

IMPORTANCE OF FARM ANIMAL BIODIVERSITY IN HUMANKIND SECURITY

Marcel Theodor PARASCHIVESCU¹⁾, Marcel PARASCHIVESCU²⁾,
Cristina GARLEA¹⁾

¹⁾Study and Research Center for Agriculture and Forestry Biodiversity – Str. Calea 13 septembrie Nr.13. Sector 1, Bucuresti, România, Cod 050727,

²⁾Academy of Agriculture and Forestry Sciences – Str. Marasti Nr. 61, Sector 1, Bucuresti, România, Cod 011464.

Corresponding author e-mail: marceltheodor@yahoo.com

Abstract:

Humans are live beings. In order to live they need food. Disposing of creative mind Homo sapiens became the top consumer in the trophic chain on the Earth and multiplied faster than their food. Then people have started to cultivate plants and to breed animals to ensure their food. Their struggle for life developed inside human species and conducted to wars which became more and more destructive. The last two World Wars were tremendously hard. So the United Nations' Organization disposing of a Security Council has been made up to secure people against new World Wars. But recognizing that lack of food stays at the wars' origins ONU included a special Food and Agriculture Organization (FAO), dedicated to secure people against famine anywhere on the Earth. On the above basis, the present paper trays to explain scientifically, the importance of farm animal biodiversity for the food security of the world. How FAO acted to sustain farm animal biodiversity is exposed, as well. Some controversial questions and misunderstanding concerning relations between environment protection especially referring to the Earth's global heating and farm animal biodiversity are answered, too. At the end opinions and hopes related to the contributions of the future Conference on the Sustainable Development that will have place in June of the next year and the food security of the World are emphasized. The final conclusions are: natural animal biodiversity secures the biological balance on the Earth; farm animal artificial biodiversity helps human food security and the social sustainability.

Key words: biodiversity, animal, farm, humankind

Introduction

In science like in jurisdiction words must have precise meanings. Then let's clarify the content of 3 terms we have to use in this report which is intended to be a scientifically one. These three terms are: live beings, biodiversity and security.

Live beings are existing things able for metabolism with the surroundings that need food to live and reproduce as genotypes, under their genetic information control.

Biodiversity means the multitude of genetic information species (species = kind of) having support biological populations formatted in nature as biological species through natural selection and evolution. In farming biodiversity is given by artificial populations (breeds and lines) created trough artificial selection.

Security is the feeling of tranquility what animals able of cognitive perception exercise when there is no danger in their habitat.

Then, on this basis, let us try to understand the importance of farm animal biodiversity for the human live beings' security.

MATERIALS AND METHODS

Biological nature of the humankind

Humans are superior animal live beings. In order to exist, to live and to reproduce, they need housing and food.

As superior animals their genetic information can't command synthesis of 7 essential amino acids needed for the proteins of the cells of their bodies. Their organisms have to receive these amino

acids with the food of animal origin (meat, milk, eggs) they consume. Few plants are able to synthesize essential amino acids. They are synthesized mostly by inferior animal species. (Stan Simona et alii, 2011)

A peculiar trait of human physiology is the development of their brain functions ensuring relations of organisms with the environment over cognitive one, up to the superior stage of creativity. Their cognitive information became creative as humans became able to art things, which not exist in nature. That allows humankind to become the dominant biological species on the Earth and the top consumer in the trophic chain of the planet. Par consequence number of people increased and the natural food resources became scarce.

In time humans learned to breed animals, and to cultivar plants, creating breeds and lines of domestic animals or sorts of cultivated plants as artificial biological populations. The created artificial biodiversity allowed people to satisfy their needs for food better than the nature did. Agriculture developed more and more.

Nevertheless people multiplication was faster than the increase of the food resources. Some human communities migrated to other places already populated with humans. The struggle for life started to be directed against other human communities.

Struggle for life of human communities, what means wars, started with the struggle for food. Humankind security got in danger (Stan Simona et alii, 2009). Progress of knowledge concerning needed nutrients for human organisms and of medicine resulted in a longer life hope of people.

