



**A Report for James Rennie Bequest Committee on a visit to the
Ilmen Reserve, Russia**

By Donald Lunan

Professor Grigory Olenev has been carrying out research on rodents in the Ilmen Reserve (553 602), in the foothills of the Ural Mountains in Russia for almost 25 years. This has predominately centred on bank voles (*Clethrionomys glareolus*, Tilesius), a species that is found throughout Europe and Asia. In recent years he has also begun similar studies on wood mouse (*Apodemus sylvaticus*, Kaup) whose range is similar to that of the bank vole. I was helping in his most recent study, determination of territory of animals during years of different population density as well as continuing the long-term studies on population density and age structure.

We carried out two sample procedures, snap trapping and live trapping. Standard mousetraps were used along with bait of corn flour and water fried in sunflower oil for the snap trapping. The snap-traps were placed in two different sample areas, a dry and a moist area. The dry section was a mixed pine (*Pinus sp*) and birch (*Betula pendula*, Roth) forest, with some lime (*Tilia sp*) growth, but only with small amounts of herbaceous cover. The moist area was situated near a river and had much denser vegetation of alder (*Alnus glutinosa*, L.), cherry (*Prunus sp*), raspberry (*Rubus idaeus*, L) and a thick herbaceous layer. More animals were caught in the dry area, but the ones in the wet section were better preserved (less nematodes and beetles). In total, 100 traps were laid over the two areas, allowing a relative population density to be calculated.

Relative population density is a simple estimation, based on the number of traps laid and the number of animals caught.

Of the caught specimens we determined the body weight and the weight and condition of the liver, spleen, kidney, adrenal gland, heart, thymus (if present) and testes (if male). In the females the reproductive organs were studied between two sheets of microscope glass and the number of embryos or placental spots were counted. Placental spots are found after pregnancy and relate to the number of pregnancies and the number of young in each pregnancy. If the embryos were in an advanced stage one would be removed and weighed.

The skulls were then removed and dried, and then boiled for 7-9 minutes, and the muscle and tissue removed. This allowed studies on the teeth to be undertaken, and the exact age of the animals to be calculated. This was done in voles by different molar root structures in different stages of life. There are 6 different structures, and since voles rarely live longer than 18-20 months, a fairly accurate age can be assumed.

In mice the age is given by study of wear on the masticatory surface on the front teeth. This is not as accurate as the molar root structure as the wear obviously changes with different food types, and therefore with region or seasonality.

The live trapping, using CMR (capture- mark- re-capture) method was carried out on a peninsula of about 1.5ha in area (this was to allow immigration and emigration, not found on an island, but not as open as a normal sites). Traps were placed 10m apart, with each site having a number. Over a five-day period the traps were checked twice a day, in the morning and the evening, roughly twelve hours apart. When animals were

caught the number of the trap, the sex, weight and any special features that would indicate its reproductive state (enlarged testes, nipples, vaginal position- closed, plugged, open) were noted. The animals were marked by removing toes, with each toes having a number (front 1-8, back 10-100) If the animal was already marked the number would be noted. Once trapping had commenced, and the same animal was caught again only the trap number would be noted, unless it was a pregnant female, and then the weight would be taken again as weight gain is rapid during this time.

In conjunction with the snap-trap data collected this allowed the development of three cohorts, called Physiological Function Group (PFG).

PFG3- Young of the year who breed -lifespan 3-5 months

PFG2- Young of the year who do not breed.

PFG1- Over-wintered adults (previously PFG2) - lifespan 14-20 months.

This greater understanding of the population dynamics of the rodent population in the Ilmen reserve has been shown to be transferable to other rodent populations throughout Europe. In years of low reproduction, like wet summers, are followed by an increased number of PFG3, to rapidly increase population size. Years of high population, after a mild winter for instance, coincide with low numbers of young of the year reproducing. This shows that the PFG3 is an important factor in population regulation.

This study was a very valuable experience for me, both in ecological fieldwork and also for me to sample what is a very interesting and diverse culture. I am very grateful to the James Rennie Trust for helping give me this opportunity.