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Sustainable bioenergy cropping: growing reed canarygrass in acid sulphate soils

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The use of cropland for bioenergy cropping is a very controversial issue. Many countries including Finland are expecting to use as much as 25% of cropland for energy crops therefore putting in doubt the possibility of doubling global food production by 2050. The use of marginal land (difficult or infertile soils) such as acid sulphate soils to grow bioenergy crops may offer solutions to both the energy/food crop delimma and the management of these soils. Acid sulphate soils, occupying up to about 300, 000 ha of Finland, contain reduced sulphur compounds in the subsoil that oxidize to sulphuric acid upon conventional agricultural drainage, dissolving some heavy metals and aluminium from the soil matrix with harsh environmental impacts.

To prevent oxidation of the subsoil and diminish the deleterious acidification, cultivation of plants tolerant to high water table and occasional water logging is being considered. Perennial bioenergy crops, such as reed canary grass (*Phalaris arundinaceae*), may be a promising alternative for these soils.

A preliminary study has shown that elevation of water table increased pH in acid sulphate soils in cores as well as in the field when the water table rose during autumn rains. The response of reed canary grass to water logging, acidity and dissolved metals will be studied in the field as well as in a controlled environment using large monoliths of undisturbed acid sulphate soil taken into PVC tubes. Crop growth and physiological measurements will be taken under different conditions.

Management systems for acid sulphate soils will be developed while maintaining good growing conditions for energy crops and preventing release of undesirable solutes to watercourses.