

## Exercise yards in Finland - structures and environmental impact

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Requirements concerning the welfare of production animals have brought exercise yards to Finnish farms. The structure of the yard, the surface material and the space allowance are important from the point of view of both animal welfare and environmental impact.

Two exercise yards have been designed, constructed and monitored. Samples from the runoff water have been taken regularly, and their nutrient concentrations (total N, NH<sub>4</sub>-N, NO<sub>3</sub>-N, total P, PO<sub>4</sub>-P) total solids, pH, total chemical oxygen demand (COD) and hygienic quality have been analysed. The behaviour of animals has been observed.

It has proved easy to clean the asphalt area and to collect the manure from it. The runoff waters have also been easy to collect – except in late autumn and early spring, when the wells have frozen. The asphalt surface has become slippery during winter time; in particular, areas with a gradient of between 5 and 7 % have caused problems. The bark covered area has been blocked off a few times after heavy rain and snow melt. After a few days it has been possible to use it again. After one year in use the bark becomes worn and fragmented, so that it has to be removed. The bark is transferred to the field as a fertilizer. Cows have preferred the bark surface even if they have had hay to eat in the asphalt covered part of the yard.

Samples taken from the runoff water on the asphalt area show very high nutrient concentrations, while samples taken from the tubes under the bark and gravel layers show lower levels. In the samples taken from the bark covered area the phosphorus values are of the same level as that found in runoff waters from cultivated land. The numbers of enteric micro-organisms in samples taken from the asphalt area are of the same level as those found in slurry and municipal waste water. However, although the concentrations in samples taken from the bark covered area are significantly lower than in those from the asphalt area, they also fail to meet the EU limit values for bathing waters.

The space requirement per cow depends on the use of the exercise yard. If all the cows are forced to go out at a certain time and if they are fed there, an area of between 5 and 10 m<sup>2</sup> per cow is needed. But if there is no feeding and the cows have free access to the yard, less space per cow is sufficient. The fences have to be high enough; a height of 1.5–1.6 m is recommended.

The structure of exercise yards depends mainly on how much space there is per cow. When the space allowance is small, it is recommended that yards should have dense surfaces. If there is more room, part of the yard can be covered with soft material that cows find more comfortable. It is advisable to design the yard so that the area covered with soft material can be blocked off whenever it gets too wet. In all cases, the area around doors and feeding facilities should have a dense surface.

Runoff waters from exercise yards have to be collected and treated using a suitable method. To minimize the amount of runoff waters from the yards, water from the roofs must be piped to a point outside the yard and water from the surrounding areas must be prevented from entering the yard.