visit the herd roamed the island as a single unit, accompanied by all the bulls with the exception of the mature black bull known as BN, who was seen only in the north of the island. On the evening of 7 April he had moved south to the main pasture but was seen at 21.00 h being driven away north again by an unidentified brown bull. No females were seen to be in oestrus, but one cow was seen on two days to perform flehmen on another, and some heifer-heifer mounting was seen.

The mature brown bull with a black face, known as BI, was apparently dominant to the two other mature brown bulls (known as WP and OBB); he was generally seen (Table 2) in closer

proximity to the main herd. The three or four year old black bulls, which were smaller than the mature brown bulls, were generally found together in the same group. Evidently BI and these two black bulls tolerated each other in the main herd.

The main herd and the mature bulls therefore ranged the entire island with the exception of the north, which was the preserve of the bull BN who seemed to have been 'banished' there.

The cattle were most frequently seen in the southeastern part of the island where a hill provided shelter from the easterly winds. They were probably also avoiding the house (in the north) where we were staying.

The herbage had been very heavily cropped, but the cattle did not show the dependence on seaweed which we had anticipated. In spite of our presence, on four days the herd moved as a group to the foreshore near the house. At 18.40 h on 4 April (high tide 21.57 h, to 3.60 m above datum), the herd was seen approaching the foreshore; by 18.52 h all were there, but they left at 19.00 h. The next day the herd was seen leaving the area at 10.00 h (high tide 10.02 h, to 3.82 m above datum) having been feeding there; a few animals remained. That evening about 8 m<sup>3</sup> of seaweed (mostly of *Laminaria*-spp. was deposited as a bank about 40 m long. The bull BN was noted on the foreshore at 20.00 h, and at 20.44 h a 2 year old black bull was seen with him (high tide 22.38 h to 3.69 m above datum). On 6 April, the herd moved to the area and all were on the beach at 09.50 h but only five stayed. Cattle joined and left the group until about 15.30 h (high tide 10.45 h, to 3.96 m above datum). Next morning (7 April) the high tide at 11.30 h was 3.97 m above datum the highest tide so far in 1985, but it was not until 18.43 h that the herd headed for the foreshore and about 20 animals fed there until about 20.00 h (high tide 00.01 h on 8 April, to 3.56 m above datum).

Items of seaweed which the cattle were seen to eat include *Laminaria* fronds and stipes and large pieces of *Fucus serratus*. Cattle fed at the strand line where the high tide had deposited seaweed and did not venture between the tidemarks. It was clear that they found movement on the slippery, loose rocks very uncomfortable and this was presumably why there was none of the movement among piles of forage that is usually associated with hay feeding.

### 3. HERD STRUCTURE

No detailed records exist of the numbers of cattle on Swona, but there appear to have been no great departures from the present level of 33 animals for several years, one animal per 3.42 ha.

Table 3 presents the sex ratio calculated in different ways and the proportions of the Swona herd, and of the Chillingham herd of different ages and both sexes. At Chillingham the usual pattern is for females to outnumber males and this was also seen on Swona. Herd records show that Chillingham cows live longer than Chillingham bulls (Hall, 1985) and a higher proportion of females than of males are mature. The same disparity exists in the Swona herd, leading to the conclusion that, as at Chillingham, cows live longer than bulls.

### 4. CONCLUSION

The significance of the Swona cattle can be seen in terms of agricultural history, animal breeding, and comparative zoology.

The Swona cattle are a living relic of the days of draught oxen. The last work ox in Orkney died on the island of Flotta in 1950 (Fenton 1969, 1978). Historically, therefore, they have significance as being closely related to some of the last triple-purpose - i.e. beef i milk and draught-cattle in Britain.

Their affinities with two present-day commercial breeds also enable some comparisons to be made between these breeds. AS the behaviour of an individual may be determined by limitation of the animals with which it associates, any effects of breed can be confounded with those of rearing conditions (Ewbank, 1967).

Nevertheless, many workers have concluded that there are breed differences in behaviour (for example Oberosler, Carenzi & Verga, 1982; Le Neindre & Sourd, 1984). Practical cattle breeders believe the colour markings of a breed to be firmly associated with production and behavioural characteristics and very probably black cattle on Swona possess the attributes of the Aberdeen Angus breed while the brown cattle have those of the Shorthorn. Within these breeds the colours of individuals are stable for life and the same is true on Swona; there were young and old brown animals, and young and old black ones.

Swona can be seen as an arena where these breeds have been competing. Black cattle form the larger part of the herd (20 out of 33 animals) but the three biggest bulls were brown; the mature brown bull BI was probably the dominant bull on Swona and he seemed to keep the other two mature brown bulls on the periphery of the herd but to tolerate the presence of the two mature but, smaller and apparently younger black bulls. His apparent tolerance of the black bulls may have been due, to their being less easily dominated. This would be consistent with earlier work; Wagnon et al. (1966) found that, in California, Angus cows were dominant to Shorthorn and Hereford cows.

There do not seem to be any published accounts of cattle feeding on seaweed, but there have been a number of studies of adaptation by sheep to this diet. Cattle appeared indiscriminate in their choice of seaweed, and the time patterns of their arrivals at and departures from the main seaweed-feeding site were not closely linked with the state of the tide, no attempt being made to feed at night. The short visits which the herd paid to that site on 4 April and 6 April were probably in the nature of reconnaissance and whether or not the herd ventured onto the foreshore depended on whether a large amount of seaweed had been deposited on the strand line, preferably high up the shore by a particularly high tide. In sharp contrast, the sheep of North Ronaldsay, Orkney, prefer the seaweed species of highest grazing value (Paterson, 1985) and show a close correspondence between feeding behaviour and the state of the tide, feeding at night if necessary (Hall, 1975; Paterson & Coleman, 1982) and ranging between the tide marks.

There was no sign in the Swona herd of a home range or territorial system among the mature bulls, apart from the fact that the bull BN had a restricted range. It would be interesting to see whether such a system operates in *s r*; it is very obvious in the Chillingham herd during the hay feeding season (Hall, 1979). The Swona cattle forage as a single group in winter rather than disperse to find food; in this respect they behave in a similar way to the European bison *Bison bonasus* (Krasinski, 1978) and the American bison *B. bison* (Lott & Minta, 1983). Indeed, all members of the Tribe Bovini whose social aviaour has been described have shown flexibility of group size in response to environmental conditions (water buffalo *Bubalus arnee*: Dahmer, 1978; Tulloch, 1978; banteng *Bos javanicus*: Halder, 1975; gaur-*Bos gaurus*: Schaller, 1967; African buffalo *Synceros catter*: Sinclair, 1977; yak *Bos mutus*: Schaller, 1976, kouprey *Bos sauveli*: Sauvel, 1949). This is the first report on the foraging strategy of free-ranging feral *Bos taurus* not provided with supplementary food.

Home ranges of the Chillingham bulls seem to overlap more as winter approaches (Hall, in preparation) and it seems from the present study that were the Chillingham herd left to itself in winter, it would forage as a single unit, rather than disperse. On Swona as at Chillingham, bulls survive less well than cows and this is probably to be expected in feral cattle generally. An important difference between the two herds is that the Chillingham cattle breed all year round (Hall, 1979) while Swona cattle seem to calve in spring, like their relatives elsewhere in Orkney. Calves born in late autumn or winter do not survive well at Chillingham (Hall, in preparation) and their dams are reduced to poor condition. This may explain why there were relatively more young animals on Swona than at Chillingham, though this may have no statistical significance.

Swona cattle are derived from breeds which have been selected for efficient conversion of forage into meat under fairly rigorous conditions and there may have been selection for placidity

and against aggressiveness. Chillingham bulls lead an active social life and probably this prevents their realizing their genetic potential (Hall, 1985). On Swona, the social environment may indeed be more benign than that at Chillingham. In any case, it is intriguing to see that man has prepared the Swona cattle well for the feral state.

## 5. ACKNOWLEDGEMENTS

Dr. Dick Broadhurst told us of the existence of the herdi. We are deeply grateful to Mr. A.T. Annal for permission to work on Swona. He and Mr. C. Annal gave the practical cooperation without which the study would not have been possible, and told us about the history of the cattle. Many colleagues read and commented upon the manuscript. SJGH acknowledges with gratitude support received through the Rare Breeds Survival Trust.

## REFERENCES

- Dahmer, T.D. 1978. Status and ecology of the wild Asian buffalo (Subalus babalis L.) Nepal. Unpublished MS thesis, University of Montana.
- Darrigade, G. 1979. Betisoak - feral cattle of the Basque country. Ark, 6, 177-178.
- Dilks, P.J Wilson, P.R. 1979 Feral sheep and cattle and royal albatrosses on Campbell Isla@a, population trends and habitat changes. New Zealand Journal of zoology, 6, 127-134.
- Epstein, H. and Mason, I.L. 1984. Cattle. In: Evolution of domestic animals. (Mason, I.L., ed.) Longman, London & New York, pp 6 - 27.
- Ewbank, R. 1967. Behaviour of twin cattle. Journal of Dairy Science, 50, 1510-1512.
- Fenton, A. 1969. Draught oxen in Britain. Narodopisny vestnik ceskoslovensky, 3-4, 17-51.
- Fenton, A. 1978. The northern isles: Orkney and Shetland. John Donald Publishers, Edinburgh.
- Haider, U. 1975. 6kologie und verhalten dos Bante@Bos javanicus in Java. Eine Feldstudie. verlag Paul Parey, Hamburg.
- Hall, S.i.G. 1975. Some recent observations on Orkney sheep. Manwel Review, 5, 59-64.
- Hall, S.J.G. 1979. Studying the Chillingham wild cattle. Ark, 6, 72-79.
- Hall, S.J.G. 1985. The Chillingham white cattle. British Cattle Breeders Club Digest, 40, 24-28.
- Henson, E.L. 1985. Personal co ication (American Minor Breeds Conservancy).
- Krasinski, Z.A. 1978. Dynamics and structure of the European bison population in the Bialowieza Primeval,Forest. Acta Th6riologica, 23, 3-48.
- Le Neindre, P. and Sourd, C,. 1984. Influence of rearing conditions on subsequent social behaviour of Friesian and Salers heifers from birth to six mokths of age. Applied Animal Behaviour Science, 12, 43-52.
- Lott, D.F. and minta, S.C. 1983. Random individual association and social group instability in American bison (Bison bison). Zeitschrift fiir Tierpsychologie, 61, 153-172.
- Oberosler, R., Carenzi, C. and Verga, M. 1982. Dominance hierarchies of cows on alpine pastures as related to phenotype. Applied Animal Etholo2y, 8, 67-77.
- Paterson, I.W. and Coleman,'C.D. 1982. Activity patterns of seaweed eating sheep on North Ronaldsay, Orkney. Applied animal Etholo2y, 8, 137-146.
- Paterson, I.W. 1985. The fora5ing strate@ of the seaweed-eating sheep of North Ronaldsay, Orkney. Unpublished PhD thesis, University o Cambridge.
- Petit, J.P. 1976. Cattle adaptation to the ecosystem of Amsterdam Island. 3rd SCAR Srzsium of Antarctic Biology, Washington. G. Llano, Gulf Publ., Houston, Texas, PP. lial-1202.
- Rouse, J.E. 1973. World cattle, III Cattle of North America. University of Oklahoma Press, Norman.

