

## REDUCED P APPLICATION IN PEAT SOIL

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### *Description*

Use balanced phosphorus fertilization on peat soil or on soil with an organic matter content higher than 40% even if the content of plant available P is low, in order to minimize eutrophication risk of surrounding water bodies.

### *Rationale, mechanism of action*

Due to low P-binding capacity P loss is inevitable from newly fertilized peat unless edaphic properties can be altered, e.g. by mixing the peat with mineral soil or other material which can increase the P retention capacity. Managed peat soil is a hot spot for P leaching, depending on peat type and drainage conditions [1,2,3]. If the peat contains calcareous material the P transported from the soil can be dominated by particulate P [4]. To increase the P binding capacity and reduce the leaching potential, sand can be mixed into the peat. This action will also improve the soil structure and the heat capacity of the soil, and thereby increase the utilization of added fertilizers. Splitting the fertilization into two or more applications will improve the P uptake by plants and reduce the P leaching. In the Nordic countries large areas of low decomposed sphagnum peat is cultivated and the soil can contribute significantly to the P loading of surface water and groundwater. For the P fertilizer recommendation in Norway, balanced application of P is recommended for P-AL levels lower than medium. For higher contents of plant available P the applied amounts are reduced according to soil analysis using the same system as for mineral soil.

### *Applicability*

A reduced or split P application is applicable to all cultivated peat systems independent of growing systems.

### *Effectiveness, including certainty*

Peat soil is a sensitive system for P leaching. Balanced or reduced P application has a fast and effective influence on P loading from the soil.

### *Time frame*

The effect of balanced or reduced P application has a fast effect on P leaching. High levels of plant available P in peat and organic soil is easier reduced than in mineral soil.

### *Environmental side effect*

Reduced P application has no negative environmental side effect.

### *Relevance, potential for targeting, administrative handling, control*

The option is relevant for all cultivated peat and organic soils and is hence a way to target high risk areas of P leaching. Target values for P application are available in fertilizer data programs used on field level. Data on P application are stored in data files available for the farmer and advisors.

### *Costs: investments, labour*

No cost or labour to implement on farm or field levels, but there may be a cost of lower yields.

### *References*

- [1] Renou-Wilson, F. & Farrell, E.P. 2007. Phosphorus in surface runoff and soil water following fertilization of afforested cutaway peatlands. *Boreal Environ. Res.* 12:693-709.
- [2] van Beek, C.L., Droogers, P., van Hardeveld, H.A., van der Eertwegh, G.A.P.H., Velthof, G.L., & Oenema, O. 2007. Leaching of solutes from an intensively managed peat soil to surface water. *Water Air Soil Pollut.* 182:291-301.
- [3] Heathwaite, A.L. 1991. Solute transfer from drained fen peat. *Water Air Soil Pollut.* 55:379-395.
- [4] Litaor, M.I., Eshel, G., Reichmann, O. & Shenker, M. 2006. Hydrological control of phosphorus mobility in altered wetland soils. *Soil Sci. Soc. Am. J.* 70:1975-1982.