ASSAY

A NEWSLETTER ABOUT ACID SULPHATE SOILS

No. 1 March 93

Local Government develops guidelines

Hastings Council are developing what they believe is the most comprehensive set of land management guidelines for acid sulphate soils (ASS). Growing awareness of acid sulphate soils in the Hastings area prompted Council to develop guidelines that would prevent their negative effects.

The guidelines would apply to all land holders with ASS. Council representative David Pensini stressed that community education was fundamental to the adoption of the guidelines and the management of acid sulphate soils.

Mapping NSW soils

Conservation and Land Management (CaLM) have begun a comprehensive soil mapping program which includes highlighting ASS. The survey will extend along the entire NSW coastal regions and will provide land management authorities and researchers with a most useful tool.

Safe excavation

A severe ASS problem may have been avoided at a proposed tourist resort development on Micalo Island, near Grafton, NSW. Initial soil surveys for an Environmental Impact Assessment revealed that almost two million tonnes of soil containing pyrite was to be excavated. This would have resulted in acidification.

Studies by Dr Greg Bowman, Principal Soil Scientist for the CSIRO Division of Soils, showed that pyrite particles were mainly in the clay sized fraction (ie. less than 20 microns). He suggests this size fraction could be separated by passing the sediment through a hydrocyclone, a machine used in conventional sand mining operations.

Once separated, the pyrite concentrate could be placed below the water table or rapidly oxidised and neutralised with caustic magnesia (a neutralising agent from ICI) in a controlled environment. A pilot project is expected to commence before major works.

ASS problem for cane farmers

Scientists have found that soil acidification and acidic run-off from cane fields could be decreased by maintaining a higher groundwater level.

Much of the cane in the Tweed region and elsewhere is grown on acid sulphate soils. Many cane farmers drain the fields continually and rapidly because they believe a high water table limits cane root development, lowering productivity.

A research team headed by Dr Mike Melville, University of NSW and Dr Ian White, CSIRO Centre for Environmental Mechanics, suspects that productivity losses are caused by inundation (either by rain or opening flood gates) *following a dry spell or drainage.* The team thinks acid formed in the dry soil when the water table was low is mobilised as the soil profile becomes saturated. They suspect acidity and aluminium in the rising groundwater affects nutrient uptake by the cane plants.

The team has installed equipment in a Tweed cane field to continuously monitor fluctuations in the groundwater (including height, pH and electrical conductivity). The condition of soil and drainage water is also being analysed to determine how they are affected by the level of the water-table.

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Run-off affects fish

Fisheries Habitat biologists are concerned about the dramatic decline of fish populations on the north coast of NSW. NSW Fisheries have been monitoring water quality discharged from drains in ASS. The results indicate that fish kills are almost certainly related to poor quality water coming from these drains.

Habitat Biologist, Craig Copeland, reports many severe fish kills in the estuaries of the north coast.

NSW Fisheries have embarked on a publicity program aimed at informing the public of the potential impacts of ASS and how these can be avoided.

Fish disease linked with land use

Australian Fiheries biologists suspect there is a link between run-off from ASS and Red Spot disease or Epizootic Ulcerative Syndrome (EUS).

Major outbreaks of EUS have occurred in Japan and the Philippines costing the fishing industry in these countries millions of dollars.

Studies by Dr Dick Callinan and Dr Graeme Fraser of NSW Fisheries have identified Aphanomyces (an aquatic fungi) as the primary infectious agent of EUS. Under normal conditions, the scientists have found that Aphanomyces will only invade the skin of a fish where there is an abrasion.

Major outbreaks of EUS typically follow heavy rain. It appears that one or more changes in estuary water quality may damage the skin, allowing the fungus to establish.

According to Graeme Fraser, run-off from ASS may be an important factor in EUS. However, he believes the relationship is not direct, as EUS outbreaks have occurred without ASS run-off.

Research is focusing on monitoring water quality changes and the health of specific fish species to determine what habitat changes are associated with EUS. PhD student on the project, Jesmond Sammut, believes that given the environmental factors that affect water quality finding answers will be difficult.

Inland soils affected

Researchers in Sth Australia have found ASS in the Mt Lofty Ranges. Finding ASS in this semi-arid, inland region is a contrast to the typically-affected lowlying coastal country.

Dr Rob Fitzpatrick, CSIRO Division of Soils became aware of the problem soils, but first assumed ground water salinity had caused the severe degradation. The discovery of a mineral, formerly only known to occur near sulphurous mine waste, indicated pyrite oxidation was a factor. According to Dr Fitzpatrick the problems in the Mt Lofty Ranges didn't result from drainage but rather, rising ground water. The pyrite came from deep below the ground, dissolved and transported to the surface, where it oxidised causing acidification.

Dr Fitzpatrick and others will be addressing the issues of ASS and conducting field trips to places such as Mt Lofty Ranges at an International Conference to be held in Adelaide on July 18-23, this year.

NATIONAL CONFERENCE ON ACID SULPHATE SOILS

Gold Coast

June 24-25, 1993

KEYNOTE SPEAKER:
Dr David Dent, lecturer in soil science at the University of East Anglia.

David is the author of *Acid Sulphate Soils: a baseline for research and development* and co-founder and editor of the international journal *Soil Survey and Land Evaluation.*

For further information contact Bob Smith (see front page of this newsletter).

This newsletter is the initiative of Bob Smith, Wollongbar Agricultural Institute. If you would like to contribute a brief article, contact Bob on the telephone number shown at the bottom of the front page.