ACTIVITY IN THE FIELD OF GENE VALUABLES CONSERVATION OF GENETIC RESOURCES IN FARM ANIMALS IN CROATIA

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Abstract

The main varieties of livestock in Croatia are represented by a very small number of breeds and strains. So far the work on improvement has neglected the biological variety as a basis for successful and satisfactory national cattle production for a longer period of time.
In Croatia about twelve autochtonous breeds and strains are seriously endangered. Since 1984 there have been attempts at organising their systematic protection. But a full national programme of protection and utilisation of valuable autochtonous animals does not exist. Regional programmes and individual activities show certain successes. Scientific background to the national protection programme is the project "Genetic Polymorphisms and Gene Collections of Domestic Animal Breeds in Croatia" (1990) and the published papers from this field in the last ten years.

Key words: Biological variability, autochtonous breeds, genetic pool, gene frequency, "fitness" characteristics, protein polymorphism.

Introduction

Improvement of farm animals in Croatia in the last five decades considerably neglected many breeds and strains. Preferring a small number of more productive breeds (here "breed" is used in a biological sense rather than as a genetic term), the general genetic pool was not considered, i. e. all the animal variability.

By gradual disappearance of a significant part of biological variability the ecological balance is disturbed thus making it more difficult to satisfy the needs for more food, the development of viable agriculture for various human needs.

The present day livestock production in Croatia is based on three breeds of cattle, two breeds of horses, three to four breeds of sheep and three breeds of goats. This is quite contrary to the FAO definition of global management of genetic resources in domestic animals (Hammond, 1994): not to create universal animals (1), to stop destroying breeds (2) and to consider "fitness" characteristics (3). The tendency in the Croatian livestock breeding for monoculture is questionable if we consider that with a small number of preferential breeds no significant productivity can be achieved.

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The gene valuables in farm animals

In livestock production in Croatia the main branches are cattle and pig farming followed by horse, sheep, goat and poultry farming.

Cattle breeding: there are the three active breeds: the Simmental, the Brown Swiss and the Holstein-Friesian. The three particularly endangered breeds or strains are the Istrian cattle (50-60 females), the Slavonian-Syrmian Podolian (20-30 females) and to a smaller degree the Grey Dalmatian cattle (300-400 cows). The Lika Buša has been destroyed to such an extent that we can say it has become extinct.

Horse breeding: there are two active breeds; the Croatian cold- blooded and the Lipica horse. The autochtonous cold-blooded horse from Međimurje is becoming extinct (there are a few horses of the type) and the autochtonous horse from Posavlje is seriously endangered (there are a few tens of mares).

Pig breeding: includes a relatively large number of good breeds and hybrids. The Šiška and the Bagun from Podravina have disappeared and greatly endangered are the autochtonous breeds from Turopolje (30-40 sows) and the Black Slavonian Pfeiffer pig (20-30 sows).

Sheep breeding: includes modern European breeds in the continental areas the Pramenka in the mountains and the improved Pramenka known as the "sheep from Primorje" in the coastal area. In the coastal belt from Istria to Dubrovnik a few strains of improved sheep have been created: the Istrian, the Cres, the Pag, the Zlarin and the Ruda from Dubrovnik region. The autochtonous Ruda and the Istrian Pramenka should be the subject of urgent protection. The attempt to revitalise the Zlarin sheep is problematical and the Pag and Cres sheep are actively used in farming.

Poultry farming: in intensive production imported lines and hybrids are used but in the country they are generally the domestic hen and the domestic turkey. The best domestic breeding achievements are the recognised autochtonous traits the hen "Hrvatica" and the Zagorje turkey. These breeds should be included in the national programmes of protection and exploitation.

Activities in promoting and protecting autochtonous animals so far

- At the Northern Adriatic Fair in Rijeka the need for protection of the Istrian cattle emphasised (Caput, 1984).
- At the Third Yugoslav Congress on the reproduction and animal breeding in Umag an appeal for protection of autochtonous breeds in Croatia (Caput et al., 1986)
- The project to build the Centre for Breeding the Istrian Cattle, made in Buzet in 1987.
- The selection programme "Istrian Cattle" accepted by the Ministry for Science in 1988. The first stage carried out between 1988 and 1990.
- The Association of the Istrian Cattle Breeders (SUIG) established in 1989 and the Agroprodukt Buzet registered for Herd-book of the Istrian cattle.
- The workshop "Protection of endangered breeds of cattle held in Buzet (Gašpert, Caput, 1990).

