Population monitoring and management

Finding the optimal population density estimation method for roe deer in open areas

Tóth, Gergely[1*]; Katona, Krisztián[1]

[1] Hungarian University of Agriculture and Life Sciences, Institute for Wildlife Management and Nature Conservation, Department of Wildlife Biology and Management, Gödöllő, Hungary
* tothgergely0148@gmail.com

DOI: 10.20315/evmc.2025.047

Monitoring population density of game populations is a basic task for game managers. However, it is not easy to find a relatively cost-effective, simple method which can be used widely among practitioners. European roe deer (*Capreolus capreolus*) populations have been increasing in Europe (also in Hungary) in the last decades. However, game managers rarely perform reliable counts of their populations, which leads to the underestimation of their population size and under-harvesting of the species, causing the wastage of important natural resources. Therefore, our aim was to identify the most suitable, cost-effective technique for roe deer density estimation in Hungary, where the species mainly occupies the lowland, sparsely forested, high-visibility flat areas.

We compared the census data obtained by: (i) the total counting in the daytime strip transect, (ii) the night spotlight strip transect, and (iii) the total counting of the sample areas with thermal camera from observation points within 0-250 m and 0-500 m ranges. The study was carried out in seven hunting areas. Our results supported the underestimation of roe deer populations obtained by classic methods. We revealed that using the thermal camera within 0-250 m and the spotlight method in the same range gave the statistically highest population density values without significant difference between them. The lowest mean value was obtained in case of the daytime strip transect, which results in underestimation of the population density in all cases. The thermal imaging method gave significantly lower values for the larger distance (250-500 m) than for the range of spotlighting (250 m). The night spotlight strip transect method and the counting from observation points with a thermal camera, both to 250 m, provided the highest values, thus they are recommended to be used for determining roe deer population density in open flat areas. Although they require a comparable amount of human resources and time, the spotlight method is well-suited for widespread use by wildlife managers due to the high costs of thermal cameras.