STRUCTURE OF THE MOOSE POPULATION AND ITS UTILIZATION IN THE KOMI REPUBLIC

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ABSTRACT: Cutover stands comprise a large proportion of the forested area within the Komi Republic. The natural succession of these stands leads to a decrease in productivity of moose populations. We describe characteristics of moose hunting in the Komi Republic and discuss methods for managing harvest by means of age– and sex–specific hunting licenses. Poaching, decreased habitat productivity due to forestry, and predation all impact moose populations adversely and must be addressed by managers to ensure future harvests of moose.

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Intensive forestry drastically affects the landscapes of the European North. Presently, in the Komi Republic, young stands occupy more than 4.8 million ha, or 17% of all the area covered by forests. Further to the north, there is a more intensive process of coniferous species replacement by deciduous species (Larin and Pautov 1989). A significant mosaic is, as a rule, observed on the territories affected by concentrated timber harvest. These factors result in a decrease in the biological activity of moose (*Alces alces*).

The number of moose in the northeastern portion of the European part of the USSR suffered great changes. At the beginning of the 20th Century, moose were a rare species, but by 1939–1940 they were common. In 1947, 12,000 individuals inhabited this territory. By 1951–1952, as a result of exhaustive hunting, the abundance of moose decreased to 4,000, but by 1969 it again increased up to 10,000 individuals (Ostroumov 1953, 1972). Preservation and improvement of the forage base in the cutovers stimulated the growth of the population. According to the Komi hunting organization, in 1984 the total number of moose was about 19,000 individuals, in 1985 it increased to 20,000, and in 1986 it increased again to 25,000 animals. At present [1990], the total number is stable at about 26,000 moose, but in some regions of the Republic there are significant variations.

The analyses of hunting license data showed that among the animals hunted, males prevail in all the age groups. In southern regions, the percentage of females increases among adult animals and there is a decrease in the abundance of young animals in the harvest. On the rest of the territory the percentage of young individuals is about 20%. The body weight given in license reports is rather variable: adult males weighed 276–320 kg. The lowest body weight of young animals during the harvesting season is observed in the north of the region (Inta Region); there are no reliable data on the variation of body weight among adult animals. Many hunters in their questionnaire emphasize "rejuvenation" of the population, which results from an intensification of hunting effort. They also note the decrease in the size of animals. After

accepting a differentiated price of a license (dependent on animal age), hunting of young individuals increased. In the northwestern part of the region, where moose hunting is based on migrants, the harvest of calves amounts to 12.5% of the total harvest; in the regions of most intensive timber harvest (Ustkulom Region) this figure is 25%. Harvest of adult animals by these license holders amounts to 60–70% (in the Northwest it ranges up to 74.7%). The carcass weight of the harvested animals indicates that most of the adult males harvested are in the 3.5–5.5 year–old age classes. For females there is more variation in age. Among adult females, 65–75% (but ranging from 56–100%) have calves, about half of them with twins. In the southern part of the Komi Republic the percentage of twins is lower (24–40%). Moose cows with 3 calves are rare (0.07%). In the upper Pechora Region, 53.8% are females; the percentage of the harvest comprised of adult animals is 58.9%, 26.7% 1–year–old animals, and 14.4% calves. The mean index of fertility in moose females with calves is 1.5 ± 0.5 embryos. Moose females with twins make up 37.2% of all females harvested and cows without calves comprise 19.8%.

The accuracy of body weights of moose reported from license returns is low. It is necessary to have one unique, reliable criterion for a more objective evaluation. The mass of the heart, easily estimated, can become such a criterion. According to the weight of this organ, the mass of an animal can be estimated more precisely. With the constantly growing demand in licenses, it is necessary to ask hunters to pay serious attention to such duties as estimation of the heart mass, the number of embryos, and placental scars, etc. With all the data available, it is possible to obtain objective information about the state of the moose population in the region.