- 
- Rudge, M.R. 1985. Personal communication (Department of Scientific and Industrial Research Ecology Division, New Zealand).
- Sauvel, R. 1949. Le Kouprey ou boeuf gris du Cambodge. *Terre et Vie*, 96, 89-109.
- Schaller, G.B. 1967. The deer and the tiger, University of Chicago Press, Chicago.
- Schaller, G.B. 1976. 4. Aggressive behaviour of the domestic yak. *Journal of the Biological Natural History Society*, 73, 385-389.
- Sinclair, A.R.E. 1977. The African Buffalo. University of Chicago Press, Chicago.
- Smith, M.B. 1983. Personal communication (State of Hawaii Department of Agriculture).
- Stonehouse, B. 1985. Personal communication. (Scott Polar Research Institute, Cambridge).
- Strange, I.J. 1983. The Falkland Islands. 3rd Edition. David & Charles, Newton Abbot.
- Suttie, J.M., Suttie, S.A. and Scriven, N. 1981. Seychelles cattle watch. *Ark*, '8, 314-316.
- Taylor, R.H. 1975. The distribution and status of introduced mammals on the Auckland Islands, 1972. In: Preliminary results of the Auckland Islands expedition 1972-1973. (Yaldwyn, i.C., ed.) Department of Lands and Survey, Wellington, New Zealand, pp 233-243.
- Tulloch, D.G. 1978. The water Buffalo, *Bubalus bubalis*, in Australia: grouping and home range. *Australian Wildlife Research*, 5, 327- 354.
- Wagnon, K.A., Loy, R.G., Rollins, W.C. and Carroll, F.D. 1966. Social dominance in a herd of Angus, Hereford, and Shorthorn cows. *Animal Behaviour*, 14, 474-479.

**TABLE 1***Swoma cattle: her structure (7 April 1985)*

	<b>Number</b>	<b>Inferred Age</b>	<b>Notes</b>
<b>Black Females</b>			
Mature cows	9	>=4 years 3 > 7 years	All had white patch on underside
Heifer (possibly pregnant)	1	3 years	Short tail, no white markings
Heifers	2	2 years	No white markings
Heifer	1	1 year	No white markings
	13		
<b>Black males</b>			
Mature bull	1	>= 4 years	White patch on belly; named BN
Mature bulls	2	4 years	No white markings
Subadult bull	1	2-3 years	No white markings
Subadult bull	1	2-3 years	White patch on belly
Young bull	1	1 year	No white markings
Bull calf	1	2-3 months	No white markings
	7		
<b>Brown females</b>			
Mature cows	3	>=4 years	2 had white patch on underside
Heifers		1 > 7 years	
Heifers	2	2 years	White patch on belly;
Heifer calf			1 had short tail
	2	1 year	1 had white patch on un derside
	1	2-3 months	No white markings
	8		
<b>Brown males</b>			
Mature bulls	3	> 4 years all same age	No white markings; named BI, WP, OBB
Subadult bulls	2	2 years	No white markings
	5		

Table 2

Distance of each mature bull from the innermost animal of the main herd (metres)

Date	4 Apr.		5 Apr.		6 Apr.		7 Apr.		8 Apr.		9 Apr.	Mean
	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
<u>Bull</u>												
BI	0	0	214	0	225	369	-	625	0	0	-	159m
WP	0	0	1227	1042	225	302	-	725	0	0	-	391m
OBB	0	0	1227	1042	225	613	-	472	0	0	-	398m
Black bulls	0	0	0	0	225	0	-	625	0	0	-	
3-4 yr old	0	0	0	1042	0	0	-	925	0	0	-	157m
BN	-	-	1364	1129	1610	1237	-	878	1237	1540	-	1285m

Table 3

Sex and approximate age distribution of Swona and Chillingham cattle

	<1 year	2-3 years	Mature	Total	% age mature	% age females
Swona males	2	4	6	12	50	64
Swona females	4	5	12	21	57	
Chillingham males	1	2	6	9	67	78
July 1983						
Chillingham females	2	7	22	31	71	
July 1983						
Chillingham males	6	4	10	20	50	66
May 1982						
Chillingham females	11	4	24	39	62	
May 1982						



---

# STANDARD DE LA BENI AHSEN RACE OVINE MAROCAINE EN PERIL

Mohamed BOURFIA  
Département des Productions Animales  
Institut Agronomique et Veterinaire Hassan II  
B.P. 6202 Rabat-Instituts  
Maroc

## SUMMARY

The standard of the breed has been drawn up on the basis of the available literature and of direct observations made on the only flock of registered animals. It is hoped that the programme for the conservation of this breed will now be launched.

## RESUME

Le standard de la race ovine Beni Ahsen en péril a été élaboré en se basant sur la bibliographie disponible et sur les observations directes faites sur le seul troupeau inscrit de la race. L'espoir est émis de voir le programme de sauvegarde de la race démarrer.

## RESUMEN

Se describe la situación de la raza en base a la literature existente y a observaciones directas de la única manada registrada. Se confía en que ahora se pondrá en ejecución el programa para la conservación de esta raza.

## 1. INTRODUCTION

La race ovine marocaine Beni Ahsen qui serait, peut-être, l'ancêtre de la race mondiale mérinos, parait en danger de disparition, en raison des croisements commerciaux et du fait que pendant les années de sécheresse son berceau, la plaine du Gharb, au Nord Ouest du Maroc, sert de refuge pour d'autres races marocaines.

La Beni Ahsen fait partie des races de la "Côte Atlantique marocaine". Elle se classe parmi les races à "queue fine". L'une des qualités incontestées de la race Beni Ahsen est la valeur de sa laine, qui l'apparente au mérinos, malgré son niveau de sélection, qui est bien rudimentaire, comparé à celui des autres races à laine. Les reproches essentiels adressés à la race se résument dans la difficulté de son engraissement. Il suffit de noter que lors de l'émission de ces réserves dans les années "20" et "30" du siècle courant, les races précoces qui déposent tant le gras étaient appréciées.

La présente note est une contribution dans l'effort national de sauvegarde de cette race, aujourd'hui en péril. Les organismes nationaux, maîtres d'œuvre de cette sauvegarde sont: la Direction de l'Élevage; l'Office Régional de Mise en valeur Agricole du Gharb qui coiffe le berceau de la race; l'Institut Agronomique et Vétérinaire Hassan II qui entretient à sa Ferme d'Application du Gharb le seul troupeau inscrit de la race; l'Association Nationale Ovine et Caprine.

La proposition du standard de la race Beni Ahsen développé ci-après émane de la bibliographie disponible et des observations directes que nous avons faites sur le troupeau de race Beni Ahsen de la Ferme d'Application du Gharb de l'Institut Agronomique et vétérinaire Hassan II, avec l'espoir qu'il sera utile dans la recherche des ovines de type Beni Ahsen, afin de pouvoir entamer le programme de sauvegarde à race.

## 2. ÉLÉMENTS DE STANDARD DE LA RACE BENI AHSEN

Avant l'intensification de l'agriculture, la zone de forte densité raciale longeait le fleuve du Sebou, de Mechrâa Bel Ksiri à Moghrane. La création des fermes a certainement poussé, au moins partiellement, le mouton Beni Ahsen vers le sud et l'est. Dans un souci de pureté raciale cependant, il est conseillé de se limiter à l'embouchure du Sebou vers le Sud-Ouest et d'éviter d'accéder dans le berceau de la race Zemmour au Sud-Est, qui se trouve en particulier dans la zone de Tiflet et qui a quelques ressemblances avec la race Beni Ahsen.

Catégorie raciale: La race Beni Ahsen fait partie du groupe des races lainières. Avec une laine abondante et très fine, une conformation moyenne et une vitesse de croissance relativement bonne: 160g de GMQ/(10 - 30j) chez les mâles doubles et 180g de GMQ/(30 - 70j) chez les mâles simples.

Format: La Beni Ahsen est une race de grand format:

	Brebis	Béliers
Hauteur au garrot	70cm (3cm*)	80-100cm
Poids vif	42 kg (5@kg)	65-80 kg
Longueur totale	95cm (5cm)	1m (environ)

\*entre parenthèses est donné l'écart-type

Tête:

Forte, chanfrein légèrement busqué donnant un profil convexe chez le mâle. Oreilles longues, légèrement tombantes. Femelles sans cornes, les mâles rarement sans cornes; en général les béliers portent de longues cornes régulièrement enroulées.

Encolure:

Longue, munie d'un fanon développé et de plis de peau rappelant les traits d'un Mérinos primitif.

Tronc:

Garrot légèrement saillant; dos droit, rarement ensellé. Rein étroit, gigot long et peu développé.

Queue fine.

Membres: Robustes à os forts.

Couleur:

Corps blanc ou blanc jaunâtre. Tête généralement brune et très rarement noire. Les pattes portent assez fréquemment des tâches brunes.

Laine:

S'étend sur toutes les parties du corps, couvre la tête et une partie de la face, et descend sur les membres jusqu'aux onglons. La toison pèse en moyenne 3.5 kg chez la brebis et peut atteindre 5 à 6 kg chez le bélier. La toison est homogène, compacte et fermée; elle est composée de brins d'égale finesse et longueur, ce qui donne une mèche, dite "carée", exempte de jarre, douce et soyeuse au toucher. Le brin est long, 9.5 à 12cm, avec des ondulations très nombreuses: 20 à 30 ondulations pour un brin de 10cm de longueur. Dans la classification marocaine, la laine Beni Ahsen est de type "Aboudia", ce qui correspond à une finesse, du type "Prime et crois- I" dans la classification française ou 58's - 60's dans la classification anglaise. Le diamètre de la fibre est de l'ordre de 27 à 33 microns. Le rendement au lavage est de 42 à 50 pour cent.

Prolificité: de l'ordre de 1.15 à 1.20.

Aptitudes de croissance et de valeur bouchère: Les agneaux gales Beni Ahsen nés simples de mères adultes pèsent en moyenne 4kg à la naissance, 11kg à 1 mois d'âge, 22kg à 3 mois d'âge, 34kg à 5 mois d'âge et leur rendement à l'abattage vers l'âge de 6 mois est de l'ordre de 45 à 50 pour cent.

### 3. CONCLUSION

Pour conclure il convient de noter les points suivants:

- Dans le berceau de la race Beni Ahsen on rencontre parfois des moutons dits "Kerkoub" qui sont de petite taille, avec des oreilles réduites et une laine de mauvaise qualité.
- Ne pas confondre la Beni Ahsen avec la race voisine zemour qui s'en distingue par un fanon moins développé et une toison de valeur moins bonne.
- Le standard développé plus haut vise, dans une première étape, l'identification des ovins de type Beni Ahsen. Il est bien évident que si l'objectif est de faire une race de type mérinos amélioré, on doit alors, comme il est de coutume dans les races de même type, rechercher des animaux présentant un fanon de moins en moins développé tout en gardant ou en améliorant la valeur de laine, ainsi que d'autres caractères économiques.



# CONSERVATION OF ANIMAL GENETIC RESOURCES IN THE USSR

N.G ' Dmitriev

Research Institute for Farm Animal Breeding & Genetics 188620 Leningrad  
Pushkin, moskovskoye Shosse 55a  
USSR

## SUMMARY

Many valuable local breeds of farm animals in the USSR have either been lost or are in an endangered state. Concern about this loss of gene resources has led to the inclusion of a genetic resources programme in the overall state plan for the genetic improvement of livestock. It includes programmes for live animal conservation and setting up of gene banks. The former activity is carried out in special state gene pool farms, one for each geographical zone, where 500 purebred cows are maintained under a rotational outbred system of mating. Semen banks of most local breeds of livestock have also been established at animal husbandry institutes. Current research emphasis is on long term embryo storage and establishment of banks of somatic cells of local breeds.

## RESUME

En URSS, de nombreuses races locales utiles d'animaux de ferme ont disparu ou sont menacés d'extinction. L'inquiétude suscitée par cette perte de ressources génétiques a conduit à incorporer un programme de ressources génétiques dans le plan général officiel d'amélioration génétique du bétail. Celui-ci prévoit notamment la conservation d'animaux vivants et la création de banques de gènes. Cette première activité menée dans des fermes étatiques spéciales, à raison d'une dans chaque zone géographique, qui renferment des "pools" de gènes et dans lesquelles 500 vaches de race pure sont soumises à un système d'accouplement en rotation avec des bovins d'autres races.

