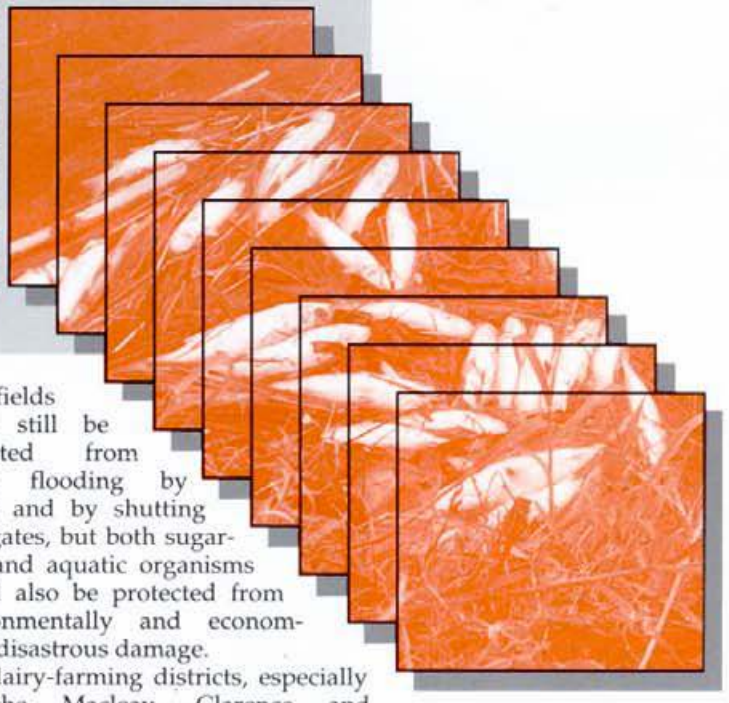
Red spot disease: the acid connection

Australian fisheries biologists suspect there is a link between run-off from acid sulfate soils and red spot disease or epizootic ulcerative syndrome (EUS), an ulcerative skin disease of estuarine fish that has been reported from much of Australia's eastern and northern coastlines, as well as the south-west of Western Australia.

Studies by Dr R. Callinan and Dr G. Fraser of the New South Wales Departments of Fisheries and Agriculture, have shown that the primary cause of mortality in affected fish is the invasion of skin and underlying muscle by an aquatic fungus, *Aphanomyces*. The sudden appearance of EUS in Australia (the disease was first recorded in Queensland in 1972) and its rapid spread suggest that *Aphanomyces* may be a recent introduction into Australia. Outbreaks have occurred in Japan and the Philippines, where it has dramatically reduced fish stocks in the lakes that supply urban Manila with fish.

Aphanomyces seems incapable of affecting fish under normal environmental conditions, and outbreaks typically follow prolonged periods of heavy rain. It appears that one or more associated changes in estuary water quality (including high acidity, high levels of aluminium and low dissolved oxygen levels) may damage the skin of fish exposed to these changes — perhaps by affecting the skin's protective mucus coating — allowing *Aphanomyces* to invade.



Fortunately, Dr Willett, Dr White and Dr Melville consider the problem can be solved simply and at little or no cost, through a change in cane-farming practices. Cane-growers believe their fields must be drained continually and rapidly by floodgates emptying into adjoining waterways. They suggest that more than 3 days' immersion kills cane roots and reduces productivity, but this belief is based more on tradition than on science; the wild sugarcane that grows along the Sepik River in Papua New Guinea (an important source of new strains for growers in Australia and elsewhere) is more or less permanently inundated, with little effect on productivity or growth.

The research team suspects that productivity losses stem not from inundation *per se* but from inundation following a dry spell or drainage regime that brings oxygen into contact with acid sulfate soils. Flooding generates and releases sulfuric acid and aluminium into the cane plants' water supply, so the roots take up these toxic substances.

Neutralising the soils by adding lime to cane-fields would be unpractical and prohibitively expensive. Instead, the researchers suggest that growers simply adjust the floodgates that drain their fields so water tables can rise to cover — and thus seal — the acid sulfate soil layer. Cane-fields could still be protected from major flooding by levees and by shutting floodgates, but both sugarcane and aquatic organisms would also be protected from environmentally and economically disastrous damage.

In dairy-farming districts, especially on the Macleay, Clarence and Richmond Rivers, Dr Willett suggests winding down drainage schemes so problem areas can return to wetlands. Paddocks affected by rainwater ponding and the subsequent production of anoxic water, and by acid sulfate soils, tend to be unproductive anyway, so primary producers would suffer minimal economic loss.

On the other hand, the gradual return of these paddocks to wetlands would have significant conservation value, not only in the sense of conserving habitats for their intrinsic value but also because the decline of wetlands has resulted in a similar decline in the populations of birds such as ibis, which provide a valuable service to farmers by feeding on insect pests.

Carson Creagh

Problems of acid sulfate soils and water quality degradation in Holocene pyritic sediment systems. M. D. Melville, I. White and I. Willett. *Proceedings of the Workshop on Applied Quaternary Studies, Australian National University, Canberra 1990* (in press).

'Review of Land and Water Management Impacts on Fisheries and Agriculture Resources in the Lower Macleay.' (New South Wales Department of Agriculture and Fisheries: Sydney 1989.)

The trouble with the Tweed. C. Easton. *Fishing World*, March 1989, 58–9.