

Report of *ex-situ* conservation status of farm animal genetic resources in the Republic of Croatia

Ivanković Ante*, Ramljak Jelena*

Native and protected breeds of domestic animals represent Croatian heritage with value visible on the economical, social, natural and cultural level. In the Republic of Croatia are registered 26 native and protected breeds. Some of the native breeds arrived from other regions as a consequence of industrialisation and globalisation of husbandry, thus they need to be under the observation of expert and wider community, and if the need occurs, protected adequately. Main reasons for the disappearance of one part of native breeds in the Republic of Croatia are: globalisation, economic power concentration, change of agricultural production systems (industrialisation), use of mechanisation in crop rearing, decrease of available pastures, natural disasters, diseases, inadequate selection, uncontrolled import of exotic breeds, depopulation and urbanisation of rural areas. Therefore, **"The National programme for protection of native and protected breeds of domestic animals in the republic of Croatia"** was adopted in March 2010. Some of the goals of the National programme are: supporting transparency and defining competences in activities of protection of native breeds (state institutions, non-governmental organisations, institutions, private sector), development and monitoring implementation of *in-situ* and *ex-situ* conservation programmes for protection of native breeds, development of the model for protection of native breeds in sustainable use systems, development of the model for protection of native breeds within natural habitats anagement/protection, and development of cooperation on national, regional and global level.

In Table 1 is an overview of native and protected breeds, population size, categorisation in relation to endangerment level, trend estimate and efficiency of in situ programmes. It shows that in Croatia there are 5 critically endangered breeds, 6 highly endangered, 4 potentially and 11 not endangered breeds. The preservation of native and protected breeds of domestic animals can be implemented through two methodological approaches: preservation in the original environment (*in-situ*) and preservation outside the original environment (*ex-situ*). The *in-situ* model for the preservation of the native breeds envisages a creation and implementation of an adequate breeding programme, including mating schemes and productivity monitoring. The *in-situ* model is acceptable because of lower initial investments, its active function in food production (earning revenues), and its ability to maintain population vitality and preserve contact with the environment, thus In Croatia it is developed in several directions: monitoring the size, distribution and structure of the breed, genetic consolidation and improvement of the breed, determination of the economic characteristics of the breed, optimization of

* University of Zagreb, Faculty of Agriculture, Department of Animal Science and Technology, Svetošimunska cesta 25, 10000 Zagreb, Croatia

the production systems and technologies suitable for native breeds, animating the public and promoting the breed. In Croatia there are several good examples of the conservation of traditional breeds in protected areas in Croatia like: Turopoljski lug and Odransko polje, Nature Park Lonjsko polje, Gajna area, river valley Raška and mountain Učka in Istria, mountain Velebit with Lubenovac area. In all of those areas cohabitation among different animal species (i.e. Turopolje pig, Black Slavonian Pig, Croatian Posavian Horse, Slavonian Sarmian Podolian Cattle, storks) and plant species (oak forests, grass of flooded and wetland) by preserving biodiversity. The **ex-situ** models for protection of native breeds suppose protection of live animals (*ex situ-in vivo*), the collection and preservation of tissues acquired from breedable animals, which are then stored in liquid nitrogen (*ex situ-in vitro* or Cryoconservation). The specified segment of the ex-situ model must be integrated into the protection programme, especially of the critically endangered breeds. Croatia is currently collecting feedback information about stocks and material stored in several different institutions (Veterinary Faculty, Center for Reproduction in livestock, etc.) in order to make inventorisation. Up till now semen from native cattle breeds (Buša, Istrian Cattle, Slavonian Sarmian Podolian Cattle) are stored, as well as semen from Istrian sheep. Other genetic material (embryos, eggs, tissue cells) are not collected. Further goal mentioned in The Programm is establishing and integrating gene banks into the existing and new programmes for the preservation of native and protected breeds of domestic animals, establishment of the Gene Bank documentation-information registry, development of methods and capacities for Gene Bank management, and etc. What needs to be done is to establish a Gene Bank, choose the most appropriate location and equipment and, in accordance with priorities, start collecting the adequate genetic materials. The type and quantity of genetic materials (semen, embryos, eggs, and body cells) must be balanced to enable more efficient action taking. After collecting and storing tissue samples of the most endangered breeds, it is necessary to complete the gene bank with an adequate number and structure of genetic materials collected from all other breeds of domestic animals, the native ones in particular. After establishing and completing the gene bank, it is necessary to perform continued monitoring and replenishment of genetic materials while aligning the species, structure and quantity.