Des banques de sperme de la plupart des races animales locales ont aussi été créées dans les instituts zootechniques. à l'heure actuelle, la recherche met l'accent sur le stockage prolongé d'embryons et sur la création de banques de cellules somatiques de races locales.

## RESUMEN

En la URSS se han perdido o corren peligro de perderse muchas razas pecuarias locales valiosas. La inquietud acerca de esta pérdida de recursos genéticos ha llevado a incluir en el plan general del estado para el mejoramiento genético del ganado un programa sobre recursos genéticos. Este abarca programas de conservación de animales vivos y el establecimiento de bancos de genes. La conservación de animales vivos se realiza en establecimientos pecuarios especiales que funcionan como fondos comunes de genes uno para cada zona geográfica en cada uno de ellos se mantienen 500 vacas de raza pura sujetas a un sistema de cruzamiento de rotación. En institutos de zootécnica también se han establecido bancos de semen de la mayor parte de las razas locales de ganado. La investigación actual presta una atención especial al almacenamiento a largo plazo de los embriones y al establecimiento de bancos de células somáticas de razas locales.

The genetic resources of farm animals in the USSR are represented by a broad spectrum of breeds, numbering over 300, and include 52 cattle breeds, 31 breeds of swine, 90 of sheep, 50 of horses, 36 of poultry, 10 of rabbits and 5 of deer.

Intensification of animal husbandry and the industrialized breeding of most farm animal species has resulted in an expansion of a limited number of specialized breeds and a drastic reduction in population size of local breeds that do not meet the requirements of the present day farming industry.

Under the Soviet power 23 cattle, 44 sheep and 13 swine breeds were created in the USSR, while 34 cattle, 25 sheep and 13 swine breeds were lost entirely or are now on the verge of extinction (Zavertyayev and Sml;rnov 1982, Rusyayev and Yakovlev, 1980, Eisner, 1983). The process of reduction of genetic resources is particularly evident in local populations. Thus, 13 out of 19 local or aboriginal cattle breeds have been severely reduced in numbers (Ivanov and Paroyan, 1982). The reduction of local breeds, although unavoidable in modern intensive animal breeding, should lead to a significant 'decrease in the genetic diversity. However, it is known from the long years of experience with animal breeding, that the development of new breeds and improvement of existing ones to meet the varied demands for livestock products require genetically diverse material. Each species of farm animal has undergone mutations and a long process of selection in different environments, resulting in genetic differentiation within the species. The numerous breeds thus created carry a tremendous pool of hereditary characters. The extinction of a breed is thus considered an irreplaceable loss of genes. It is this concern that has led to studies on conservation and proper utilization of local genetic resources.

Many local or aboriginal breeds of farm animals in the USSR have unique genes or gene complexes determining valuable genetic traits which can be of use in future selection. Such characteristics include good adaptation to extreme environmental conditions, good viability, resistance to diseases, strong constitution, high quality production, etc. Although the most valuable breeds of farm animals in USSR have been studied closely by Soviet scientists, many local breeds have escaped such a detailed analysis of their economical, morphological and genetic traits. Such studies are necessary for decisions concerning the preservation of genetic resources that are required not only for the present but for future animal breeding as well.

Early in 1927, Prof. A.S. Serebrovsky proposed special farms for preserving the local breeds (Serebrovsky, 1928). The theoretical foundation for this concept was laid in the 1920s by a prominent Soviet biologist, Academician N.I. Vavilov, who established the world famous pool of plant genetic resources. The significant progress in the USSR in plant breeding was possible due to the existence of a large gene reserve in the form of a world plant seed collection at the All-Union Institute of Plant Growing, named after N.I. Vavilov. Even at present, in spite of the wide use of radiation and chemical mutagenesis in plant breeding, this collection has remained as an inexhaustible source of valuable genes for the development of varieties required for varying conditions.

Work on the development and improvement of methods for preservation of local livestock breeds in the USSR is now being carried out on a large scale. A long-term comprehensive goal-oriented "Genetic Resources" programme has been designed to cover the entire nation (mashurov et al, 1982). A special section devoted to preservation of local breeds is also included in a Comprehensive State Plan of measures for further genetic improvement of livestock extending up to 1990. To preserve local breeds, each geographical zone has a special state gene pool farm with at least 500 purebred cows.

Fundamental studies on the conservation of domestic animal genetic resources are being carried out at the Institute of Cytology and Genetics (Novosibirsk) where a domestic animal gene pool has been created (Rodin Yu, 1983). In addition to being a living bank of domestic animals' genes, this world's largest collection is also being used as a selection centre for creating

new farm animal breeds. Plans for the future include large-scale national and international programmes for the accumulation and conservation of the genetic resources of domestic animals.

Gene pool preservation in the form of small populations of live animals entails a number of problems, one of which is inbreeding. Conventional breeding methods of directional or progressive selection when used on these populations can reduce genetic variability. Simulation studies on different types of selection have shown that stabilizing selection, even if highly intensive, does not cause a narrowing of genetic variability of polygenic characters, and also maintains the means of the characters relatively stable for many generations (Zavertyayev, 1983).

The development of techniques for artificial insemination, and deep freezing and long-term storage of semen have dramatically changed the methods and forms of gene pool preservation and made sperm banks an extremely efficient means for gene pool preservation. Thus, deep-frozen bovine semen of local breeds is now stored at all leading institutes of animal husbandry. Research on storage of deep-frozen semen from other animal species is also in progress. Semen from these banks should be used in a planned way, so that females of the breeds are maintained at the gene pool farms in their natural environments. The All-union Institute of Farm Animal Breeding and Genetics has designed a method for conservation of small local populations of gene pool herds using bovine sperm from the gene banks (Anon, 1971). The method is based on pure breeding with an outbred mating system. The breeding herd of 500 cows is divided into 4-5 unrelated genealogical groups according to the genealogical structure of the breed. The semen bank contains semen of bulls originating from each of the 4-5 pedigree lines. Approximately 10 000 doses from two bulls are stored per line. A rotational system of outbreeding among the lines allows the preservation of the genetic structure of the breed for a number of generations, the inbreeding coefficient being no greater than 1.5 percent. Experiments on freezing and long-term storage of embryos are also under way in the Soviet Union in order to create embryo banks of local breeds. This and other methods which are now being developed in the laboratories, including those based on cellular and genetic engineering, are expected to make a significant contribution to the conservation of animal genetic resources in the form of banks of somatic cells and individual genes of local breeds. It is beyond doubt that the role played by the gene pool of local populations in the creation of new animal breeds as well as in improvement of the existing ones, will become more and more significant in future. Progress for the preservation of the genetic resources of farm animals in the USSR will therefore contribute to the realization of the Food Programme of the country, planned by the USSR government for the period, 1980 to 1990.

Within the framework of this programme, the Soviet Union cooperates with various international bodies, such as the European Association for Animal Production (EAAP), the International Society for Animal Blood Group Research (ISABR), among others. A monograph entitled "Local, rare and endangered breeds and species of domestic animals in the USSR". by FAO/UNEP is scheduled for publication in 1987.

## REFERENCES

- Anon 1977. methodological recommendations for preservation of local breeds of farm animals. Leningrad, 58.
- Eisner F.F. 1983. The problems of preservation and adequate utilization of the genofund of farm animals. Bull. VNIIRGZH, NO. 63: 6-10.
- Ivanov K.M. and Paroyan I.A. 1982. Preservation of endangered local breeds of animals in the USSR. XXXIII Annual Conference of European Association of Animal Breeders, Leningrad.
- Mashurov A.M., Uzorin E.K., Dankov A.A. and Ukhanov S.V. (1982). The problem of preservation of the farm animal genofund.
- Rodin Yu. 1983. A preserve for domestic animals. znaniye, no. 7: 8-10.

- Rusyayev A. and Yakovlev A. 1980. To preserve the genofund of local cattle breeds. *Molochnoye i myasnoye skotovodstvo*, no. 3: 31-33.
- Sérebrovsky A.S. 1928. Genogeography and the genofund of fam animals. *Nauchnoye slovo*, 1928, no. 9: 3-23.
- ZavertyayeV B.P. 1983. methodological foundation for performing stabilizing selection in small animal populations. *Byull. VNIIRGZH*, no. 63: 10-13.
- Zavertyayev B.P. and Smirnov V.N. 1982. Preservation, of the genofund of local cattle breeds in the USSR (exemplified by the Red Gorbatovskaya breed). XXXIII Annual Conference of the European Association of Animal Breeders. Leningrad.

---

# OVINO CRIOLLO NEGRO EN BRASIL

A.H.A. Camargo  
Fazenda Canoas, Ponte Alta  
Santa Catarina  
Brasil

## SUMMARY

In this paper, a brief description is given of the origin and introduction of Black Criollo Sheep in Brazil, together with genetic characteristics and some data on the level of production, its meat and wool. It is noted that the number of those sheep is decreasing quickly and this valuable genetic stock is rapidly heading towards extinction.

## RESUME

On présente dans ce travail, une brève description sur l'origine et introduction en Brésil; caractéristiques zootechniques, quelques données sur la production des moutons, de sa viande, et laine des moutons noirs de ce pays, élevés dans la région du Sud du Brésil. On alerte aussi, que le nombre de ces moutons vient de diminuer rapidement, menaçant ce matériel de valeur d'élevage à pas large vers la direction d'extinction.

## RESUMEN

Este trabajo presenta una breve descripción del origen e introducción en Brasil así como las características zootécnicas y algunas observaciones sobre la producción de corderos, carne y lana de ovinos Criollo Negro criados en la región Sur de Brasil. También se resalta la grave y acelerada reducción de ese rebaño, lo que está llevando a la extinción de un valioso material genético, potencialmente aprovechable.

---

<sup>1</sup> El autor desea expresar su profundo agradecimiento a su esposa Sra Raquel Vieira Camargo, por su amable cooperación y revisión del manuscrito. Merece un agradecimiento especial la Profesora Lilian Mary Jiménez, del Centro Agro-Veterinario - UDESC, LAGES S.C., por sus valiosas sugerencias y traducción del original, en portugués al español.

## 1. INTRODUCCION

El rebaño de ovino's Criollo Negro mas expresivo de Brasil sitúase en la región Sur, abarcando los Estados de Rio Grande do'Soul, Santa Catarina y Paraná, pero apesar de estar presente en otros Estados, en éstos su número no llega a ser significativo. Las pasturas naturales en determinadas áreas de aquella región son consideradas de baja calidad, tornándose escasa en el periodo de invierno (Mayo a Octubre). Además, la pedregosidad del suelo, especialmente en las regiones de sierras, así como las sucesivas heladas, nieve y lluvias a temperaturas extremadamente bajas, son motivos para que el ovino Criollo Negro resista y sobreviva, mientras que otros, de raza "noble", desaparecen. En tales condiciones, no es de sorprenderse que el medio ambiente imprima una marca característica en la lana e igualmente en el cuerpo del animal.

Asesar del elevado costo de manutención de animales de grande y medio porte, principal obstáculo al incremento de la preservación de germoplasma animal, el esfuerzo en atingirlo permanece, debido al reconocimiento del gran beneficio que esa actividad trae consigo, tanto del punto de vista social como económico.

Las razas ovinas naturalizadas en América Latina y especialmente en Brasil, estan siendo rapidamente substituidas por razas exóticas, sin que cualquier providencia sea tomada para evitar su extincion. Entretanto, la experiencia ha mostrado que, en las condiciones de producción de Brasil, el componente ovino Criollo, presenta un grado importante de eficiencia. Por otro lado, como esa raza nunca fue seleccionada para producción, pero si lo fue por selección natural, para adaptación en diferentes regiones, no se puede pensar en el ovino Criollo como única alternativa para el componente genético.

El objetivo mayor es mostrar que el ovino Criollo Negro, es un material genético importante, llegando a ser insustituible en ciertas regiones y condiciones brasileñas. Afirmar lo contrario, sería despreciar casi 500 años de selección natural que esos animales sufrieron en la región Sur de Brasil.

