MOOSE IN LATVIA AND INTENSIVE GAME MANAGEMENT PRACTICES

Ruta V. Mikhyeva and Vitauts G. Gaross

Research and Production Association "Silava," Riga, Latvia

ABSTRACT: Historical population trends of moose in Latvia and current information on moose population size, sex and age ratios, annual increment rates, and mortality factors are presented. The authors review moose antler quality, interspecific competition, food habits, and discuss forest damage by moose. A management framework for regulating moose harvests in accordance with carrying capacity, under conditions of intensive forestry, is outlined.

ALCES SUPPLEMENT 2: 85-88 (2002)

Key words: *Alces alces*, *Cervus elaphus*, ecology, intensive forestry, interspecific competition, Latvia, moose, population composition, red deer

---

Little information is available in the published literature on moose (*Alces alces*) in Latvia. The purpose of this paper is to present some general background information on moose ecology within this region and discuss the role of moose management within Latvia's intensive forestry program.

PAST AND PRESENT MOOSE POPULATION STATUS

Moose have been common over the land area of present–day Latvia since the end of the glacial era. Data on moose populations for the last 5 centuries are scanty. Indirect evidence, however, indicates that moose were highly valued and populations were large enough to supply people with meat and hides. Moose numbers decreased sharply by the end of the 18th century, and 100 years later it was assumed there were no more than 1,000–2,000 moose. More reliable data indicated there were only 85 moose in 1923 and about 1,000 in 1940.

The post–World–War II period was distinguished by a marked increase in moose all over Latvia. The highest number, according to official information, was recorded in 1973 (21,830). However, more reliable methods showed these estimates were incorrect and, in most cases, underestimated the actual size of the moose population. The official numbers represent, at best, only rough estimates of population size. Follow–up investigations, using more accurate methods, estimated the number of moose in 1975 at approximately 45,000 or 22 moose/1,000 ha of forest land. On some forestry enterprises and forest ranges, this figure reached 40 moose/1,000 ha. The total harvest between 1954 and 1988 was 111,829 moose. The moose population started declining after 1975 (Fig. 1). A reliable estimate of the 1989 spring population was 16,000–17,000, or 6 moose/1,000 ha of forest. In a number of localities, the population density ranged from 1 to 5 moose/1,000 ha of forest.

The adult sex ratio of moose between 1935 and 1937 varied from 1 male/female to 1 male/1.7 females. Similar sex ratios were recorded in 1963, when there was practically no harvest and the impact of predators was insignificant. These sex ratios are believed typical for Latvia. Sex ratios in 1975, 1978, and 1989 were 1 male/female, 1 male/0.9 female, and 1 male/1.3 females,

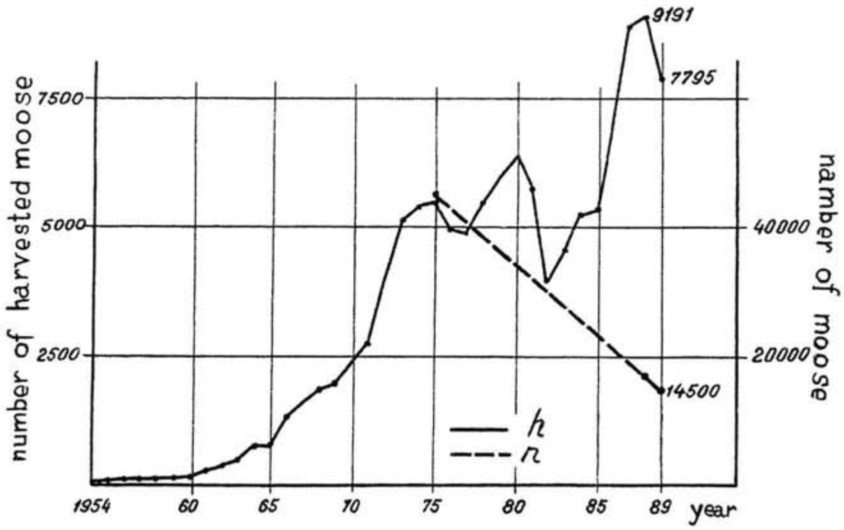

Fig. 1. Total number of moose harvested (*h*) from 1955 to 1989 and estimated number of moose (*n*) from 1975 to 1989 in Latvia.

respectively. The sex ratio of calves has slightly favored males and has been relatively constant from 1974 to 1988 (Fig. 2). The age ratio of adults for different age classes (young, mature, and old) was established for 1988 by analyzing the harvest data in combination with estimates of the age and sex distribution of the population. Bulls composed 20% of the 1.5–3.5–year age class; 75% of the 4.5–11.5–year age class; and 5% were in the 12.5+ year age class. Cows composed 13%, 83%, and 4% of these age classes, respectively. A similar sex/age distribution was found for the harvest between 1974 and 1979. These figures are unlikely to correspond to actual population values, but they may, nevertheless, serve as an indicator of population composition.

