NOTA BREVE

ECONOMIC ASPECTS IN THE CONSERVATION OF INDIGENOUS BREEDS IN ANDALUSIA

ASPECTOS ECONOMICOS EN LA CONSERVACION DE RAZAS AUTOCTONAS DE ANDALUCIA

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SUMMARY

In this paper an evaluation in dollars of the cost of the Andalusian rare indegenaus breeds conservation by several methods is presented.

It constitutets a preliminary aproach to the development of conservation and preservation planes from the official and privates institutions.

In this study we include seven cattle breeds, four sheep breeds, and three goat breed.

RESUMEN

En este trabajo se presenta una evaluación en dólares del coste de la conservación por diversos métodos de las raza minoritarias indígenas Andaluzas.

Esto constituye una primera aproximación a el desarrollo de planes de conservación y preservación desde las instituciones públicas y privadas.

En este estudio incluimos siete razas bovinas, cuatro razas ovinas y tres caprinas.

INTRODUCTION

It is difficult to asses the financial profits from genetical conservation of rare breeds (Smith, 1984) because the impossibility of the prediction of future needs.

The expected profit for one year was proposed by this author with the function:

$$B=P(R-R_o)-n\ C$$

Where:

P: Possibility of a better profit from the conservation herd than the original herd.
R: Earnings from the conservation herd.
R_o: Earnings from the original herd.
n: Number of herds for conservation.
C: Cost of each herd conservation.

Smith takes into account the following factors:

1.- Total value of the market.
2.- Cost of the conservation.
3.- Proportion in the future commercial production of the conservation herd.
4.- Proportional profits in the economic efficacy with respect to the commercial breeds.
5.- Number of years necessary to reach the commercial use.
6.- Length of the utilization period.

The main problem with the farming of rare breeds is the change with time of the conditions of production and requirements. The maintenance of the genetic diversity is an obligatory factor to guard against these contingencies.

This strategy is only possible if the cost of the conservation is low in relation to the value that the herd will reach in the future, if it contribute to the economic efficiency of the production, as we have pointed out.

Uncertainty about future production and marketing conditions is rife in undeveloped countries, that is why the profits are higher in developed countries. But in undeveloped countries the adaptation of autochthonous herds to hard, local conditions can be donsidered as being commercially viable because of their productive efficiency in these areas.

The cost of the different conservation methods (live animals, frozen semen, frozen embryos) have been calculated following the Brien *et al.*(1984) and Maijala (1987) data. The herd size has been calculated taking into account the census observed and the consanguinity increasing (AF) for each generation, in function of the herd size (Gowe *et al.*1959), observing the Brem *et al.* alternatives in function of the type of reproduction (Random, with constant family size,etc...):

$$AF= \frac{3}{32Nm} + \frac{1}{32Nf}$$

Where:

Nf= Number of females.
Nm= Number of males.

In the present paper we have followed three objetives:

- To compare from an finantial point of view the diverse conservation methods for each breed to determine which gave better profits.
- To predict the future finantial profits with the decision to conserve a determined breed with each method.
- To determine the finantial incidence of the number of conservation herds necessary.

A.- GENETIC-FINANTIAL ANALYSIS OF THE NUMBER OF CONSERVATION HERDS.

We have used the Smith (1985) function:

$$K_5= K(x+(1-x)\ n^{-0,5})$$

Where:

K_5= Measurement of the discount considering five herds to be conserved.
K = Original measurement of discount for uncertainty.
x = % of uncertainty impossible to

Table I. *Conservation cost for diverse methods in the breeds Negra Andaluza, Berrenda en Negro and Berrenda en Colorado of cattle.* (Coste de la conservación por diversos métodos en las razas bovinas Negra Andaluza Berrenda en Negro y Berrenda en Colorado).

Methods	Nº of animals necessary for each herd	Required time. (years)	Cost for each herd ($)	
			Initial	per annum
Population of live animals (2 herds)	5 males 25 females		20000	7500
Frozen semen (500 doses)	25 males	10	1250	250
Frozen embryos (100 embryos)	25 males 25 females	2	15000 females	250
			1250 males	250

eliminate with the increase of "n".
n = Number of herds.

With our proposal, with the selection of five bovine herds the K_5 could pass from 1 to 0,2.

For the calculation of the number of animals for each herd, we have used the function of Hill (1972):

$$\frac{1}{8\,L^2}\left[\frac{1}{m}+\frac{1}{f}\right] = 0{,}005$$

Where:

L= Mean interval between generations.
m= Number of males.
f= Number of females.

In our case, the amount of 5 males and 25 females could adjust very well to such function, with L= 2.