## 2. ORIGEN E INTRODUCCION EN BRASIL

Son denominados ovinos Criollos, aquellos animales que descienden de otros, introducidos en Brasil por los colonizadores, ya sea de Europa o de Africa Occidental. Estas especies son también llamadas de indígenas.

MASON (1981), supone que el ovino Criollo de América del Sur desciende de los churros importados de España, entre 1548 y 1812. Por otro lado, VALE (1949), relata en su obra que la ovinocultura portuguesa se originó a partir de dos troncos, el *ovis aries ibericus* y el *Ovis aries africanus*. según el autor, la raza Criolla portuguesa la cual probablemente fue introducida en Brasil, deriva del tronco ibérico, siendo conocida en Portugal como Raza Bordaleira Churra.

Se cree que el ovino Criollo Negro del Sur de Brasil sea originario de los ovinos Bordaleiros churros y de los Churros españoles, los cuales tienen las mismas características, de lo que se deduce que los Bordaleiros Churros y los Churros españoles tengan el mismo origen.

## 3. CARACTERÍSTICAS ZOOTECNICAS

El ovino Criollo Negro, al cual se está refiriendo, es muy semejante al Churro español y al Bordaleiro Churro portugués; el tipo de lana es parecido y tiene los mismos USOS.

Son animales de tamaño mediano, de cuerpo angosto, con peso adulto entre 35 - 50 kg, para hembras y 40 - 70 kg, para machos. Estos, presentan cuernos bastante desarrollados y las hembras pueden tenerlos, pero muy rudimentares. Las orejas son medianas y ligeramente caídas. El vellón cubre apenas el cuerpo del animal, siendo la cara y las patas cubiertas apenas por pelos cortos y finos. La lana del vientre es substituida por pelos, a medida que el animal va envejeciendo. El vellón adquiere tonalidad "mora" por sucesivas esquilas. mayores detalles de las características externas, pueden ser visualizados en las Figuras 1, 2 y 3.

## 4. PRODUCTIVIDAD

### Producción de Corderos

La gran virtud del ovino Criollo Negro es que se adapta bien y produce económicamente en condiciones locales de suelos ácidos y de pasturas naturales a calidad, normalmente secas entre los meses de Mayo a octubre, en la referida región brasileña.

La oveja muestra destacada aptitud materna, lo que es propio de los animales de razas Criollas, y es de temperamento manso y dócil, demostrando significativa agilidad, robustez y longevidad.

En trabajo realizado por CAMARGO et alii (1985a), fueron obtenidos índices satisfactorios de nacimiento de corderos y baja mortalidad hasta el destete. Los resultados de dicho trabajo son presentados en la Tabla 1.

**TABLA 1**

*Producción de corderos de un rebaño de ovinos Criollo Negro Prowdio de dos años (1985 y 1986)*

Sexo	no. de ovejas encarneradas		no. de nacimientos		Peso al nacer (kg)		no. de corderos muertos hasta destete	
	1985	1986	1985	1986	1985	1986	1985	1986
Macho	-	-	27	22	3,4	3,2	0	2
Hembra	50	46	20	24	3,1	3,2	0	1
Total/Promedio			47	46	3,2	3,2	0	3

De acuerdo con los datos de la Tabla 1, se verifica que no hubo muerte de corderos hasta el destete durante el primer año de observaciones (1985), lo que en parte, puede ser atribuido a un invierno favorable, con pocas lluvias durante los meses de parición (junio y Julio) (Figura 4). Por otro lado, la baja mortalidad de corderos puede adjudicarse a su rusticidad y a la gran habilidad materna de la oveja Criolla Negra, pues jamás abandona su cria, a la cual amamenta hasta el quinto o sexto mes de edad, en caso de no haberse procedido al destete forzado.

No han sido registrados partos distócicos; talvez, por la buena conformación de la garupa y buena inclinación de la pelvis, sin considerar el tamaño relativamente pequeño del cordero.

### Producción de Carne

La carne, la lana y el pelego (Figura 5), son los principales productos económicos extraídos de los rebaños de ovino Criollo Negro criados en la región Sur de Brasil, ya sea para consumo interno en la propiedad o para la venta.

CAMARGO Et al (1985a) evaluaron la ganancia de peso de corderos de ambos sexos, sometidos a condiciones de pasturas naturales y manejo extensivo de acuerdo con los datos expuestos en las Tablas 2 y 3, se puede observar, que esos animales obtuvieron aumento de peso y un peso razonable de carcaza pues, según OLIVEIRA (1983) para las razas productoras de lana, el peso ideal para la matanza de corderos es de 25 kg y para las razas productoras de carne es de 32 kg; llevando en consideración las condiciones de suelos pobres y Ácidos en las que se encontraban y teniendo el *Andropogon lateralis incanus*, como especie dominante de la pastura.

**TABLA 2**

*Promedios de pesos al nacer y de ganancias de peso de ovinos Criollo Negro nacidos durante los meses de Junio y Julio de 1985*  
*Pesos a diferentes edades (kg)*

Sexo	Peso al nacer (kg)	Hasta destete (81 días)	Hasta 222 días	Ganancia de peso diario, hasta 22 días (kg)
Macho	3,4 (27)*	20,4 (27)	35,4 (15)	0,145 (15)
Hembra	3,1 (20,)	18,3 (20)	29,7 (19)	0,120 (19)

*El número entre paréntesis refiérese al número de animales observados en las respectivas pesadas.*

De acuerdo con los datos de la Tabla 2, se verifica que no hubo muerte de corderos hasta la época del destete (81 días), lo que confirma su rusticidad. Los doce (12) corderos machos que faltaron, cuando de la pesada a los 222 días de edad, fueron sacrificados. De los otros quince (15) machos, doce (12) también fueron sacrificados hasta marzo de 1986 y tres (03) fueron destinados para reproductores. De las hembras, apenas una murió, entre el periodo de destete hasta los 222 días, motivo por el cual no se obtuvo su peso.

**TABLA 3**

*Edad, peso vivo, peso de canal, rendimiento de canal y peso del pelego después del sacrificio de corderos Criollo Negro. Datos promedios de 06 animales nacidos durante los meses de Junio y Julio de 1985.*

Edad(meses)	Peso vivo (kg)	Peso de canal (kg)	Rendimiento canal (%)	Peso pelego(kg)
6,3	34,3	13,9	40,5	3,5

Observando las Tablas 2 y 3, verificase que esos animales obtuvieron buenas ganancias de peso y de rendimientos de canales; pero, se cree que pueden attingir valores superiores a los presentados, cuando suplementados en el periodo de mayor deficiencia nutricional (invierno) y cuando fueren sacrificados a los 12-15 meses de edad. WILSON (1985), afirma que el ganado ovino confinado presenta rendimientos de canales de aproximadamente 48 a 50 por ciento en relación al peso vivo. Según el mismo autor los ovinos de la raza maure Negra, criados de manera extensiva rinden mucho menos: 35 a 45 por ciento.

### **Producción de lana**

El ovino Criollo Negro se caracteriza por el tamaño mediano y por la naturaleza de su vellón, que es constituido de fibras gruesas y lisas, formando mechales largas y puntiagudas (Figura 1).

Según MASON (1981), JARDIM (1983) y CAMARGO et alii (1985b), el peso del vellón varía entre 1 y 2,5 kg, para animales esquilados apenas una vez por año.

CAMARGO et alii (1985b) obtuvieron rendimientos promedios de producción de lana de ovinos de la referida raza, que variaron de 1,6 a 2,4 kg, para animales con diferentes edades, de acuerdo con los datos presentados en la Tabla 4.

De acuerdo con los datos enunciados en la Tabla 4, se observa que los ovinos presentan un vellón bastante uniforme, con mechales bastante largas, en las diferentes partes del cuerpo, siendo esta una característica muy valorizada y deseada por la industria artesanal de lana.

**TABLA 4**

*Longitud de mecha de la lana y, peso del vellón de un rebaño de ovejas Criolla Negra. Datos colectados por ocasión de la esquila de 1985\**

Edad (dientes)	no. de observaciones	Longitud de mecha (cm)						Peso vellon (kg)
		cuarto	lomo	paleta	barriga	costilla	pescuezo	
2	8	28**	21a	26a	13a	30a	17a	2,4a
4	16	27a	20a	26a	10a	28a	18a	2,0a
6	11	26a	20a	26a	10a	26a	20a	2,1a
8	21	26a	19a	23a	5b	25a	20a	1,6b
Total/Promedio	56	26,7	20,0	25,2	9,5	27,2	18,7	2,0

\* Datos colectados en Ponte Alta, Santa Catarina - Brasil.

\*\* Valores en la misma columna, seguidos de la misma letra, no difieren estadísticamente entre si ( $P < 0,05$ ), por el test de Tukey.

## 5. PERSPECTIVAS FUTURAS Y CONCLUSIONES

Muy poco se ha hecho, hasta el momento, para evaluar sistemáticamente las razas indígenas en Brasil, lo que pone en riesgo de perder dicho material.

La introducción indiscriminada de razas especializadas para alta producción, en ambientes diferentes de los de su origen frecuentemente lleva a la pérdida de un material genético nativo potencialmente de gran valor. En el Sur de Brasil, el ovino Criollo fue la base de la ovinocultura; pero hoy encuentra en situación de ser totalmente sustituido por otras razas. Además de esto, en algunas situaciones, vienen siendo cruzados con razas exóticas sin ningún plano sistemático de mejoramiento, con la expectativa de que razas introducidas resuelvan problemas de producción, los que normalmente tienen otras causas, tales como alimentación, sanidad, etc.

El ovino Criollo Negro en Brasil está marginalizado y no goza del aprecio de pecuaristas y órganos gubernamentales capaces de aprovecharlo mejor. Actualmente, encuentra diseminado en pequeños rebaños, en manos de pequeños productores, de reducidos recursos económicos. Como es de conocimiento general, el manejo, la alimentación y la sanidad que esos criadores pueden ofrecer a los animales no son adecuados, resultando, por consiguiente, en baja productividad del ovino Criollo Negro.

## BIBLIOGRAFIA CITADA

- Camargo, A.H.A.; Camargo, A.A.; Camargo, J.M.A. and Dias, C.T. dos S. 1985a. Projeto. Preservaggo e avaliagao do potencial de produqgo de ovinos Crioulo Preto. 7 p. (Resultados do projeto de pesquisa).
- Camargo, A.H.A.; Dias, C.T. dos S.; Camargo, A.A. & Camargo, J.M.A. 1985b. Determinagao do comprimento de mecha e do peso do velo de 6velhas Crioula Preta. (Em preparaggo).
- Jardim, W.R. 1983. Os ovinos. Livraria Nobel, S.A. 4a ed., 193 p.
- Mason, I.L. 1981. Razas indígenas de ovinos y caprinos en América Latina. In: Muller-Haye, B. and Gelman, J. Recursos genéticos animales en America Latina ganado criollo y especies de altura. FAO; Roma. 168 p.
- Oliveira, J.V.de. 1983. Ovinocultura - Recomendaciones Técnicas. Emater - SC./Acaresc, Florianópolis - SC. 78p.
- Vale, i.m. do. 1949. Gado bissulco. Livraria Si da Costa, Litboa. 418 p.
- Wilson, R.T. 1985. Producción pecuaria en Mali Central. La cria de ovejas en el sector tradicional. Rev. Mundial de Zootecnia, FAO', 53: 8-14.



---

## MPWAPWA CATTLE OF TANZANIA

P.M. Katyega  
Livestock Training Institute Buhuri  
P.O. Box 1483  
Tanga, Tanzania

### **SUMMARY**

A historical perspective of mpwapwa cattle is presented. Then a brief account of breed description, habitat and performance is given.

### **RESUME**

Cet article fait l'histoire des bovins mpwapwa, et décrit brièvement la race, son habitat et ses performances.

