ANTHROPIC IMPACT UPON THE ECOSYSTEMS IN THE PROXIMITY OF THE LOWER PRUT NATURAL PARK

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The present study is the result of investigations performed in the proximity of the Lower Prut Natural Park. The causes and the consequences of the anthropic impact, in the last 50-60 years, from the Lower Prut hydrographic basin are given especially by: the disturbances of hydrological conditions of the Prut River (after the building of the Stanca-Costesti accumulation dam, which stopped yearly flooding , the water supply in pools and the lakes being insufficient; the lack of seasonal floods led to excessive soil salinization); draining up of some sown areas of wet lands (easily flooded lands); poaching, hunting; the diminution of meadow forest areas; intensive grazing, the protected area perimeters included etc.

The extension of agricultural surfaces by means of ploughing has destroyed the fallow lands and the natural meadows of the Lower Prut area, very rich in numerous species of flora and fauna. The massive deforestation of the previous century, interested in changing former forest areas into agricultural zones has led to important changes to the climate, plant complexity and soil characteristics.

Important changes occurred: steppe characteristics prevailed, so that the climate was no longer wet and cool, but drier and warmer, the lands losing part of their vegetation.

***Key words**: anthropic impact, biodiversity, avi-fauna*

Through Decree No. 2151 of November 30th, 2004 concerning the setting up of protected natural areas for new zones, the Lower Prut Low Meadow natural Park has been approved as a protected natural area with corresponding management characteristics for the Lower Prut Low Meadow Natural Park with an area of 8,247 ha.

Government Decision No. 1284/2007 concerning the declaration of avi-fauna special protection as an integral part of the European ecological network Nature 2000 in Romania has appointed in the Lower Prut hydrographical basin only one area with an avi-fauna special protection: Prut Meadow-Vladesti-Frumusita (SPA).

Through Decree 776/2007 concerning the declaration of communitary important sites as an integral part of the European ecological network Nature 2000

in Romania, ttthe Lower Prut has been declared a site of communitary importance (SCI).

MATERIAL AND METHOD

For this paper, various studies have been done in the villages close to the Lower Park Meadow Natural Park, in *Cavadinesti, Suceveni, Oancea, Vladesti, Mastacani, Foltesti, Frumusita, Tulucesti and Vanatori* . This paper was based on both specialty sources and on-the-spot investigations. All the observations and researches have been performed upon climatic, vegetation and fauna alements as well as upon soil quality.

RESULTS AND DISCUSSIONS

Biodiversity Description in the Lower Prut Meadow

Vegetation

The Prut meadow vegetation is represented by natural vegetal formations of pastures and forests specific to alluvial soils which are flooded periodically and with a supplement of phreatic humidity.

The pastures are made up of mesophilic and mesohydrophilic species represented by graminaceae.The present forest vegetation is represented in *Table 1*.

Table 1

Structure of Woody Vegetation

Species		Average%
Scientific Denomination	Popular denomination	
Salix alba	Selected white willow	90,6
Populus nigra euroamericana	Euroamerican black poplar	5,9
Populus nigra sp.	Indigenous black poplar	1,7
Populus alba	White poplar	1,1
Quercus, Acer,Ulmus, Carpinus	Oak, sycamore maple, elm tree, hornbeam	0,7

Swamp vegetation is made up of *Carex riparia, Scirpus sylvaticus, Typha latifolia, Phragmites communis, Equisetum arvense, Mentha aquatic* etc. while *Lemna trisulca, Hydrocharis morsus - ranae, Potamogeton natans* are to be found in water ponds.

There are also very rare species such as :*Nymphaea alba, Salvinia natans, Thelypteris palustris, Nymphoides peltata, Vallisneria spiralis, Stratioides aloides, Alisma gramineum, Iris pseudacorus, Sagittaria sagittifolia, Potamogeton crispi, Ceratophyllum demersum* etc.

