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Importance of thick humus layers for the sustainability of sensitive stand sites in the Northern Limestone Alps

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Thick humus layers over calcarious bedrocks are rare in lowland areas or low mountain ranges but common in the subalpine and montane zone of the Northern Limestone Alps.
In low mountain ranges such humus layers indicate unfavourable conditions for the germination and growth of trees. In contrast in the Northern Limestone Alps such humus layers, called Tangel, are beneficial for the regeneration and growth of spruce. Seedlings have a more balanced nutrient supply especially for nitrogen, phosphorus and potassium compared to sites with calcareous mineral soils. In mixed mountain forests with high portions of humus layers and coarse woody debris, spruces show better radial growth and are characterized by less canopy transparency and chlorosis compared to spruces on sites which had been clear cutted several times and today have only 1/10 of the formerly humus layer stock. Besides the more favourable nutrient supply also the larger available water capacity is responsible for these results.
Finally it can be shown that the microtopography in the snowclimate of the montane and subalpine zone of the Northern Limestone Alps play an important role for spruce regeneration. Spruce saplings are preferred in exposed position, caused by mighty humus layers and coarse woody debris.
It can be shown that those organic layers can be conserved best by permanent and dense forest coverage. This requires avoiding of clear cutting, adjusting game density and leaving of deadwood. Destroying those humus layers will inhibit forest regeneration for long time.