### **RESUMEN**

Se hace una presentación histórica de la raza mpwapwa de ganado vacuno. Luego se hace una breve descripción de la raza, su habitat y se indica el rendimiento de la misma.

## 1. INTRODUCTION

Between the late 1930s and early 1940s several exotic breeds of cattle were imported to Mpwapwa. These comprised of Sahiwal from India, Red Sindhi from Pakistan, Ayrshire from Great Britain, and Boran from Kenya. Local Ankole cattle from Bukoba area and small groups of Tanzanian Shorthorn Zebu (TSZ) from many areas of Tanzania were also brought in.

These breeds were used in breeding and selection studies at Mpwapwa from 1940 to 1958, by British researchers, C.I. Buckley and G.K. Read. They recorded lactation yields ranging from nil to 910 kg of milk per lactation. These results indicated the poor inherent milk production of the indigenous TSZ. As for the Borans, they showed greater potential for milk production, and yields of up to 1360 kg per lactation were recorded from unselected groups. However, it was felt that the indigenous populations were very variable and that a large population had to be screened to enable promising foundation material to be collected. Also, the use of *Bos taurus* dairy cattle for milk production was not practicable because of the harsh environmental conditions and their susceptibility to diseases prevalent in East Africa. They perform well only at the higher altitudes and under good husbandry conditions.

It was known that *Bos taurus* x *Bos indicus* crossbreeds would offer greater promise but would also require a higher standard of husbandry than could be anticipated on an average peasant farm. Further, as selection efforts had improved milk productivity of certain zebu breeds such as the Sahiwal, Red Sindhi, Kenana etc. in other tropical countries, it was felt that crossbreeding with such zebu breeds would offer an opportunity for quicker improvement of productivity of East African zebus than could be expected from selection within the indigenous populations.

Such then was the background to the breeding project designed to develop Mpwapwa dual-purpose type of cattle. The objective of the project was to develop a breed of cattle capable of yielding about 2200 kg milk per lactation on moderate levels of concentrates, and whose steers would yield about 220 kg dressed carcass weight at less than 4 years of age. By 1958, breeding work at Mpwapwa had resulted in the development of Mpwapwa cattle whose genetic constitution was approximately 55 percent Asian zebu (35 percent Red Sindhi, 20 percent Sahiwal), 35 percent African (20 percent TSZ, 10 percent Boran and 5 percent Ankole) and 10 percent *Bos taurus* (mostly Ayrshire).

In 1958, a progeny testing scheme was planned and initiated by Dr. H.G. Hutchison and was implemented up to about 1965. Since 1965, selection within the population was in the direction of the Sahiwal due to poor lactation performance of the Red Sindhi and what is now recognized as the true Mpwapwa breed appears to have more Sahiwal blood and phenotypically is more similar to the Sahiwal. Since 1973, the Mpwapwa herd has been selected solely on performance with a view to developing a breed type recognizable by its visual and production characteristics. A breeding scheme was also adopted (Fig.1) to form F1 and backcross populations with sires of European and Mpwapwa breeds respectively.

The aim of this short paper is to describe Mpwapwa cattle which constitute an important part of local animal genetic resources in Tanzania.

## 2. BREED DESCRIPTION

The Mpwapwa is a medium sized animal by international standards. Mature bulls in good condition weigh between 450 and 600 kg and the females weigh between 350 and 450 kg at maturity. A hump is normally present; its size larger in males than in females. The development of the dewlap and navel folds or sheath is less than in many other zebu breeds but is certainly more than in European stock. No efforts were made to standardize specific colours or colour patterns as to do so would lessen progress made in the more important characteristics. However, the majority of the animals are solid light to dark red in colour although some are mottled or spotted (see Fig. 2 and 3).

### 3. NATURAL HABITAT

The home of the Mpwapwa breed of cattle is the Livestock Production Research Institute Mpwapwa, Tanzania. The Institute which was founded by the Germans in 1905 has an area of about 4000 hectares and is surrounded by hills, rising from an altitude of about 1 036 to 1 523 metres above sea level. The mean monomodal annual rainfall which falls between November to May is about 700 mm while the mean minimum and maximum temperatures are approximately 13°C in June and 26°C in November respectively. As for the soils, the main textures include loam, clay loam and sandy clay loam. These soils support a natural and planted pasture sward; the latter is composed of *Chloris gayana*, *Panicum maximum*, *Andropogon dactylon* and *Cenchrus ciliaris*. The legume component of the pasture sward is about 10 percent.

Mpwapwa cattle, having evolved under harsh environmental conditions of central Tanzania, are hardy and medium in size. They have been widely distributed in various parts of Tanzania for cattle improvement programmes.

### 4. BREED PERFORMANCE

It is estimated that there are approximately between 3 000 to 4 000 Mpwapwa cattle in Tanzania at the present time. The goal of the breeding programme which is still being pursued, is to produce cattle with the hardiness, longevity and the production potential needed by cattle raisers in climatically difficult zones of the country.

Some of the performance traits of Mpwapwa cattle compared with other genotypes are summarized in Tables I and 2. It is hoped that the data presented in the two tables together with those presented elsewhere (Katyega, 1981, 1982) will serve as a source of information on mpwapwa cattle to those involved in animal genetic resources conservation and management.

### REFERENCES

- Katyega, P.M.J. 1981. Production traits in Egyptian water buffaloes and Mpwapwa cattle. *Tanzanian Veterinary Bulletin*. 3:26-43.
- Katyega, P.M.J. 1982. Egyptian water buffalo in Tanzania. *World Animal Review*, 43:42-43.

**TABLE 1**

*Growth and carcass characteristics of Mpwapwa steers compared with Boran, TSZ and Boran x TSZ*

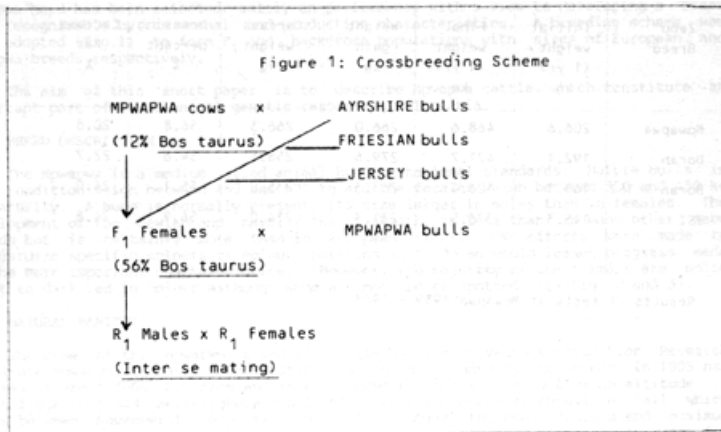
Zebu Breed	Initial weight (1 yr) kg	Final weight (4 yr) kg	Weight gain kg	Carcass weight kg	Dressing percent %	Carcass Fat %
Mpwapwa	206.6	468.6	266.0	266.3	56.8	20.8
Boran	192.1	471.7	279.6	258.5	54.8	22.7
Boran x TSZ	163.1	426.4	263.3	235.0	55.1	24.0
TSZ	145.3	376.5	231.3	214.0	56.9	24.8

*Results of tests at Mpwapwa 1959 -1963*

**TABLE 2***Performance of Mpwapwa F1 and backcross animals*

Trait	Mpwapwa	European x Mpwapwa F	Mpwapwa x F
Age at first calving (months)	40.2	37.0	37.0
CaLving interval (days)	409.4(883)	385.1(426)	373.5 (158)
Lactation yield (kg)	1863.7(1435)	2724.6 (641)	2129.0 (198)
Lactation Length (days)	288.1 (1435)	297.5 (641)	285.9 (198)
DaiLy milk yield (kg)	6.7 (1435)	9.2 (641)	7.3 (198)

*Results of tests at Mpwapwa 1973-1981. Number of observations are shown in parentheses*



Source: 1976 Mpwapwa Annual Report

# HISTORY OF HORSE DOMESTICATION

SàNdor Bokonyi

## SUMMARY

The wild ancestor of the present day domestic horse was *Equus ferus* Woddaert which included two distinct sub-species - the tarpan and the taki or the Ptzevalsky horse. The tarpan is the main ancestor of the- Present day domestic type. Its domestication first started in East Europe in the Neolithic period from where it spread in different directions, moving in successive waves to the Carpathian Basin and Moravia in the west, Caucasus in the southeast and Mesopotamia in the Near East, finally reaching western Europe in the Bronze Age.

The early domestic horses were small compared to present day animals, measuring only 137 cm at the withers. They were chiefly used to provide mobile power - either draught or riding. Later, during the Iron Age, the Scythians brought these eastern horses to Austria, Italy and Greece, where they were much in demand for their superior power and size, a result of conscious breeding by the Scythians. In contrast, the horses indigenous to the western half of Europe, represented by the Celtic horse, were smaller and slender. These were later improved by crossing with the eastern Scythian horses. From the Greeks, the eastern horses reached the Romans and contributed to the development of the Roman horse. ,

## RESUME

L'ancêtre sauvage du cheval domestique actuel est *Equus ferus* Boddaert, qui comprenait deux sous-espèces distinctes, le tarpan et le taki, ou cheval de Przevalsky. Le tarpan est le principal ancêtre du cheval domestique actuel. Sa domestication a commencé au néolithique en Europe orientate d'où elle s'est répandue dans différentes directions, par vagues successives, vers le bassin des Carpathes et la moravie à l'ouest, le Causase au sud-est et la mésopotamie au Proche-orient, pour atteindre enfin l'Europe occidentale à l'âge du bronze. Les premiers chevaux domestiques étaient plus petits que les animaux actuels, puisqu'ils ne mesuraient que 137 cm au garrot. Ils étaient essentiellement utilisés comme animaux de trait ou comme monture. Ensuite, à l'âge du fer, les Scythes ont introduit ces chevaux de l'Est en Autridhe, en Italie et en Grèce, où ils étaient très-demandés en raison de leur taille et de leur puissance, re'sultat d'une sélection judicieuse des Scythes. En revanche, les chevaux indigènes de la moitié occidentale de l'Europe, représentés par le cheval celtique, étaient plus petits et plus élancés. Ceux-ci ont été ensuite améliorés par des croisements avec les chevaux orientaux des Scythes. Des Grecs, les chevaux orientaux sont parvenus jusqu'aux Romains et ont contribué à l'obtention du cheval romain.

## RESUMEN

El antepasado salvaje del caballo doméstico actual era el *Equus ferus* Boddaert del que existían dos subespecies diferentes, tarpan taki o ca a o Przevalsky. El tarpan es el principal antepasado del caballo doméstico actual. La domesticación de este animal comenzó en Europa oriental en el periodo neolítico y de allí se extendió después en diversas direcciones, trasladándose en ondas sucesivas a la cuenca de los Cárpatos y a Moravia, en el oeste, a los Cáucos, en el sudeste, y a la Mesopotamia, en el Cercano Oriente, hasta llegar finalmente a Europa Occidental durante la Edad de Bronce. Los primeros caballos domésticos eran pequeños en comparación con los animales actuales y medían sólo 137 cm a la altura de la cruz. Se utilizaban principalmente para aprovechar su energía, ya sea como animales de tiro o de montar. Más tarde, durante la Edad de Hierro, los escitas llevaron estos caballos orientales a la zona que hoy ocupan, Austria, Italia y Grecia, donde eran muy solicitados por tener más fuerza y mayor tamaño como resultado de la cría consciente por parte de los escitas. Los caballos autóctonos de Europa Occidental, en cambio,

de los cuales es característico el caballo celta, eran más pequeños y delgados. Posteriormente se los mejoró mediante la cruce con los caballos escitas del este. A través de los griegos, los caballos orientales llegaron hasta Roma y contribuyeron al desarrollo del caballo romano.