People continue to multiply. In the former century a real demographic explosion had place (Figure 1). (Atlas Classique. Pierre Gourou Classiques Hachette)

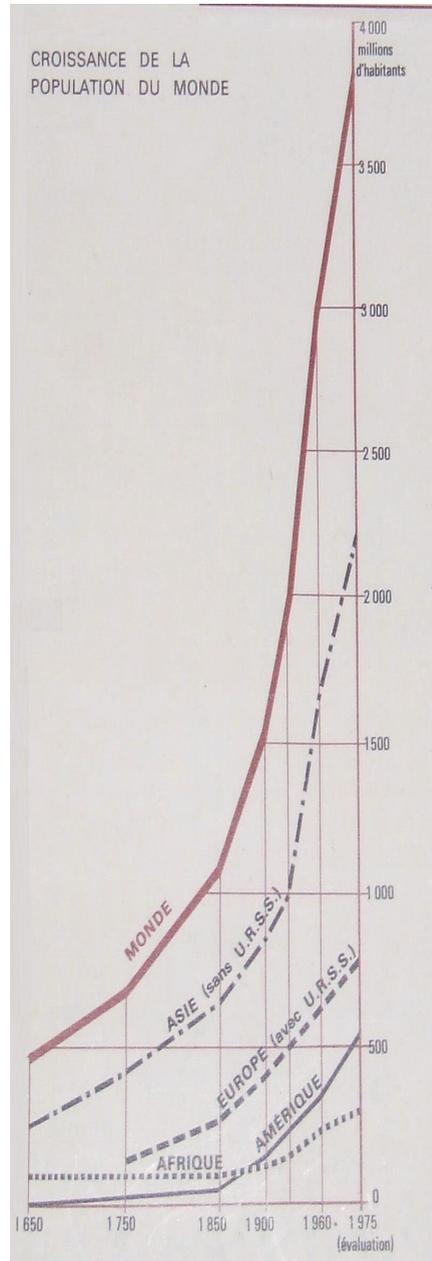


Figure 1. Development of world population

Wars, what in old times were local fights, involved more and more people until they became “world wars”. Par consequence of the demographic explosion of the humankind in the former century some main events related to the humans’ security should be noticed. Firstly two world wars, at less than twenty years interval, have broken out. Secondly intensive agriculture and the industrial farming in animal production were developed. New wanted types of farm animals have been created.

Farm animal biodiversity

From nutritional point of view human species is omnivorous. Humans eat both vegetable and animal food. From food human organism has firstly to receive energy to maintain its basal functions and to complete its biological production depots.

It also needs amino acids for the plastic proteins that ensure the growth of its body and of its progeny and the replacement of the used cells.

The third requirement refers to the chemical macro elements for skeleton formatting and to the micro elements for enzyme synthesis conditioning a normal metabolism.

There is also the need for vitamins, a kind of enzymes that animal organisms have to take in the food because they are not able to synthesize. Vegetable foods ensure energy, macro and micro elements and hydro soluble vitamins. Foods of animal origin ensure energy, amino acids, both kind of elements and lipoid soluble vitamins. Diversity of food helps a good nutrition. It is result of biodiversity of genetic species cultivated by people to producing food (Paraschivescu M.Th. et alii, 2009).

Concerning farm animal biodiversity we must have in view, at first, the natural biodiversity given by the domesticated biological species. These species have been genetically created by natural selection that means a more fertility of the better accommodated live forms to the habitat. The natural biodiversity is

mostly a qualitative one. The organic substances synthesized by different genetic species differ until their molecules’ formulas. Fat substances differ concerning their content in oleic acids’ molecules. Sweet substances differ with their monosaccharide content. Animal proteins are as different as they are engaged in the Major Histocompatibility Complex (MHC), which is one of the main mechanisms isolating the reproduction of biological species. Maternal organisms have to recognize the proteins of embryo before accepting the pregnancy. This kind of diversity is good from the human nutritional point of view.

The number of farm animal species given by the number of genetic information species of farm animals’ ancestors. This number is rather small. There are some species like cattle, sheep, goats, swine, or horses, or poultry, met everywhere on the Earth. These are called eurobiontic because they have a large area where live. Other species, as buffalo, yak, camel, llamas or reindeer are stenobiontic occupying narrow living space.

A higher biodiversity means a larger living area and a chance for more feed resources for the farm animals. (Paraschivescu M.Th. et alii, 2009)

In principle where it is possible to produce food is better to produce food not feed for animals. But there are locations where the vegetable production can’t be used as food. Biodiversity of farm animals helps to use such vegetal organic substances as feed stuffs. Aquatic animal species are very important from this point of view, as well.

On the other hand there is an artificial farm animal biodiversity. Disposing of domesticated animals, humans bred, what means have permitted to reproduce, the ones able to produce over the needs of their origin biologic species. (Paraschivescu M.Th. et alii, 2011).

Such groups of animals, formatted by artificial selection, were kept in closed reproduction by artificial means and became artificial biological populations,

which are called breeds. In time biological production of farm animal breeds increased as effect of artificial selection.

Young animals grow faster and higher daily gain of the body mass was registered. Cows and goats were given more milk. Hens laid more eggs.