On some sectors along the river Prut some forest phytocenosis fragments are still to be found , such as : *Vitis sylvestris, Fraxinus pallisae, Frangula alnus.*

The Lower Prut Meadow Avi-Fauna

The diversity of animal species belonging to various groups of vertebrates identified in this area is determined mainly by the structure and variety of the ecosystems, but also by the anthropic factor which influence their actual state.

From an avi-faunistic point of view the Lower Prut hydrographic basin represents a very important area due to the presence of aquatic birds during migration: Ardeids (*Ardeola ralloides, Egretta garzetta, Egreta alba, Ardea purpurea*), Cyconiids (*Ciconia nigra, Ciconia ciconia)*, Threskiornithides *(Plegadis falcinellus, Platalea leucorodia*), Anatides (*Cygnus olor, Anser albifrons, Anser erythropus, Anser anser, Anas crecca, Anas querquedula, Aythya ferina, Aythya nyroca*), Ralides (*Fulica atra*), Charidriiformes (*Himantopus himantopus, Recurvirostra avosetta, Vanellus vanellus, Philomachus pugnax, Limosa limosa, Tringa totanus*), Larides (*Larus ridibundus*), Sternide *(Sterna hirundo, Chlidonias hybridus*), Hirundinides (*Riparia riparia, Hirundo rustica*), Sylviide (*Acrocephalus sp*.) etc.

Causes and Consequences of the Anthropic Impact

The ecosystem biodiversity of the Lower Prut , ie. of the Lower Prut Low Prut Meadow Natural Park is dependent upon the way in which the lands in the area are being used , either floodable , occupied by lakes, pools, ponds (under the management of piscicultural farms), of lands used for agricultural purposes (by landowner associations) and of lands under private property (farmer households).

The causes that led to disturbances in the natural ecosystems from the Prut hydrographic basin are various. Let us mention some of these:

- The disturbance of the hydrologic regime of the Prut river after the building of the Stanca-Costesti dam that limited the yearly floodings, the pools and lakes being left without water supply;
- The lack of seasonal floodings led to excessive soil salinization;
- The draining of important areas of wet zones (floodable lands);
- Poaching, hunting;
- The reduction of the areas covered with holm forests;
- Intensive grazing even within the perimeter of protected areas;
- Pisciculture proceedings, intensive aquaculture in dyked ponds and the water levelling according to production necessities;
- The use of monocultures on agricultural lands and the excessive plotting of private lands etc.

All these elements negatively affect the biological diversity of wild flora and fauna species.

Many natural habitats where there is an equilibrium between various ecosystems have been degraded or destroyed as a result of introducing modern technologies which are meant to intensify the agricultural output.

The forests, the brieries, the riverside coppices, the groves represent places for the survival of lots of endangered species due to the intensive technologies used in agriculture as well as due to other anthropic activities.

As a result of systematic uses of herbicides , many wild plants started to disappear: *Centaurea cianus* (cornflower), *Agrostema githago* (corncockle), *Achillea millefolium* (milfoil), *Artemisia campestris* (wormwood) and other species, too.

The insecticides used for plant protection have destroyed not only the pests dangerous for the agricultural cultures, but also much of the microfauna and hence the food for the favorable fauna.

Chemical fertilization of natural pastures has favored the development of graminaceae to the detriment of vegetable plants and other species.

The wild birds that feed on insects are exposed to intoxication as a result of insecticide treatment of agricultural crops.

The extension of agricultural plots through ploughing has destroyed the fallow lands and the natural grasslands of this area, favourable habitats for numerous apesies of flora and fauna.

As a result, the distribution of reptiles and amphibians , such as *Pelobates fuscus,* that populates agricultural plots of land, meadows , irrigation canals, pools has become limited.

Coluber caspius, identified on the terraced slopes with steppe vegetation of the Prut meadow, the pool turtle– *Emys orbicularis,* which is to be found in lakes, irrigation canals, floodable areas, then the tree frog– *Hyla arborea*, found in the Prut floodable area , in lakes, swamps or bigger pools.