The horse has a special place among our domestic animals and in our hearts as well. Although it is not as old as other domestic species - it was acquired by man at least three thousand years later than the five neolithic domestic species: sheep, goat, pig, cattle and dog - it reached an outstanding importance as early as the prehistoric period. As a quick draught animal it created a revolution in transport and thus in trading. It had a strong influence upon the development of warfare. As early as the Copper Age and the very beginning of the Bronze Age, i.e. soon after its first domestication, it became the most common domestic animal of certain people in East Europe, and in the, Iron Age, when the first equestrian nomadic people appeared, it began to play a role in the shaping of history too. This significance of the horse further increased in the Migration Period, when waves after waves of nomadic peoples overwhelmed Europe and defeated the Roman Empire, peoples that gave a new character to the whole continent.

The horse also had a place in man's views of life after death. The practice of killing a horse and placing it in the grave of its dead master began right after its first domestication. Horse sacrifices became even more frequent during the Bronze Age. From that period up to the Christian era, the horse outnumbered all other domestic and wild species in ritual graves. Horse skulls were buried beneath floors or placed on poles in front of dwellings throughout Christian Europe. In fact, this custom is still in existence in the Middle East.

This special place was acquired by the horse because of its close relationship with man and in this respect it has been surpassed by the dog only in the most recent times. This followed from its role as a comrade-in-arms, a rank no other domestic animal has ever attained. The life of the mounted warrior often depended on his horse. The two commonly fought together: man against man, warhorse against warhorse. For this reason, the horse was the first species of domestic animal to be treated individually, rather than en masse as a herd. This led to conscious breeding and selection and consequently to the development of different breeds. Strangely enough, this breeding selection of the horse, commenced so early in its domestication exclusively to produce power, as a specialized draught or saddle-animal, may be one of the causes of its present-day tragedy. As the horse has practically no other use and cannot vie with the engine, it has been rapidly relegated to the background. It would therefore not be surprising if the horse is one of the first species among our domestic animals to disappear.

This special place of the horse is exemplified by the abundance of literature on its origin, ancestry, domestication, history and classification, much greater than that on any other domestic species. In spite of this, many aspects of its domestication remained unanswered. Archaeologists have achieved a major breakthrough in the last 15 years by studies on animal remains from excavations and analysis of large bone samples collected throughout Europe. Large-scale research in this area has been done in East and Central Europe and on aspects of wild ancestry in Western Europe. In order to be able to cope with the large number of samples, new methods have been developed to distinguish wild and domestic types. These studies opened up new vistas in the domestication and history of the horse. As a result, information on the process of domestication, its spread from the most important horse domestication centre of the East European steppes, the role of the early equestrian nomads, the beginnings of conscious horse breeding, the exploitation of the early types of horse and other facets on its domestication have become available. Thus it seems appropriate to summarize the knowledge on horse domestication and history of early domestic horses in order to lay the foundations for future research.

### **The wild ancestor of the domestic horse**

The evolution of the domestic horse could be traced to its wild ancestors originating from the Eocene, but it is adequate to consider the changes starting from the true horses of the Pleistocene.

Studies indicate that large and medium-size horses lived side-by-side during the successive periods of this era. By the end of the Pleistocene, the overspecialized large forms died while the medium-sized ones survived the drastic climatic change that signalled the end of the era. The surviving horses belonged to one single species, *Equus ferus* Boddaert. They lived on a very large area in Europe and Asia (except the southern and northernmost regions of both continents) and could be divided into two clearly distinct sub-species, the taroan equus ferus gmelini Antonius) and the taki or Przewalsky horse (*Equus ferus przewalsskii* Pojakoft).

Compared to modern horses, the tarpan was a small but strongly built animal with a short head, broad, flat forehead, a ram nose and small, pointed ears. Its colour was mouse-grey or ash-grey with a black stripe along the spine. Its mane was short and erect (typical of wild horses) and its tail was short and covered with long, dark hairs. In the autumn, the tarpan grew white, downy hair so that in the winter, while its trunk was nearly grey, its head, legs, mane and tail remained dark. This provided a good camouflage in the snow-covered landscape. Owing to its appearance, the tarpan has been identified with the white wild horses described by Herodotus in his fourth book as living beside the marshes of the Hypanis (Bug) River in today's Ukraine.

In East Europe, particularly in the Ukrainian steppes, the tarpan was fairly numerous. It lived in small groups consisting of mares, their offspring and several stallions, but in the spring (mating season), the strongest stallion drove out the other males. As the steppes became populated after the Russian-Turkish War (late 18th century), the tarpan gradually decreased in number. Horse breeders of the region disliked the tarpan stallions as they eloped with mares from their domestic herds. An unbridled hunt of the tarpan led to its extinction by the end of the 19th century. There remains today only one complete skeleton and a skull in the Soviet zoological collections.

The other wild sub-species, the taki or Przewalsky horse still exists, but more are living in zoological gardens than in the wilderness. The taki is somewhat larger than the tarpan, its wither height ranging from 124 to 145 cm. It is a stocky, long-muzzle horse with a large head in proportion to its trunk. The neck is thick with slightly protruding withers. Its basic colour types are dark bay and chestnut with reddish and faded brownish tints. The taki also has a dark stripe along its back, often accompanied by a cross-stripe across the shoulders. The colour is quite light around the mouth. The short, erect mane, the tail and feet are dark. The lower half of the tail is covered with long hairs, while the hairs of the upper part are short. Originally, Przewalsky horses populated large areas of Central and western Asia where they lived in small groups of eight to fifteen individuals. Decimated by hunting and expanding nomadic herders, they withdrew into deserts and remote mountainous regions.

Some wild horses also survived the end of the Pleistocene in other regions of Europe. Nevertheless, they certainly were far less numerous than the tarpan or the Przewalsky horse and hence, played a lesser role in horse domestication. Due to the lack of proper remains, they are not well-known either.

### **The domestication of the horse**

The domestication of the horse differs in an essential point from that of the earliest domesticated animals: dog, sheep, goat, pig and cattle. While the domestication of these five species was for the purpose of securing living food (mainly protein) reserves, the domestication of the horse occurred when man was already aware of further uses (milk, wool, draught power, etc.) of the domestic animals. It is plausible therefore that in addition to domesticating the horse for its meat (earlier man hunted wild horses for their meat too), another essential motivation was to utilize it as a beast of work.

The main problem in estimating the period when domestication began is 'in distinguishing bones of domestic horses from those of the wild ones. The extreme similarity in bone structure suggests that the way of life and the diet of early domestic horses were very similar to those of their wild forms. However, during the last 20 years or so, research methods have been developed

using data on herd structure, kill-off pattern, finds connected with horse keeping and artistic representations too that throw more light on this subject.

According to our most present knowledge, the first domestication of the horse happened in the Neolithic period in East Europe, more exactly in the South Ukraine. The first site where there was positive evidence of domestication is Dereivka, a settlement of the Srednij Stog culture on the Dnieper River, about 70 km from the town of Kremenchug. Radiocarbon (uncalibrated) studies estimate the date at about 3500 B.C.

The human population of Dereivka originally carried out specialized hunting of wild horses for their meat, and this gradually developed into domestication. The domesticated nature of the Dereivka horses was evident from skull morphology, the enamel pattern of the teeth and the morphology of the bones. The most convincing evidence of domestication however was provided by the six antler bits found in the site. The wild ancestor of the domestic horses of Dereivka should be the tarpan since the site lies in the middle of its distribution area. Thus, there cannot be any doubt that the tarpan was the wild form from which the first domestic horses of Europe were derived.

There is not much known about horse domestication in West Europe. One can certainly suppose a domestication centre there too, although clear evidence as in Dereivka has not been found on any West European site.

From the region of the first domestication, domestic horses quickly spread out in all directions. First they inundated the Ukrainian and Russian Plains stimulating local domestication wherever wild horse stock was available. Then still in the second half of the 4th millennium B.C. they reached Moldavia, East Romania, the Carpathian Basin and Moravia in the west, the Caucasus and possibly even East Anatolia in the southeast. Nevertheless, whereas the domestic horses assumed major economic importance in the region of domestication, they were nothing more than curiosities or status symbols in their new homelands of the first wave. The second wave occurred in the second half of the third millennium B.C. and reached the above regions and the western part of Europe. This wave probably took domestic horses to Mesopotamia and other regions of the Near East too. Large masses of horse appeared in the central, southeastern and western parts of Europe by the beginning of the Bronze Age around the turn of the third and second millennium B.C. True horse breeding started in these regions, sometimes reaching the dimensions of that of the original domestication centre. Later the upswing in horse keeping declined and only the appearance of the Scythians, and later some equestrian nomadic peoples of the migration period brought a temporary upswing again.

### **The description of the early domestic horses**

it is no simple task to reconstruct the early domestic horse; there are no complete skeletons, even whole skulls are rare, and one must rely upon individual bones and animal representations found at different sites.

In comparison with present day horses, the early domestic horses were small animals falling into the size category of ponies. Nevertheless, they were not true ponies because their body proportions corresponded to those of the horses. The wither height of the East European early domestic horses averaged about 137 cm. (The West European ones were about 10 cm smaller.) They were strongly built animals with thick legs, somewhat more slender than the wild ones. However, in the whole history of the horse, they were the closest animals to their wild form. Their characteristic feature was that they had narrow hoof bones with well-arched lower surfaces, typical of steppe horses accustomed to hard, dry soil. During the climatic change which culminated in the Bronze Age resulting in a wet, cold climate and consequently large-scale forestation, these horses became wide- and spread-hoofed. This phenomenon is observable from the Carpathian Basin through South Russia to Central Asia.

The skull of the early domestic horse is a little large in comparison to its body. It has a

spacious, vaulted brain-case and a comparatively long, rather wide naso-facial part. The forehead is flat, not very broad and the profile is straight. The teeth are comparatively large - it is a well known phenomenon in early domestic individuals of every species - showing a rather variable enamel pattern.

The early domestic horse differed from its wild ancestor in its external appearance too. Unfortunately, we do not know anything about its coloration but we know that its mane was long and hanging and not short and erect like that of the wild horse. This is clearly shown on artistic representations of that period. The long, hanging mane is a mutation following domestication and its presence should confirm the domesticated nature of a horse in question.

A comparison of early (bronze age) domestic horses originating from the eastern domestication centre with those of the western part of Central Europe and West Europe shows that the former are clearly larger, although the two groups overlap in size. This contrasts with the present situation where the western (cold blood) horses are larger than the eastern (warm blood) ones.

### **The use of early domestic horses**

Horse domestication left its mark on the economy of people. In settlements of the domestication centre, horses constituted the essential and sometimes overwhelming part of domestic animals. Mobility was important to their economy; hence they placed a special emphasis on animal species that could be easily driven. In other regions, horses rarely assumed the same importance, although they played a role in the economy of people of eastern origin or with eastern connections.

No doubt, horse meat was eaten in prehistoric times. Its consumption declined in the Roman Imperial Period and ceased more or less completely after conversion to Christianity in Europe. Nevertheless, the main exploitation of horse was not for its meat.

The six bits (cheekpieces) made of antler found in Dereivka, the site, where domestic horses first appeared, reveal the nature of the horse's other use(s) soon after its domestication: it served as a beast of work. At the same time, the presence of bits excludes or at least minimizes the role of the horse as a pack animal. To a pack horse man, a simple halter will do.

The question remains whether the horse was first used as a riding or draught animal. Some kind of riding must have existed immediately after its first domestication, as otherwise a horse herd would be impossible to handle and keep together. Nevertheless, formal driving most likely preceded formal riding (Littauer, personal communication).