In the 19th century England developed meat production in part of cattle and in sheep formatting beef cattle breeds and mutton ewe's breeds.

They were not milked and so they required less labor force. That time England needed labor force to develop industry. Breeding of beef cattle has been transferred in the English colonies. In the North America English colonies took place a specialization of cattle breeds as beef cattle selected to produce good and cheap meat and dairy cattle selected to produce much milk. Applying Artificial Insemination, progeny testing the sire bulls and using MOET biotechnologies that was a success (Paraschivescu M.Th. et alii, 2008).

There are now specialized dairy cows yielding over 30 000 kg of milk per year. The idea of specialized artificial populations extended to other genetic species. In poultry were selected lines to reproduce by crossing them hybrids of laying hens and lines to obtain broiler chicken hybrids.

In order to produce good but cheaper commercial pork paternal breeds or lines with much muscle and fertile maternal breeds or lines to multiply the paternal traits have been selected. In ewes there are breeds for lean mutton, breeds for wool, breeds for pellets and breeds for milk. This kind of artificial biodiversity is continuing in farm animals.

By specializing the artificial farm animal populations breeders decreased evidently the quantity of dry matter feed consumed per production unit. One kg of live weight of pork is obtained consuming less than 3kg of dry matter including the feed consumed by the parents of piglets. A kg of broiler chicken is obtained with less than 1, 5 kg of grains. Similar effects

have been registered concerning egg or milk production.

The explanation of this fact is found in the action of genetic information. Factors determining the quantity of deposited biological production (meat and fat) and of excreted biological production (progeny and milk) are genetically contradictory. Artificial selection for only one of the two kinds of biological production gives way to increase the selected trait and reduce the quantity of nutrients used for the opposite production. (Paraschivescu M.Th. et alii, 2009). That reduces the needed feed per unit of biological production of the desired type. The future trend pertains to the specialized artificial populations of farm animals. Less feed consumed by the farm animals means more food produced for human consumption. That helps the food security of humankind and the social peace.

We can conclude that natural biodiversity of farm animals, the genetic species of ancestor species of farm animals, is helping to ensure more feed stuffs for animals while artificial biodiversity of the bred farm animals (the breeds and lines) or the resulted crosses and hybrids, reduce the quantity of feed consumed for food production.

RESULTS AND CONCLUSIONS

The human need for security

The need for humankind security appeared in the former century after the First World War. Then idea of a Nations' League was promoted by some prestigious politicians, including the Romanian Nicolae Titulescu. The convention was broken by Nazis German Party and after not more than 20 years the Second World War burst out.

This time the number of deaths and the material damages were tremendous and all people understood that there is a need for a security organization.

Thus at 1945 October 24 the United Nations' Organization (UNO) has been founded. Inside UNO a Security Council successfully acted and continues to act preventing wars (Stan Simona et alii, 2009).

Recognizing that at the origin of wars stayed the famines of human communities caused by lack of food, the Food and Agriculture Organization (FAO) has been created inside ONU, from its foundation.

The target of FAO was and remained to fight against famine anywhere on the Earth as a necessity for humankind security.

The food security concept was clearly promoted in 1963 when in Rome FAO has claimed for "the right of anyone to eat as much as its needs are".

That right of individuals is a duty of each state for its inhabitants. Food security is attained when all people have direct access to their food.

That isn't an easy task. In 1925 human population counted 1500 million of souls. In 1960 Earth's population got up to 3000 millions. In 1975 it went to 4500 million and now is over 7000 million. This demographic explosion explains the proclamation.

Afterwards cultivated surface extended in the detriment of natural ecosystems. Woods have been especially affected. Some biological species became vulnerable up to the risk of extinction, a sign of danger for the food security of the future (Paraschivescu M.Th. et alii, 2009).

FAO is a strong and active organization involved in many actions connected with the food security. It received the task of surveillance of biodiversity, as well (Figure 2)

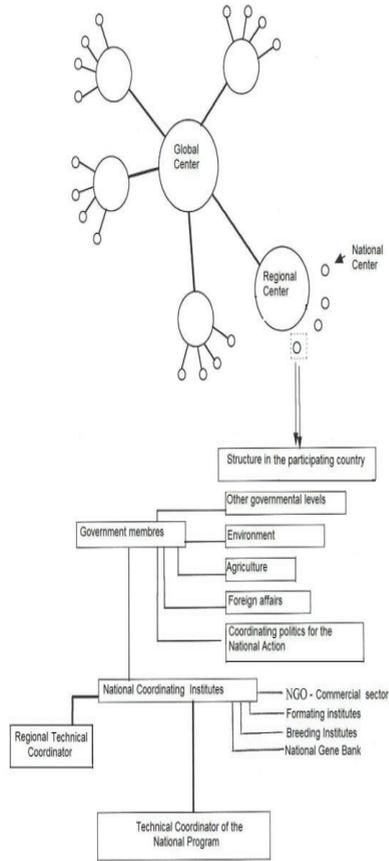


Figure 2. FAO Program structure for Farm animal resources management

The question of animal biodiversity was extended from the wild animals to the farm animals, too. The schedule of the FAO's Management program of Farm Animal Resources exposed above determined the idea of the sustainable development of the world economy what means with human production activities not to show damage to the natural environment.