From the Lower Prut avi-fauna there had disappeared , ever since the 20th century, the bustard (*Otis tarda*) and (*Tetrax tetrax*), identified for the last time on October 7th, 1973 in the Brates Lake area, the Galati County, but also the corn crake (*Crex crex*).

Some mammal species, such as the ground squirrel *(Spermophilus citellus),* affected by the changes within the natural habitats have diminished their number significantly**.** Other species of common vertebrates in this area that populate, during various phenological stages, the pastures,the steppe vegetation lands have adapted to the new living conditions in these semi-natural and agricultural habitats, being therefore represented in great numbers.

We mention here the lizard –*Lacerta agilis*, the green lizard - *Lacerta viridis,* the green toad – *Bufo viridis* ,the small lake frog– *Rana eculenta*, the white stork - *Ciconia ciconia,* the red kerstel - *Falco tinnunculus,* the partridge- *Perdix perdix*, the quail– *Coturnix coturnix,* the pheasant – *Phasianus colchicus*, the yellow wagtail– *Motacilla flav*a, the black whinchat- *Saxicola torquata*, the grey head sylvia - *Sylvia communis*, the linnet- *Carduelis cannabina*, the yellow bunting - *Emberiza citrinella*, the grey bunting - *Miliaria calandra*, the hare (*Lepus europaeus),* the roebuck *(Capreolus capreolus),*the wild boar (*Sus scrofa*), the muskrat (*Ondatra zibethica*), the jackall (*Canis aureus*), the fox (*Vulpes vulpes*), the raccoon dog (*Nyctereutes procyonoides)* etc.

The populations of these species are influenced by the very state of the natural or semi-natural ecosystems of this area, represented by meadows, hayfields and pasture lands. The number of the various groups of invertebrates (worms, shellfish, insects, etc) characteristic to all natural biotopes are influenced by the ecological state of aquatic ecosystems (lakes, pools, etc) of the vegetal associations from the wet areas and they influence, in their turn, the populations of amphibians and reptiles, birds and mammals that feed on them.

Ways of Improvement and Reconstructing of the Ecological Equilibrium

In order to reconstruct the ecological equilibrium in this area we may recommend the following:

- Specialty studies for the reconstruction of natural ecosystems;
- Reconstruction of salinized soils, of degraded and abandoned lands;
- Exploitation of fisheries with higher efficiency in a natural or semi-natural regime;
- The support of farmer households by the Romanian government through compensatory payments for the protection and conservation activities of protected areas (Nature 2000 Program);
- The integrated use of the land for well-established activities : agricultural, piscicultural, animal breeding, forestry, viticulture, pomiculture, beekeeping, etc.
- Regeneration of natural brushlands from the Prut meadow and the plantation of native varieties of willow, poplar, etc.
- The use of crop rotation for agricultural crops and the use of correct technologies;
- The collection of the wooden mass , of reed, bulrush, of willow branches or osier for household use, in handicraft activities, etc.
- The support of sport hunting activities on lands with various functions (state or private), as a source of income and agreement ;
- The acceptance of the mosaic variety of the lands with multiple functions (ex. the alternation of agricultural lands with woody lands , clusters of trees, etc., biocenotic oases or even isolated trees that allow the preservation of a high biological diversity) ;
- The ecological tourism , agro-tourism, etc as a source of income and agreement.
- The use of pesticides and of chemical fertilizers must be done only accordind to the disease and pest prognosis bulletin, while the fertilizers must be used according to the soil and plant chemical analysis bulletins, for the conservation and the preservation of ecosystem biodiversity, both to our own benefit and the society's.

CONCLUSIONS

The natural habitats have been degraded or destroyed as a reflex of introducing modern technologies meant to speed up the agricultural production.

The degradation of natural habitats, the reduction of the areas occupied with spontaneous vegetation, the diminution of animal populations from this area inevitabley lead to effects upon all the links of the ecosystem.

The application of all these measures will lead to the reconstruction of the ecological equilibrium of the Lower Prut Meadow ecosystem.

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