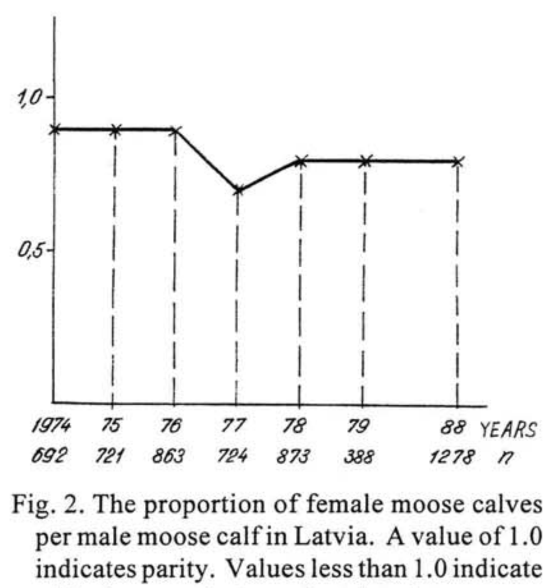

Fig. 2. The proportion of female moose calves per male moose calf in Latvia. A value of 1.0 indicates parity. Values less than 1.0 indicate a bias in sex ratio toward male calves.

The annual increment rate (autumn calf proportion) for 1963 was 29% (Fig. 3). A slight decrease in annual calf percentages occurred during the 1970s. Generally, calf percentages have been stable, staying within limits of 23–29% during the last 2 decades.

During the last 4 decades, legal hunting has been the only factor used to control Latvia's moose population. Poaching has been disregarded as an important mortality factor. Wolf predation has inflicted serious damage to moose in some localities since 1979 and appears to be increasingly important. Wolf predation would probably be a much greater mortality agent of moose if there were no alternate prey for wolves such as red deer (*Cervus elaphus*), roe deer (*Capreolus capreolus*), and wild boar (*Sus* sp.). Other mortality factors, such as

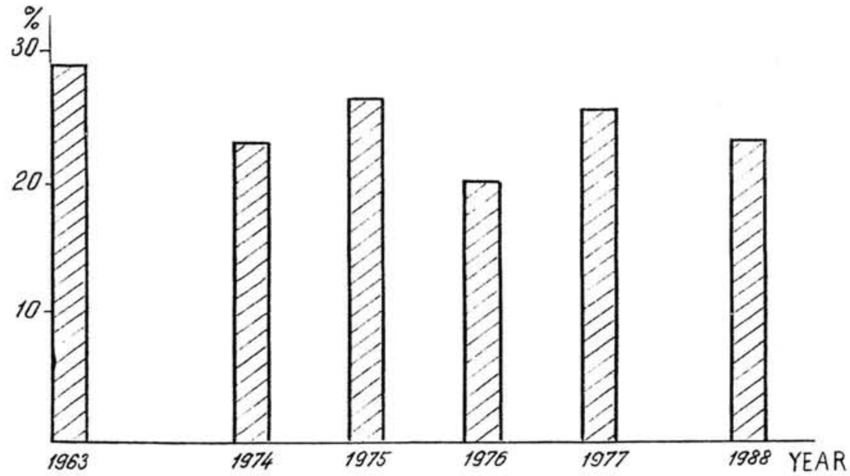

Fig. 3. Annual increment rates (percentage of calves of the total number of moose in autumn) from 1963 to 1988 in Latvia.

diseases and road accidents, make up approximately 3–5% of the die–offs.

MOOSE ANTLERS

Moose antlers measured between 1974 and 1988 showed that 0.1% of the bulls, aged 1.5 years or older, possessed antlers deserving the top award for quality, based upon international standards for evaluating moose trophies. The parameters describing the quality of antlers such as spread, number of points, size of the palm, and circumference of the beams, reach their maximum value for moose 8–14 years of age. No regional or time–dependent variation in antler quality has been observed in Latvia. Thus, weather and climate appear to have little effect on antlers.

