Good Land Management may enhance Soil Depollution

German researchers have recently studied the effect of land management practices on the removal of nitrogen and phosphorus contents from heathlands. They have shown that sod-cutting allows for a complete removal of nitrogen in soil. Prescribed burning is shown to be the best practice to limit phosphorus removal, which could be useful in areas where plant growth is limited by this chemical. Finally, their results highlight the role of combining several management practices to achieve efficient long-term management.

Every year, millions of tonnes of nitrogen compounds are emitted into the air in Europe. These emissions, which are generated in particular by road transport and agriculture, are found as a deposit on the land and may affect local ecosystems.

On European heathlands in particular, various scientific studies have shown that this atmospheric nutrient deposition (such as nitrogen deposition emitted into the air by road transport) has contributed to widespread changes in both the structure and function of the living ecosystems. The increased nitrogen loads have been shown to be one of the possible causes of the replacement of some plant species.

Recently, German researchers have investigated to what extent different land management practices can help reduce the quantities of atmospheric nutrient loads. To this end, they measured the quantity of nutrients (nitrogen, calcium, potassium, magnesium and phosphorus) in German land before and after managing land by mowing, prescribed burning or sod-cutting.

The results of their investigation show that:

- After a management period, the quantities of nutrients in above-ground biomass are reduced by up to 60% and 77% by mowing and prescribed burning respectively, depending on the nutrient. Sod-cutting is the only practice that removes the entire nutrient contained in the above-ground biomass.

- After the management period, mowing and prescribed burning practices led to an increase in the nutrient content of the organic layer of soil. On the contrary, all nutrients were removed after sod-cutting.

- Overall, one year of mowing, prescribed burning and sod-cutting remove a quantity of nitrogen corresponding to the average quantity that is deposited in 5, 5 and 90 years respectively. For phosphorus, the quantity removed corresponds to 14, 3 and 152 years of deposed phosphorus respectively.

The authors conclude that in view of the current deposition rates, the low intensity management practices (namely mowing and prescribed burning) are insufficient to prevent the accumulation of nitrogen compounds in heathland ecosystems in the long term. In addition, their results show that high-intensity practices (sod-cutting) are an indispensable instrument in preserving balanced N budgets. Regarding the phosphorus load, prescribed burning is the practice that most limits the removal of this chemical due to ash deposit. Consequently, the researchers suggest that this management practice is of great interest on heathland where the growth of certain plant species is limited by the phosphorus quantity.

Overall, these findings highlight the importance of combining several management practices in order to maintain and preserve the structure of natural ecosystems.

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