- Cofounders of the Danubian Countries Alliance for Gene Conservation in Animal Species-DAGENE (Bugatzppuszta) (Caput, 1989).
- Participants at the DAGENE meetings in Krems (Caput, 1990.), Üllö, (Caput, Posavi, 1992) and Košice (1993).
- With the national project "Genetic Polymorphism's and Gene Collections of Domestic Animal Breeds in Croatia" (1990) a systematic follow-up of gene frequency for some breeds and the basis for efficient protection programmes was started. (Caput et al., 1993).
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Three investigation stages have been planned:

I Defining populations and creation of nuclei ("in situ") and gene banks ("ex situ").
II Genetic polymorphism's and mapping of breeds, traits and types of varieties.
III Interaction of genotype - environment of the productive and reproductive characteristics. Effects of applied genetics and cross-breeding of autochtonous breeds with new ones.

Analysis of the current state in the population (number, owners, endangerment and others) has been made for the Istrian cattle, the Slavonian podolian, the Dubrovnik sheep (ruda), the Pag sheep, the Turopolje pig, the black Slavonian pig, the hen Hrvatica and partly the Istrian pramenka and the cold-blooded horse from Međimurje. The autochtonous breeds have been promoted in the world (Global data bank in Hannover, (Simon, Buckeneuer 1993), FAO/UNEP World watch list, FAO Animal report, DAGENE - symposias and workshops in Krems, Budapest Üllo and Coventry), as well as in our country (HRT - "Znanstveno ozračje", 30 Sep, 1993, a series of articles in the periodicals Stočarstvo, Agronomski glasnik and others and at meetings of the HAD, HED and others). We have succeeded in securing permanent financial support for breeders of the podolian cattle by the law on premiums for cattle breeders in Croatia (Buzet, Višnja, Žminj, Lemeš). In the period from 1991 to 1993 in investigating genetic polymorphisms cca 1500 analyses on Istiran and Slavonian podolian cattle were carried out. Some of the results have been published in the above mentioned periodicals and a considerable part is the subject of a doctoral dissertations entitled "Relationship of genetic polymorphisms of blood and milk protein with the characteristics of the Croatian Simmental". In establishing "Gene collections" the following has been done: the nucleus of the Istrian cattle has been established (Buzet, Višnjan, the Slavonian - Syrmian podolian (Lemeš), and the pig from Turopolje the (Zoo, Zagreb); the semen of the Istrian bulls has been frozen. The establishment of collections is primarily determined by available funds. So far the financial support has been given by the Ministry of agriculture and forestry of the Republic of Croatia and the international foundation "SAVE".

In defining breeds and genotypes we have been using variability evaluations of morphological, functional and genetic characteristics (Posavi, 1994). Genetic characteristics are less prone to influences of selection and environment and are thus more reliable in establishing genetic structure, relationship and phylogenetic changes.

There have been no systematic investigations of protein polymorphism of domestic animals in our country so far. Therefore one of the primary tasks in the project is to study the current methods of work in this fleld.

Degrees of homozygosity will be estimated on the basis of the established frequencies.

In storing semen and embryos methods of dilution and freezing in liquid nitrogen are applied. Bull sperm freezing is a routine work and methods are being developed for other species. The methods of obtaining embryos and their storage are being accepted. In the initial phase of our project (until 1995) freezing and transplations of embryos have been planned. Establishing gene collections in the natural form the accepted techniques are those which take into account free keeping natural service, avoiding incest, preventing gene frequency below 1%, economic exploitation of animals and others.

We are also doing initial work on a complete national programme of protection and utilisation of endangered autochtonous breeds according to the FAO and EAAP recommendations. (Caput, 1994).

Our recent activity, in collaboration with our colleagues from the Danubian countries was the organisation of the "Third International DAGENE - Symposium" within the planned rhythm of our regular meetings and discussions.

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