INTERSPECIFIC COMPETITION AND FOOD HABITS

Extensive observations show moose and red deer exhibit little interspecific competition. They cohabit at fairly high densities on more than one–third of the forested land base (5–10 moose/1,000 ha, 10–40 red deer/1,000 ha). The two species display normal increment rates on sympatric ranges, and their life–history strategies (e.g., feeding habits, rut, morphological traits, etc.) are basically the same as in areas where they do not coexist. This is possible because summer food resources are abundant for both moose and red deer, and moose are below the carrying capacity of a forest that could sustain $\geq$40 moose/1,000 ha. Red deer have been observed feeding predominantly on farm lands almost all year, except during winter when snow cover is approximately 25 $\pm$ 5 cm deep.

Winter foods for moose normally consist of *Salix* sp., *Rhamnus frangula*, *Populus tremula*, *Juniperus communis*, and *Sorbus aucuparia*. More recently, moose have also been observed on farm lands where they utilize winter cereals, cabbage, beets, and other crops for food. During severe winters, moose feed mainly on *Calluna vulgaris* and *Vaccinium* sp. Where winter foods are in short supply, moose have caused damage to pine (*Pinus* sp.) by browsing young shoots and twigs, or spruce (*Picea* sp.) by chewing the bark. Young stands of pine 0.5–2.5 m in height are most severely attacked. Newly planted stands may also be damaged, especially those from fertilized–treated nursery stock rich in nitrogen, phosphorous, and potassium. Spruce bark damage by moose occurs mainly on trees 20–50 years of age.

Bark chewing results in the spruce stem becoming infected by fungal diseases, and die–backs occur within 5–15 years.

INTENSIVE MOOSE–FORESTRY MANAGEMENT

Forestry remains one of the cornerstones of Latvia's national economy, yielding timber worth 240 million rubles (1 US$ ≈ 29 Russian rubles) annually, in addition to other forest products. Yet moose management runs counter to the forest yield–management practices on which modern forestry should be based. One of the principal reasons why hunting quotas for moose were raised during the 1970s, and the harvest increased (Fig. 1), was to reduce moose–related forest damage. Unfortunately, because of indecisive and conservative attitudes to the problem in question, as well as inaccuracies in the population estimates, this action was delayed for 5–8 years. This resulted in the forest sector suffering tremendous losses, which will require at least 60–70 years to repair. Despite the decline in the moose population after 1975, intensive harvesting continued until 1989. Biologists and land managers believe this was another mistake because moose harvest should have been reduced.

Detailed analyses of the population data and the occurrence of forest crop damage show the so–called "silviculturally optimum" moose population density for the forest of Latvia in general, or individual forestry enterprises (covering 30–50,000 ha of forest), to be invalid. The estimate of 5–10 moose/ 1,000 ha of forest, as an index of carrying capacity under conditions of intensive forestry, is considered a very rough estimate. All the factors affecting moose abundance such as the number of predators (mainly wolves), food availability, weather, climate, and man's activities should be known when estimating carrying capacity. These factors are extremely dynamic and are considered relatively stable only on smaller areas (around 10,000 ha for Latvia). In order to harmonize management of the moose–forest system, the following data should be accumulated annually: the occurrence of forest crop damage; moose population size, sex ratio, and annual increment rates; and the number of moose dying from harvest, predation, accidents, diseases, and other factors. The general trend in population density should be maintained upward with the following principle kept in mind: the moose population should be large enough to utilize the annual increment produced by its natural forage, without harming forestry interests. In practice, management proceeds by allowing the population to grow when there is no visible damage to the forest crops; i.e., the kill is further reduced from the previous year and the harvest is set less than or equal to the annual increment. If crop damage is increasing, hunting quotas are raised. Moose densities are thus reduced when required to avoid overutilization of natural forage and to reduce forest crop damage.

In summary, a prolonged period of intensive hunting on moose in Latvia, based upon the hunting techniques used (mainly enclosures), has had no long–term adverse impacts on the moose population. The population estimate for 1989 indicates that the cutbacks currently practiced should be halted and management should change to a policy of population control by implementing the principles discussed above. In this respect, methods that stimulate the growth of natural moose forage are of greatest importance. Only an integrated approach will resolve the problem between moose and intensive forestry and increase the overall productivity of the forest biogenocenosis.