The horse undoubtedly was a better draught animal than cattle because of its swiftness. whereas a slow ox cart covered up to 24 km (this was the daily coverage of the six-oxen wagon of the American West in the last century), a horse team with a cart easily made 50-60 km a day, even on unpaved roads. The slow cattle therefore, remained the draught animal of agriculture while the swift horse became the "motor" for transport. Horse-drawn carts certainly revolutionized transport, particularly from the Bronze Age, - when the discovery of the spoked wheel made carts lighter and quicker. Simultaneously, more precious wares (bronzes and probably textiles) appeared requiring transport over long distances. Thus horse-drawn carts revolutionized trade too, extending its action radius enormously. The horse was drafted into military use with the introduction of the chariot in the Bronze Age. The chariots not only gave the armies strategic mobility but also a new weapon, essentially an "elevated firing platform".

### **The last prehistoric wave of steppe horses to Central Europe**

In the last prehistoric period, the Iron Age, another wave of eastern horses reached Central Europe. The Scythians who thrusted as far as the Carpathian Basin to the west, brought a large number of fine steppe horses that reached Austria, Italy, and Greece, either through trade or as booty.

The size and appearance of the Scythian horses can be gauged from the immense amount of osteological finds as well as the various works of art and objects on which they are depicted. The best artistic representation of the average Scythian horse is to be seen on the electrum vase

discovered in the kurgan of Chertomlyk, the Kuban (4th century B.C.) The horses on this vase could be considered very fine animals even by present standards; they are mostly reminiscent of Arab thoroughbreds (having a relatively small head with a concave profile and a flag-like carriage of the tail, characteristic of Arab thoroughbreds), though some of their features (a thick neck and trunk) are different. Some of the horses represented have short manes, but this does not necessarily imply that they are wild ones, for one of the short-maned animals has a bridle and a saddle. The Scythian custom of trimming the mane may be due to the inconvenience that long manes caused to archers. The human figures standing beside the horses on the Chertomlyk vase give an idea of the size of the animals. The horses' withers almost reach the breast of the men, which points to a wither height of about 140 cm. This is close to the mean wither height of 136-137 cm obtained from actual measurements.

In the western half of Europe, west of the line stretching from Vienna to Venice, another horse group lived in the Iron Age. It was of local origin, and its typical representative was the Celtic horse. The horses of this western group were considerably smaller than the eastern ones, having an average wither height of 126-127 cm. In addition, they also had slender extremities.

From the breeder's point of view, the eastern horses were better animals (since the Scythians acquired their knowledge on breeding, selection and conscious horse breeding from the Persians). This is evident on the belt-plate Vace, Slovenia, where the two horse types appear together. The larger eastern horses were able to carry heavier loads, move more rapidly with a rider of equal weight, carry with ease riders wearing armour and cover longer distances. Due to these superior qualities, people living in the area of the western group of horses were desirous of acquiring the eastern horses. That this could be achieved by outstanding personages only is evident from the fact that eastern horses with their original gear were discovered mostly in graves, in which only rich people (chieftains, heads of families) were buried with horses.

Thus, the view prevalent at the end of the last century and which exists even today, that the Celts were the best horse breeders of the Iron Age, is not supported by factual evidence. On the contrary, Celtic horses were very small and remains of several animals with a wither height less than a metre have been found in Celtic sites. Nevertheless, there is no doubt that a significant phase of the European history of the horse began with Celtic horse keeping and West European equestrian traditions originated from the Celts. They held horses in esteem, even granting them a place in mythology: the veneration of Epona, goddess of fertility, had in all probability started from the veneration of a horse deity.

Originally Greek horses may have been small ones. This is evident from the advice given by Xenophon to a Greek rider to hold the highest point of the mane near the horse's ear with the left hand when mounting. Also, the representation of the gold comb of the Solokha kurgan demonstrates how small the Greek horses were. The wither of the Greek warrior's horse hardly comes up to the waist of the foot soldier standing beside it. These small horses were later improved by breeding with eastern horses. The latter animals were sold by Scythians living in the Carpathian Basin to the Veneti (living around Venice), who made them famous race horses. (Skeletons of such oriental horses have recently been found in many Veneti graves.) In addition, the Greeks directly acquired Scythian horses through their colonial towns in the Black Sea area. Finally, the 20 000 Scythian mares seized by Philip of Macedonia and the 50 000 eastern horses of Alexander the Great's Persian booty exerted a big influence on Greek horse breeding, considerably increasing their size,

This ends the prehistory of European domestic horses and commencement of their history. Through the Greeks, the eastern horses reached the Romans and participated in the development of the Roman horse. The latter and the horses of the nomadic peoples of the migration period played a significant role in European horse breeding. A final addition came from the Arab horses which represented the last wave of eastern horses to come to Europe.

## RECENT PUBLICATIONS

ESTIMATED GENETIC VALUES FOR 14LILK PRODUCTION IN THE TROPICS. 1986. B.Y. Abubakar, R.E. McDowell, K.E. Wellington and L.D. Van Vleck. *Journal of Dairy Science* 69:1087-1092.

The paucity of data on production traits is a serious obstacle to genetic improvement of dairy cattle in the tropics. Sire evaluations are often of limited value as they are based on information of only a few daughters per sire. This paper is concerned with this problem and attempts firstly to look at the consequences of including extended records of abnormal lactations terminated after at least 60 or 9 days in lactation. It then examines the influence of number of daughters per sire on sire evaluations using extended or non-extended records. The data for the study comprised 15 512 lactation records of 138 Jamaica Hope sires from 38 commercial dairies in Jamaica.

The main conclusions are as follows:

1. Heritabilities and repeatabilities are not influenced by record classification,
2. Sire evaluations are not improved by using extended records.
3. A minimum of ten daughters per sire is required for sire evaluation since the progeny test results are more consistent with ten instead of five.
4. Sire differences are more pronounced when only first lactation data is used for progeny tests.

CROP/LIVESTOCK INTERACTION AS 1. CROP PRODUCTION DETERMINANTS. 2. LMST'OCK PRODUCTION DETERMINANTS. 1985. R. Hart and R.E. McDowell. *Cornell International Agriculture Mimeograph* 107. 25p.

The interdependence of crop and livestock agriculture in the tropics, particularly among smallholders, has brought into focus the need for research on total farming systems to understand the complex nature of crop/livestock interactions. This mimeograph analyses the importance of these interactions as they influence ' crop or livestock production. The first part deals with crop/livestock interactions as they affect crops at different hierarchical levels such as ecosystem, farm and community and provides case studies to illustrate them.

The second part on "Livestock Production Determinants" written by McDowell is of more interest to animal scientists. An interesting discussion is presented on the feeding behaviour of different species of ruminant livestock and how this is related to the morphology of their mouth and masticatory parts. It also examines species differences in digestive capacities in relation to their size. On the basis of the feeding behaviour and efficiencies in digesting poor quality roughage, the situations under which each species is at an advantage are examined with emphasis on availability of crop products. Thus, among the ruminants, the buffalo is classified as the least selective feeder with a capacity for high rumen fermentation rate; hence it ' s ability to utilize poor quality feeds efficiently. A symbiotic relationship thus exists between animal and crop, the buffalo's superior ability for traction in the mud making it the ideal animal for rice cultivation, while its feeding and digestive characteristics enables it to make maximal use of rice straw. In contrast, the goat is highly selective but is able to utilize a wide variety of plants. It is therefore, at an advantage in situations where there is a broad range in the digestibility of feeds but is at a disadvantage when crop residues constitute the main feed source. Monogastrics are also discussed in relation to available feed resources, but unlike in the case of ruminants, their feed requirements are such that significant interactions with crops do not exist. The author concludes by making a plea for cooperative efforts between plant breeders and animal scientists to optimize crop/livestock integration in the tropics.

SUCCESSFUL TRANSFER OF FROZTN N'DAMA EMBRYOS FROM THE GAMBIA TO KENYA. 1986. T. Jordt, G.D. Mahon, B.N. Touray, W.K. Ngulo, W.I. Morrison, J. Rawle and Max Murray. *Tropical Animal Health and Production* 18:65 - 75.

Since our news item in *Animal Genetic Resources Information* issue 4 (1985) on attempts to use the embryo transfer technique to introduce the N'Dama breed to Kenya from The Gambia, a full account of the procedure adopted has been reported. The donor N'Dama cows used in this study were purchased from farmers. As they did not have reproductive histories, selection was made on the following criteria: having a calf at foot; possessing typical N'Dama phenotype; being young; and being clinically healthy. Since the animals were in anoestrus, oestrus was induced using intravaginal progesterone releasing coils (PRID) after which they were subjected to hormonal programming using either pregnant mare serum gonadotrophin (PMSG) or follicle stimulating hormone (FSH) for superovulation. The response to PMSG was superior to FSH. Of 26 N'Dama cows programmed, only 7 animals produced embryos, a success rate considerably lower than that obtained in exotic breeds (60-70 percent). However, the mean number of embryos per cow (4.3) was similar to that in exotic breeds. The embryos were cryopreserved for over a month in The Gambia before shipment. In Kenya, 29 embryos were thawed and implanted into Ig Boran heifers, seven days after oestrus induction with Prostaglandins. Eleven pregnancies were established, from which 10 live calves were obtained (with one abortion).

This study has demonstrated the feasibility of using embryo transfer technique to introduce N'Dama cattle to other countries by procedures other than by live animal transfer. However, the results obtained, even after careful attention to selection of donors and recipients and with skilful handling were lower than those obtained in developed countries. It is not therefore a procedure that can be practised routinely and as the authors point out "successful outcome depends on the availability of properly selected donors, access to sufficient numbers of suitable surrogate mothers and the presence of trained manpower".

AN ANIMAL SCIENCE PERSPECTIVE ON CROP BREEDING AND SELECTION PROGRAMS FOR WARM CLIMATES. 1986. R.E. McDowell. Cornell International Agriculture. Mimeograph 110. 20p.

Crop residues and haulms of leguminous crops are an important by-product of crop agriculture in many areas of the tropics. By their very definition, they tend to have a low opportunity cost and although they are sometimes incorporated in the soil to enrich the soil microfauna and flora, by far the most important use for them is as dry season feed for ruminants. The importance of crop residues in the tropics can be gauged from the fact that in Africa crop residues constitute over 90 percent of the total agroindustrial by-products utilizable as animal feed and that in India and Pakistan, crop residues provide over 70 percent of the feed for cattle and buffaloes. Again, 40 to 80 percent of the livestock in the tropics are associated with mixed crop/livestock farming systems, emphasizing the need to develop appropriate strategies to utilize crop residues for animal feeding<sup>4</sup>

A great deal of research has been done on procedures to improve the nutritive value of crop residues involving alkali treatment or supplementation with oil seed cakes or leguminous forages. However, there is little published information on the impact that current crop breeding programmes have on livestock. This is the theme of this mimeograph. An attempt has been made to highlight the dangers inherent in the present crop improvement programmes by plant breeders whose interests lie solely in grain production. The associated effects observed with this approach on crop residue production have included the following: low yield, poor ratio of leaf to stem, low palatability, and most important of all, poor digestibility. The digestibility of some of the improved varieties of cereal grain crop residues is about ten or more points lower than that of traditional varieties (42-56 percent). There is thus a reluctance on the part of crop/livestock integrated smallholders to accept new high yielding varieties because of the concomitant detrimental effects on crop residues, so important for their livestock. The research activities of a number of international research institutes in the area of varietal differences in crop residues are reviewed and these seem to indicate that there is no real antagonism between high grain yields and good

quality straw. The author has made a convincing case for including crop residue qualities in the overall selection programme for grain production in the tropics.

**ANIMAL GENETIC RESOURCES IN AFRICA.** Working papers presented at the Second OhU Expert Committee Meeting on Animal Genetic Resources in Africa held in Bulawayo, Zimbabwe, 24-28 November 1983. OAU/S7RC/IBAR, Nairobi.