The strategy of protection of native and protected breeds of domestic animals implemented in the Republic of Croatia is primarily based on the *in-situ* models for preservation. Competent authorities involved in the protection programmes through condition inventorisation, creation of a Main Register and exterior, genetic and production characterization of breeding as well as breeding organisations will contribute to faster and more efficiency protection on native and endangered breeds in Croatia.

Table 1 Overview of native and protected breeds, population size, categorisation in relation to endangerment level, trend estimate and efficiency of in situ programm

Species	Breed	Number of animals valid for breeding				Effective size of population (Ne)		Categorisation of breed endangerment status	Estimate of the population trend
		Total (*estimate)	Under control			Ne	Ne ^s		
			Male	Female	Young				
Horses	Lipicanac horse	1.224.	177	396	651	489.3	342.5	Not endangered (III)	Stable
	Croatian cold-blood horse	5.334.	203	2.778.	2.353.	756.7	529.7	Potentially endangered (II)	Positive
	Croatian Posavac horse	4.350.	116	1.838.	2.396.	436.5	305.5	Potentially endangered (II)	Stable
	Međimurje horse	37	7	21	9	21.0	14.7	Critically endangered (Ia)	Negative
Donkeys	Istrian donkey	200*	361	1.024	451			Critically endangered (Ia)*	Positive*
	Littoral Dinaric donkey	2.500*						Highly endangered (I)*	Positive*
	North Adriatic donkey	150*						Critically endangered (Ia)*	Stable*
Cattle	Buša	269	16	172	81	58.6	41.0	Highly endangered (I)	Stable
	Istrian cattle	789	21	460	308	80.3	56.2	Highly endangered (I)	Positive
	Slavonian Symirian podolac	171	9	107	55	33.2	23.2	Critically endangered (Ia)	Stable
Sheep	Pag island sheep	30.000*	91	1.919	380	-	-	Not endangered (III)	Stable
	Krk island sheep	15.000*	7	133	12	-	-	Not endangered (III)	Stable
	Lika sheep	30.000*	144	4.349.	1.158.	-	-	Not endangered (III)	Stable
	Ruda sheep	491	30	350	111	110.5	77.4	Highly endangered (I)*	Positive
	Rab island sheep	7.500*	23	608	120	-	-	Not endangered (III)	Stable
	Dalmatian "pramenka	200.000*	295	7.029	811	-	-	Not endangered (III)	Stable
	Istrian sheep	5000*	56	1.775	430	-	-	Not endangered (III)	Stable
	Cres island sheep	15.000*	38	739	119	-	-	Not endangered (III)	Stable
Tzigai sheep	3.500*	56	1.937	856	-	-	Not endangered (III)	Stable	
Goats	Croatian white goat	5000*	2	66	10	-	-	Potentially endangered (II)*	Stable*
	Croatian spotted goat	35.000*	20	435	62	-	-	Not endangered(III)*	Stable*
Pigs	Black Slavonian pig	1.189	78	669	442	279.4	195.6	Potentially endangered (II)	Positive
	Turopolje pig	173	15	130	28	53.8	37.7	Critically endangered (Ia)*	Negative
Poultry	Hen "Hrvatica"	1.000*	-	122	-	-	-	Highly endangered (I)*	Stable*
	Zagorje turkey	-	-	2.151	-	-	-	Highly endangered (I)	Positive
Bees	Grey bee	320.000+	-	6.000	-	-	-	Not endangered(III)*	Stable