The sustainable world economy requires to maximally satisfying the needs of the actual human generation without affecting future generations' interests. Environment protection is a basic condition for the sustainable development.

This statement generated the Ecologist social movement dedicated to natural environment protection as civic or political organizations (Paraschivescu M. et alii ,2009).

Unfortunately Ecologist Organizations are not always acting in the favor of the sustainable development of the human society. They limit their action to protecting nature but ignoring human existence, what is dangerous for the world security.

For instance ecologist papers have been published considering that highly producing dairy cattle are causing global heating of the Earth because they are emitting methane (CH₄) as digestion gas out of the concentrated feeds they consume (Jonson E.D.et alii, 1991).

Scientifically experiments with ruminants didn't confirm such hypothesis. More than that other ecologist papers claimed that a greater livestock of cattle will increase the carbon dioxide (CO₂) emission and the green house effect of atmosphere will become more intensive. That is wrong. On the Earth the quantity of Carbon atoms is constant (Paraschivescu M. et alii, 2009). Part of Carbon atoms are blocked underground as diamonds, mineral compounds, coal, oil or natural gases, part of them are stored on the Earth's surface in the organic lifeless substances, and part of them are deposited in the bodies of live beings.

Only the Carbon atoms present in the atmospheric gases CO₂, CH₄, CO and CFC molecules are acting as global heating agents of the planet.

If live beings are less than more Carbon atoms will be free to format gas molecules in the atmosphere.

The true is that no live being, except humans, could cause misbalances on the Earth (Paraschivescu M.Th. et alii, 2011).

Sustainable development and world security

UNO as the world security organization has got to the stage of acting against a very large scale of insecurity sources as: politics of states, terrorism, fishery, food production, energy sources, environment protection and so on. All these targets have conducted together to the sustainable development concept.

The UNO Conference on Sustainable Development that has take place between 4 and 6 June last year, in Rio de Janeiro had two items submitted to discussion:"The Green Economy in the sustainable development and poverty exclusion context" as the first subject and "The Institutional Frame of the Sustainable Development" as the second one.

Green Economy suggests the fact that green plants production is inexhaustible since it is formatted from mineral substances (CO₂, N₃ and H₂O) using sun light energy in the presence of chlorophyll green pigment.

So must be all regenerating inexhaustible production. Example given the energy obtained from hydro-electric power stations is a "green energy", because it is inexhaustible. Aeolian energy, wave's energy, and sun energy deserve to be included in the "green economy" (Paraschivescu M.Th. et alii, 2011).

But green plants are perishable. Desertification caused by global heating of the Earth will decrease the vegetal organic production of natural flora and cultivars. That will cause less feed for farm animals, too. The danger of famine for people will increase.

Reducing the quantity of burned fossil fuel is the only one solution to diminish transferring blocked underground Carbon atoms to atmosphere. Substitution of fossil fuel with Biofuel stops the mentioned transfer of Carbon atoms.

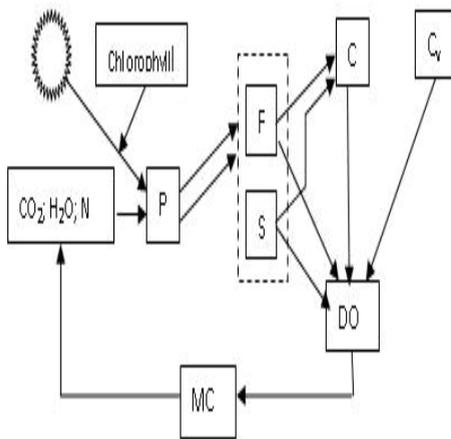


Fig. 3. Primary trophic net (V. Tufescu - 1981)

Nevertheless with Biofuel the chain of gas mineral compounds of Carbon trough organic compounds and again to mineral gas is a short one: atmospheric CO_2 – vegetal organic substance – CO_2 , while the trophic chain is much longer (see Fig.3): CO_2 – first producers of vegetal organic substances – first consumers (phytophagous and saprophagous) – second consumers – top consumers - died organic matter – micro consumers – CO_2 . On the other hand producing Biofuel means reducing food or fodder cultivar areas and, unfortunately, the target of famine exclusion in the world wasn't completed yet.