In sheep, based on the function cited, with L=1, we propose herds of 25 males and 60 females herds.

Table II. *Cost of the different conservation methods in the Cárdena, Pajuna, Murciana and Mostrenca breeds.* (Coste de los diferentes métodos de conservación en las razas bovinas Cardena, Pajuna, Murciana y Mostrenca).

Methods	Number of necessary animals per herd	Required time (years)	Cost for herd ($)	
			Initial	per annum
Population of live animals	3 males 20 females		17500	5750
Frozen semen (450 doses)	25 males	10	1130	2250
Frozen embryos	20 males 20 females	2	13500 males	2250
			1130 females	2250

B.- COST DETERMINATION OF THE CONSERVATION SYSTEMS IN AUTOCHTHONOUS ANDALUSIAN BREEDS ENDANGERED WITH EXTINCTION.

Observing the total bovine census, we could use at least the following reproducer by each breed with a top-crossing reproduction:

- In Negra Andaluza (N.A.), Berrenda en Negro (B.N.) y Berrenda en Colorado (B.C.). **10 males and 50 females.**

- In Cárdena (C.), Murciana (M.), Pajuna (P.) and Mostrenca (Mn.). **3 males and 20 females.**

In the first case, the consanguinity could reach 1% by each generation, obtaining a consanguinity coefficient in ten generations, Ft= 9,6% . In the second case, the increase of consanguinity by each generation will be AF=3-4%, which determine a Ft nearing the 30%.

Following the Brem´s (1988) recommendation about the repercussion of consanguinity on infertility, the amount in the first case is not danger, but in the second case it is at the danger limit.

In sheep and goats, the stocks of males and females are sufficient for the organization of conservation herds.

Tables I and **II** show the conservation costs by different methods for both groups of bovines.

Table III shows the conservation cost for sheep and goats, but the technical possibilities for embryo transference in goats makes its use impossible as conservation method in this species.

Table III. *Cost of the conservation with diverse methods in the sheep and goat breeds studied.* (Coste de la conservación con diversos métodos en las razas caprinas y ovinas estudiadas).

Methods	Number of necessary animals per herd	Required time	Cost for each herd ($)	
			Initial	per annum
Population of live animals (2 herds)	25 males 60 females		13000	4500
Frozen semen (750 doses)	25 males	3 years	2250	375
Frozen embryos (150 embryos)	25 males 25 females	6 months	15000 females	250
			7250 males	250

The cost per annun for live animal population maintenance has been estimated by the difference between the income from commercial breed herds and the income from endangered breeds herds. We have estimated a cost per annun of 250 $.

We have calculated that the cost for each dose of semen obtained is 2,5 $, and its maintenance cost 0,5 $. 5 generation, at least, would be necessary, of top-crossing for the breed recovery.

The obtaining cost of frozen embryos would be 150 $, and their maintenance cost 2,5 $ per annun.

C.- FINANCIAL PROFITS FROM CONSERVATION.

Using the Smith (1984) function, cited previously; with five bovine herds, conserving frozen embryos and semen, if we presume a future substitution of 50%, this will correspond to a posibility of future utilization P= 0,0450, and fixing 20 years in the establishment of this use, we will need a financial efficiency of at least 2% for making any profits.

If the efficiency reaches 5% upon the commercial breeds, the profit could reach 20.000 $ per annum. This amount would multiply by 6, if we used frozen semen, and could decrease slightly if we conserved herds of live animals.

For sheep and goats, if we calculate the profit in the same way as for bovines, using 10 herds for frozen embryo conservation, presuming a future substitution of 50%, and P= 0,12%, for 20 years, we will need an finantial efficiency of 6%, for profit making.

The efficiency would be similar if the conservation method were of live animals, and would be less using frozen semen as conservation method.

REFERENCES

Brem, G., F. Graf, y H. Krausshich. 1984. Genetic and economic differences among methods of gene conservation in farm animals. In: *Livest. Prod. Sc.* n° 11, p.p. 65-68.

Gowe, R.S., A. Robertson and B.D.H. Latter. 1959. Enviroment and poltry breeding problems. Thesing of poultry control strains. In: *Poultry Science* n°38, p.p. 462-471.

Hill, W.G. 1972. Estimation of genetic change. I. General theory and desing of control populations". In: *Animal Breeding Abstrac* n° 40 p.p. 1- 15.

Smith, Ch. 1984. Genetic aspects of conservation in farm livestock. In: *Livest. Prod. Sc.* n° 11, p.p. 37-48.

Smith, Ch. 1985. Scope for selecting many breeding stocks of possible economic value in the future. In: *Anim. Prod.* n°41 p.p.403-412.

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