Most effective moose harvesting is at the end of the season. In 1983–1984, the hunting season lasted through the end of January. In October 1983, 5.8% of license holders hunted. In November that figure was 15.3%, and in January it was 50%. In the 1988–1989 season, moose harvesting lasted until mid–February. In October, 1.5% of license holders hunted. In November that estimate was 19.5%, in December and January it was 21%, and in February it was 27%. This shift of the main hunting season to a later period results from climatic factors.

Common methods of moose hunting in the Komi Republic are individual shooting and stalking. The results depend on the quality of snow cover and weather. Successful harvesting of migrants depends on the depth of snow. Winter moose migration starts, as a rule, when the depth of snow approaches 1.5 m (usually in December). Five days are required to shoot one animal. It is not easy to transport moose carcasses within the Komi Republic; sometimes the distance from the place of harvest to the point of marketing is more than 1,000 km. Snow–cars ("Buran") and rifled guns are used for the most part on state–industrial–farms. At the places where hunters use smooth–bore guns there are more animals with old wounds.

Productivity of moose harvesting is also improved by the possibility of conducting hunting on remote territories, but to ensure timely meat transportation all this becomes possible only after tracks are open. That is why the time of hunting must be set by taking into consideration regional environmental characteristics.

In the Komi Republic, natural regeneration is the preferred method of reforestation. More than 90% of all cutovers are regenerated that way. As a result of forest succession, the region is characterized by the substitution of *Pinus sylvestris* by *Picea obovata*. In winter, *P. obovata* is an

important food item for moose only in the subpolar Urals; on the rest of the territory it is not reported as significant. Evidently this is the reason that young stands of coniferous trees are not badly damaged by moose. The animals intensively browse young aspen (*Populus tremula*) growth on cutovers, which results in their shading by birch. With the onset of deciduous forest stands dominating the cutovers, the forage capacity of moose habitats will decrease. The primary wintering areas for moose are partial cutovers dominated by spruce. As a result, the browsing intensity on such forage plants as young larch (*Larix* spp.) and rowan tree (*Sorbus aucuparia*) increases. It leads to their degradation – drying out and disappearance from the stand. This is followed by a decrease in winter carrying capacity. In the middle taiga subzone, the lack of winter habitats is felt already. Naturally it affects the state of the moose population.

With the size of the known moose population at present, licensed harvesting of the animals is about 12%. Such a harvest does not seriously affect the stability of the population, but annual losses increase due to poaching. According to the opinions of the authorities on hunting farms and hunters themselves, 16–17 animals are harvested for every 10 individuals reported through a hunting permit. Officially, not more than 10 violations are registered every year. In this way, anthropogenic removal is increased by up to 5,000 animals annually, which is more than 19% of the population. Most intensive moose harvesting is observed along highways and railways, where changes in the structure of the moose population and decreases in density are most evident.

The impact of predators such as brown bear (*Ursus arctos*), wolf (*Canis lupus*), and skunk bear (wolverine, *Gulo gulo*) should also not be ignored. Moose are preyed on by bears during the rut (Yazan 1972) and also in spring, when bears leave their dens. Wolves are responsible for the largest part of moose population losses; the percentage of wolves, by the way, is also rather high. After aerial hunting of predators, it was confirmed that in the northern subzone in winter, moose are the primary prey of wolves. Moose hair was found in the digestive tracts of all the animals investigated, and all the wolves were in good physical condition. The examination of wolf carcasses showed that every adult female had 6 embryos. That is why the problem of wolf control is one of the most important in the Komi Republic; its success would save quite a number of ungulates.

In some regions of the Komi Republic, the effects of anthropogenic factors account for changes in the density and structure of the moose population. For the rational utilization of the moose stock, hunting should be differentiated in such a way that commercial harvest of the population would correspond to its density, food quality, and habitat conditions. To stabilize the existing quantity of moose hunting licenses, it is necessary to limit non–licensed harvesting, to take certain measures to limit the wolf population, and regenerate partial cutovers in the middle taiga. When setting the timing of a hunting season, it is necessary to take into consideration biological, climatic, and economic factors. Some steps should be taken to collect objective information about the state of the population. For this purpose hunters need to accurately report their activities on their licenses.

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