Postion Paper for the 5th NRF Open Assembly, September 24th – 27th 2008

Population of mammals of boreal regions of Eurasia under climate changes

L.G. Emelyanova
M.V. Lomonosov Moscow State University, Geographical Department, Chair of Biogeography.

Today the problem of the global warming becomes one of the most actual. Number of publications devoted to changes of environmental parameters and components under the global climate changes grows swiftly.

In the great volume of works relating the reaction of biota on the changing circumstances, publications devoted to the flora and vegetation changes are prevailing as well as verifications of observed alterations in biota phenology (changing terms of season phenomena's coming in life of vegetables and animals in 20th- 21th centuries). Works establishing some individual facts are preeminent.

It should be noticed that there are very few works devoted to the change of animal components because of difficulties connected with observations on reserved objects, perennial dynamics of population for many species. It is difficult and sometimes even impossible to determine, whether changes, that take place, are the biota's reaction on anthropogenic factors' influence (fires, forest cutting, etc.), or these changes are provoked by climate alteration. Small number of works devoted to the change of animal components under the effect of changing climate parameters, may be explained by the more weak «answer» of animals to the changing environmental conditions as in comparison with over groups of living organisms.

The purpose of this report is the summarizing of published and the own long-termed field and questionnaire materials relating the changes in the animal world, mostly mammals, in boreal regions of Eurasian sector – zone of tundra and taiga – in the period of global climate changes.

The own observations for the study of mammals' population in summer and winter seasons had been implemented in the middle of European taiga (watershed basin of Vaga and North Dvina rivers) since 1992 to nowadays. The basic methods of study – winter route registration, registration by method of line traps and pit-traps.

We fulfilled the questionnaire design of representatives of native nations and old residents in the North of European part of Russia and in the North of Yakutia (30 forms) and so we received following results. The natives of the European North notice weather shifts to far less extent in comparison with answers we got from respondents of the Siberian North. Observations of native population in Siberian sector testify to climate alteration by the example of snow cover's change, and especially of water regime and rivers' and lakes' biota. According to their estimating, periods of freezing-over and drifting of ice have changed as well as the terms of food fish moving, permafrost conditions (erosion of rivers' banks quickens, some lakes in tundra vanish, more mammoth's fauna remains are destroyed by frost). Somewhere advance of forest elements to the North is marked (new species of plants and animals, which are typical for forest zone, appears in tundra, terms of birds' arriving and flying away changes, amount of atmospheric precipitates rises (more deep snow cover makes deer wintering more difficult, increase swamping in some districts etc.). Instability and abruptness of weather conditions are visible last years. Majority of respondents have noted firm increase of precipitates' amount last years too.

Nevertheless, almost every respondent who lives in taiga zone and answers to the questions, has marked more important influence of anthropogenic effects on biota (cutting down and burning out of forests, poaching, land use structure's modification due to perestroika period) in comparison with influence of climate changes.

Among the exactly established in Eurasian (Palearctic) sector dimensioned changes in zoota we should note change of natural habitat of *Sus scrofa* – European wild boar (wild pig).

The boar is the massive animal weighing to 320 kg, incapable to overcoming deep snow cover and finding food under the snow. This is an usual inhabitant of low snowy Eurasian regions. Nevertheless, in spite of all its ecological characteristics, in 80-th years of 20th century the boar started to spread to the north and has reached middle taiga regions of the European part of Russia nowadays.

In the detailed annotated list of mammals of Eurasian taiga zone, composed by I. L. Kulik (1972), this species hasn't been mentioned. The range of *Sus scrofa* natural habitats at that time didn't reach even

southern boundary of taiga zone, what was displayed on range' maps in many professional summaries of Eurasian mammals'. Nowadays steady populations appeared not only in southern, but in middle taiga of European part of Russia, what has been marked in annotated lists and modern maps of species' spread (Pavlinov et al., 2002; Emelyanova, 2003).

To another large-scale change in animal population of northern Eurasia we should referred changes in dynamics of *Lemmus lemmus* (Norwegian lemming) population, dominating species of Scandinavian and Kola peninsula's tundra in the past. In the first half of past century regular (every 3-5 years) extra peaks of this species' population were noticed. Descriptions of large-scale Norwegian lemming's migrations during such explosive growths of population one could find even in school books. But already for more than 50 years period there haven't been registered any considerable growths of this species population in Scandinavian and Kola peninsula's north, although earlier this species was the landscape animal in the true sense of the word.

At the same time in the eastern sector of Palearctic tundra spreading from Kanin peninsula to Chukotsky peninsula no such essential progresses in population of background tundra species hadn't been registered. Quite regular peaks and extra peaks of population of *Lemmus sibiricus* (Sibirian lemming) and *Dicrostonyx torquatus* (Collared (white) lemming) were fixed (Emelyanova, 2000; Reproduction's Conditions…, 2006)

In the North of Yakutia the annual moving of Polar (white) bear on the continent becomes far more deeper and longer for last years (since 2000 and to nowadays), this may be connected with change in ice conditions near the shoreline.

Advance of tongs encephalitis's zone to the North, registered last years, can be referred to the zoota's essential changes in this area. Since 2004 administrative regions, where tongs encephalitis's diseases were not registered before (middle taiga Ustyansky, Tarnogsky and other districts of Archangelsk oblast), have come into the zone of tongs encephalitis's danger. Annually 2-8 cases of diseases are registered here for last years, including cases with mortal outcome. Publications discussing this problem contain some suppositions about connection between moving of tongs encephalitis's zone to the North and the global warming. But leading Russian specialists don't connect these changes with global climate changes (Korenberg, 2007).

Annual (during 15 years period) registrations of mammals in the central sector of middle taiga of the European part of Russia (watershed basin of Vaga and North Dvina rivers) didn't reveal considerable statistically confirmed changes in structure and composition of animal population. Thus we regard the statements of some researchers about "swift moving of southern zones to the North and fast disappearance of tundra zone from the Earth's surface" as premature. The scale of climate changes within this territory doesn't cause global advances in structure and composition of animal population nowadays. Migrations of rare species, registered in middle taiga of the European Russia during last years, don't exceed moving, registered here before by frequency.

References

Emelyanova L.G. Fauna of mammals and birds/ Flora and fauna of middle taiga of Arkhangelsk oblast. Moscow: Moscow State University Publ., 2003. P. 42-61.

Emelyanova L.G. Super-high lemming populations peak of 1991: quantitative characteristics in Northern Taymyr / Heritage of the Russian Arctic. Research, conservation, and international co-operation. Moscow: Ecopros Publishers. P. 513-519.

Korenberg E.I. Contemporary features of natural tongs encephalitis nidi: new or forgotten? / Proceedings of All-Russian Scientific Conference "Contemporary Scientific and Applied Aspects of Tongs Encephalitis (by the 70-th anniversary of tongs encephalitis virus discovery). Moscow. P.23-45.

Kulik I.L. Taiga faunistic complex of mammals of the Eurasia // Bulletin of Moscow Society of Naturalists. Biology Dep., 1972, V. 77, N 4. P. 11-24.

Pavlinov I.J., Kruskop S.V., Varshavsky A.A., Borisenko A.V. Terrestrial animals of Russia. Reference and key book. Moscow, 2002. 298 p.

Reproduction conditions for sandpipers in tundra (with estimate of lemming populations state)/ Information Proceedings of Workgroup on Sandpipers. Mensbir Ornithologist Society. Moscow, N 1-13, 19, 2006.