Establishment of regional data banks is an important component of FAO's program in animal genetic resources conservation and management. In order to develop a methodology for data banks of livestock breeds, FAO entered into contracts with different groups, one of which was the Interafrican Bureau for Animal Resources (IBAR) of the Organization of African Unity (OAU). The approach adopted by IBAR was to obtain reviews by national animal scientists on indigenous breeds that are either of high potential in the different ecological zones of Africa or those threatened with extinction. This book contains reviews of such breeds of cattle from Sudan, Kenya, Ethiopia, Nigeria, Botswana, Zimbabwe, Malawi and Swaziland and of small ruminant breeds from Morocco, Egypt, West and East Africa and Zimbabwe. The data on cattle describe the ecological zones where the breeds are found, their physical characteristics, production parameters for reproduction, growth and milk and special attributes such as those relating to disease resistance. With the exception of the review of cattle breeds of Zimbabwe, all other articles are on single breeds and therefore do not present results on comparative performance. In contrast, the reviews on small ruminants present results of multibreed comparisons, although in many instances, such results are merely collations of data obtained at several locations.

The book has a lot of information on domestic ruminant genetic resources of Africa. The authors have drawn on material from both published and unpublished reports and the reviews therefore provide up-to-date information on the breeds reported. On the basis of the presentations, a number of breeds have been identified as of high potential for the different regions. There are N'Dama, white Fulani, Azaouak, Gudali and Kuri for West Africa; Boran, Kenana, Butana and Sahiwal for East Africa; and Tuli, Nguni and mashona for the South African region. The breeds recognized as being endangered are muturu, Lagune and Pabli, all of which are trypanotolerant.

The book is a useful contribution to the information on animal genetic resources in Africa but its value is marred by poor editing-and printing.

**GENETICS AND ANIMAL BREEDING. PART A. BIOLOGICAL AND GENETIC FOUNDATIONS OF ANIMAL BREEDING. PART B. STOCK IMPROVEMENT METHODS.** 1982. J. meciejawski and J. zieba, J. Elsevier Scientific Publishing company, Amsterdam.

This book is a translation of a textbook written in Polish in 1975, and although the intended readership is not defined, it should comprise college and university students and teachers. The treatment of the subject of genetics and animal breeding is fairly standard and readers in other parts of the world should therefore also benefit from it. The book is written in a manner that could be easily assimilated by even those without a prior knowledge of genetics or statistics. The background demanded, apart from relevant biological knowledge, is only some familiarity with elementary mathematics.

The first part of the book has two major sections - One dealing with basic information on animal production and biological processes and the other on the fundamentals of heredity. The former gives a useful introduction to those unfamiliar with animal production, but animal scientists may find some sections fairly elementary. The introductory chapter dealing with evolutionary aspects is perhaps the best in this section and gives the reader a clear insight into the role of animal breeding in transforming wild animals into present day domesticated types. The second section on the fundamentals of heredity has standard chapters, although the value of the book to animal breeders would have been greater, had more examples been chosen from livestock. Thus, in discussing chromosomal translocations, no mention is made of the translocation in many breeds of cattle nor is the effect of translocations on embryonic viability discussed. Similarly,

breed variability in resistance to diseases caused by parasites is discussed without mentioning obvious examples such as the resistance to trypanosomiasis by breeds such as the N'Dama or the tick resistance of zebu cattle.

The second part of the book carries the title "Stock Improvement Methods" giving the impression that it includes chapters on animal improvement programmes for various species of livestock. However, it is devoted almost entirely to an exposition of population genetics. In comparison with standard texts on population genetics such as Falconer's "Introduction to quantitative genetics", some chapters in this book may be considered rather inadequate for the advanced student. For example, each chapter carries equations for calculation of genetic estimates, but the manner in which these are derived is not explained. There are also omissions of some important topics. Thus, the reviewer could find no reference to genetic correlation, and genotype-environment interaction was mentioned only in passing, in the context of selection limits.

All considered, in spite of minor deficiencies, this book is a useful addition to the literature on animal genetics and should be particularly valuable to undergraduate students. The subject matter is dealt with lucidly and there are many worked examples. The text is very well laid out with excellent illustrations. Each chapter ends with a number of questions and problems while an extensive glossary in each of the two parts of the book clearly explains the terms used in the text.

---

## REPORT OF MEETINGS

### FIRST WORLD BUFFALAD CONGRESS

Recognizing the importance of buffaloes in the livestock industry of many Asian countries, the 5th World Conference on Animal Production held in Japan in 1983, convened a pre-conference symposium on the “Current developments and problems in swamp buffalo production”. It is therefore heartening to note that now a World Congress has been held, devoted entirely to the buffalo. The congress was held in Cairo, Egypt from 27-31 December, 1985 and was organized by the Egyptian Veterinary Association for Buffalo Development in collaboration with the University of Florida, Gainesville, USA. It had as its theme: “New Strategies for the Improvement of Buffalo Production for Human Welfare”. The scientific programme included symposia on the following topics: World Buffalo Patterns; Existing Production Systems and Improvement Strategies; Genetics and Breeding; Endocrine Control of Reproduction; Reproductive Pattern in the Buffalo Cow; Economics and Socio-economics of Production; and Diseases of Economic Significance. Among the papers on breeding and performance traits presented during the plenary sessions and symposia were the following: Classification and evolution of the domestic water buffalo (T. Kashiwabara and H. Mori, Japan); Genetic potential of the Bulgarian buffaloes and their future prospects (Tz Hinkovski and A. Alexiev, Bulgaria); Biological potentials of the Egyptian water buffalo (M.R. Shalash, Egypt); Breeding strategy for improving milk production of buffaloes in India (A.K. Chakravarty and V.D. Mudgal, India); modern developments in buffalo breeding (P. mahadevan, Australia); Genetics of buffaloes in the world (O.P. Sharma, India); Work efficiency in buffaloes (N.S. Ramaswamy, India); and Reproductive potential of Egyptian buffaloes (M.R. Shalash, Egypt)

The Congress approved several resolutions, one of which stressed the importance of training in modern techniques of conservation, breeding and upgrading and recommended that priority be given to the establishment of international germ plasm banks.

An International Buffalo Federation was also founded with Professor M.R. Shalash of Egypt as its first president and offices at the National Research Centre of Dokki, Cairo, Egypt.

The next congress is to be held in India in 1988.



---

## NEWS ITEMS

### STRAIN DIFFERENCES IN TRYPANOTOLERANCE AMONG BORAN CATTLE

Boran cattle from East Africa, in common with other *Bos indicus* breeds are believed to be susceptible to trypanosomiasis, in contrast to the West African *Bos taurus* breeds such as the N'Dama or the West African Shorthorn. Recent work has, however, shown that there are strain differences within the Boran breed in trypanotolerance. A Boran type bred by the orma tribe in Kenya has shown markedly superior tolerance to tsetse fly challenge when compared in the same environment with an improved Boran strain. The Orma type of Boran not only had a lower trypanosomiasis infection rate, but infected animals also suffered less from anaemia and mortality. This interesting observation may lead to possibilities of cattle production using the larger *Bos indicus* strains in the tsetse infected humid zones of Africa, an area that is underutilized in terms of large ruminant production.

### HYBRIDS OF GAUR AND DOMESTIC CAME

The gaur (*Bos gaurus*) is an inhabitant of the hill forests of the Indian peninsula. Successful crossing of the gaur with domestic cattle has taken place accidentally in a government farm in southern Malaysia into which a male gaur had strayed from the adjoining jungle. The discovery that the gaur had bred some of the cows was made when calves were born that were different from the usual types obtained. The growth rate of the hybrid calves up to six months of age was nearly 70 percent greater than normal calves. In addition, the hybrids had extra muscling in the hind quarters, a trait most likely inherited from the gaur. The females have a diploid chromosome complement of 62 and therefore it is likely that at least the females should be fertile. Other traits of the gaur that may be exploited to advantage are possibly those associated with hardiness and disease resistance. The gaur is an endangered species with the population in the world amounting to only a few thousand animals. Hybridization may therefore offer a means of conserving the useful qualities of this breed. (Adapted from *Ceres* 105: No. 3)

### INTEREST IN SOUTH AMERICAN CAMELIDS

Increasing interest is being shown in Peru in increasing the number of llamas (*Lama glama*) and alpacas (*Lama pacos*). The two species are well adapted to survival in the highlands. They have soft, padded feet which do not break the ground like a sheep's hooves and they make very efficient use of the extremely poor highland forage. The long, fine wool of the alpacas is highly prized by the textile industry. Llamas are a good source of wool, meat and milk. Their hides have a variety of uses and even the faeces are useful, providing a source of energy in the mountainous areas. The local people are being encouraged to adopt proper weaning and culling practices and to use shears instead of knives for shearing. These practices have helped to increase the productivity of llamas from 30-40 young/female in 1970 to 60-70 at present. A further impetus to the raising of these animals may follow from the interest being shown by other countries to raise them. New Zealand has decided to import these animals from Canada and the United Kingdom and is presently studying animal health conditions to be met by importers.

Recognizing the international importance of these camelids, Peru has recently established a Scientific Information Centre on South American Camelidae with headquarters at the Research Centre of Veterinary Research Institute for Tropical and High Altitude Research, Universidad Nacional Mayor de San Marcos, University of Lima, P.O. Box 4270, Lima, Peru. Its purpose is to serve as an information and documentation centre on these species of animals to interested persons within and outside the region. The centre will welcome scientific material and other information from those working on the South American camelids.

## **FERAL GOATS ARE NOT A NUISANCE**

The contempt for feral goats in New Zealand has disappeared with the recognition of potential benefit from these animals. It has been found that about 80 percent of these animals have mohair and cashmere which are much more valuable commercially than sheep's wool. Top grade cashmere can fetch more than \$80 a kilo and in addition, there is currently a worldwide boom for mohair.

Fibre is, however, not the only reason for the feral goat's popularity. These animals have been observed to thrive in areas infested with a shrub called "gorse" which is difficult to eradicate. This woody legume, shunned by other animals, is liked by goats and as a result, farmers have found it advantageous to have mixed farms of sheep and goats. Not only do the goats provide extra income but by clearing the land of gorse, they also increase the grazing area for sheep.

## **RARE BREED CENSUS IN THE USA**

The American Minor Breeds Conservancy (AMBC), a non-profit group based in Pittsboro, North Carolina has recently published the results of a comprehensive census of Canadian and U.S. livestock breeds. It reported that about 80 of American 160 livestock breeds and 25 of its 60 major poultry breeds are endangered. In order to develop a comprehensive list of livestock breeds and identify those that are in danger of extinction, a Rare Breeds Rescue Programme was also launched. To qualify for inclusion as an endangered breed in this program, the breed must have been recognized in North America at least since the turn of the century or represent a breed which has a small genetic base worldwide. Such minor breeds have been classified into four categories depending on the number of individual registrations per year. Definition of these four categories are as follows:

**Watch:** Breeds whose registrations over a 25 year period have shown a steady decline or where registrations are less than 5000 per year.

**Minor:** Cattle, sheep, goat and horse breeds with less than 1000 registrations per year. Pig breeds with less than 200 registrations per year.

**Feral:** Stocks known to have been running wild for at least 100 years with no known introductions of outside blood.

**Rare:** Cattle and horse breeds with less than 200 registrations per year. Sheep, goat and pig breeds with less than 500 registrations per year.

Among the cattle breeds classified as "rare" is the milking Devon that arrived in the New World with the Pilgrims in the 17th century. However, Texas Longhorn cattle that were considered endangered some years ago are now not even in the "watch" category. There were only two herds about 15 years ago, but with the "rediscovery" of the breed for its adaptability to the Texas plains, it has now increased in number considerably.

One of the interesting pig breeds that is seriously endangered with only two herds of 30 sows is the Carolina mule-foot hog whose single hoof on each foot makes it adaptable to concrete floors that cause soreness among other breeds. The Tamworth breed has also decreased in numbers to warrant inclusion in the "Minor" category.

The AMBC has argued that, unlike European countries, the US does not have a national programme to conserve rare breeds of livestock. It has therefore urged that as a beginning, a national semen bank for rare breeds be established which should later complement a national strategy of conservation of live populations.