Not long ago FAO officially declared existing of famine in Somalia. In order to have a good balance between the human population and food resources some actions like birth control and family planning have to be taken, at world level. Let us hope other solutions for the future of human society was be suggested by the UNO Conference on Sustainable Development in June 2012.

More difficult will be the second item of the conference. Specific institution has to be proposed and accepted by the participant states.

Or, there are great differences from state to state concerning resources, scientifically development, and inner

politics and so on, or there are great differences from state to state concerning resources, scientifically development, and inner politics and so on. At the same time many involved phenomenon are global and have no boundaries.

CONCLUSION

Food security is one of the main conditions of humankind sustainability. Famine has to be excluded everywhere on the Earth.

FAO has proclaimed “the right of anyone to eat as much as its needs are” what is a difficult target.

This target requires more animal production. Natural biodiversity of farm animals given by genetic species involved favor to have more fodder production while artificial biodiversity resulting in specialization of breeds allow a more efficient using of feed.

Birth control and family planning could help in balancing human population to the food resources. Increased livestock of farm animals can not contribute to the global heating of the Earth.

On contrary animal bodies are depositing Carbon atoms reducing their presence in the atmospheric gazes (CO_2 and CH_4) having green house effect.

Maine attention has to be paid to reducing fossil fuel consumption because this way large amount of carbon atoms are shifted from the underground depots to atmosphere increasing its green house effect.

In order to sustain humankind security UNO Conference on Sustainable Development has proposed some “Institutional Frame of the Sustainable Development” to be founded.

This time consents on solutions are very important but concluding will be difficult. Let’s hope for the best.

REFERENCES

- Jonson E.D., Hill T.M., Carmean B.R., Branine M.E., Lodman D.W., Ward G.M. 1991, New Perspectives on Ruminant Methane Emission, *Journal of Animal Science*,
- Paraschivescu M., Paraschivescu M.Th., Bogdan A.T., 2009, Carbon Balance and the Atmosphere Green House Effect, Simpozionul „Contribution of scientific research to the progress of veterinary medicine”, Facultatea de Medicină Veterinară, *Lucrări Științifice, Seria C, vol.LV (1)*, pag.175-183, București,
- Paraschivescu M., Paraschivescu M. Th., Bogdan A.T., Stan Simona, 2011, Animal rights and their welfare in concept, laws, actions. Simpozionul cu tema: „Contribuții ale cercetării științifice la progresul medicinei veterinare” F.M.V. București,
- Paraschivescu M.Th, Bogdan A.T, Paraschivescu M., Tobă G.F., Ipate Iudith, 2008, Biotehnologiile de reproducție și biodiversitatea la animalele de fermă - *Lucrări Științifice seria C, Medicină veterinară - pag.382-387*,
- Paraschivescu M.Th, Bogdan A.T, Paraschivescu M., Tobă G.F., Stan Simona, 2009, Biodiversity in farm animals: sources, using, conservation. The 38th International Session of Scientific Communications of the Faculty of Animal Science, *Lucrări științifice, Seria D vol.LII, pag.89-95, U.S.A.M.V. București*,
- Paraschivescu M.Th., Bogdan A.T., Paraschivescu M., 2011, *Generația verde în biodiversitatea zootehnică; diferențe genetice și dezvoltarea biodiversității zootehnice și veterinare*”, C.S.C.B.A.-I.N.C.E, București,
- Stan Simona, Chirițescu Verginia, Paraschivescu M.Th., 2009, Politici naționale și europene privind conservarea biodiversității în spațiul comunitar. Aspecte legislative. *Manifestare științifică „Identificarea, conservarea determinate ale emisiei de gaze de digestie la rasele de animale de fermă*, Simpozion, *Facultatea de Medicină Veterinară, Lucrări științifice, București*,
- Stan Simona, Bogdan A.T., Paraschivescu M.Th., Chirițescu Verginia, 2011, Bioetica rurală și semnificația ei în relație cu protecția mediului și trasabilitatea alimentară, *Sesiunea Științifică a cadrelor didactice și studenților, pag.57*, Facultatea de Medicină Veterinară - Universitatea „Spiru Haret”, București,
- Tufescu Victor, Tufescu Mircea, 1981- *Ecologia și activitatea umană*, Editura Albatros, București,
- 1964-*Atlasse Classique. Piere Gourou Classiques* Hachette