

Effect of organic fertilizers on permanent grasslands in the Low Beskids – the Polish part of the Western Carpathians

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Abstract

The aim of the study was to determine the actual dispersal of N and P from cattle slurry on permanent grasslands in the Low Beskid Mountains located in the Polish segment of the Western Carpathians. This has a special impact on environmental conservation and quality of life in rural submontane areas. The study used slurry from Simmental and HF cattle. The experiment was conducted on 120 ha of pastures and mown meadows in a clay loam soil. Data were statistically analysed with Statgraph using Duncan's test. After slurry application, N, P, K content and NH₃ emission were measured, and chemical analysis of the plant material was performed. Initial N and P content in meadows was 15.85 and 34.5 kg/ha; in pastures, N content was about 50% higher and P content about 30% lower. This N to P ratio in permanent grasslands resulted, among others, from N loss through emission and leaching. Over 22% and 27% N were leached in meadow and pasture. P loss from leaching was 5.5 kg. The use of slurry as a fertilizer also led to N loss through emission. Following slurry application, N emission as ammonia was 9.8 kg in meadow and 28.9 kg in pasture. Accumulation of elements in grass yields of meadows and pastures was 70.77 – 78.23 kg for N and 20 – 16.5 kg for P. Several technological factors of dairy farming contribute to periodic variations in the biogenic amines content of natural fertilizers. Before their use as fertilizer, the essential and permissible doses must be calculated based on current chemical analyses. Classical methods of soil slurry application cause large N losses as NH₃ emissions. N loss from leaching is directly proportional to N content in a single fertilizer dose. This observation refers to the permissible level of 170 kg N/ha. P fertilization also involved a high level of leaching, which is directly related to an almost 80% content of mineral P in cattle slurry.