EUS: MYSTERIOUS FISH DISEASE STALKS INLAND WATERS

In the last two decades a serious and severely damaging fish disease has been spreading through countries of the Asia-Pacific region with dangerous consequences to the fish resources and livelihood of inland fisherfolk. For a disease which is twenty years old, it is strange and baffling that the scientific community has not been able to pinpoint its causative agent.

Not only is this disease -now officially termed Epizootic Ulcerative Syndrome (EUS) - a scientific puzzle or, optimistically speaking, a scientific challenge, it is also a worrisome social problem. Hundreds of inland fishermen, often the more marginalised amongst the fishworker communities in the affected countries, have been overnight deprived of their incomes, as consumers began to totally reject the disfigured, disease-stricken fish. There are no signs of an immediate abatement of EUS and, worse, there are all indications of a possible spread of the disease.

Though cutaneous ulcerative diseases are common amongst wild and cultured fish, for the last two decades, regions in Australia and Asia-Pacific have been witness to a group of epizootic syndromes, all involving a severe ulcerative mycosis.

As Kamonporn Tonguthai of the Aquatic Animal Health Research Institute, Kasetsart University, Bangkok, paints out, there have been several reports of ulcerative disease conditions amongst wild and cultured fish in this region. While FUS refers specifically to the Asian condition, there are great similarities with other fish conditions. However, Tonguthai cautions, only further research can confirm whether these are indeed the same disease.

EUS was first reported in March 1972 from central Queensland, Australia, where several species of estuarine fish had developed large shallow circular or irregular skin lesions. Initially named ‘Bundaberg fish disease’, it displayed a pronounced seasonality and was soon associated with prolonged periods of rain which was thought to alter the quality of water and make it prone to infection by bacteria. As it spread to

several species of freshwater fish in the river systems of Papua New Guinea and Western Australia, the disease soon came to be called “red spot”.

In 1980 a similar haemorrhagic condition was seem among fish, including rice-field fish, in Java, Indonesia. But pathological and epidemiological differences seemed to set this apart from the Australian condition. However, subsequent outbreaks of EUS in brackish water fish in the Philippines and typically ulcerated snakeheads and catfish in other states of Indonesia have confirmed the link with the Australian red spot.

In 1986 the FAO’s Consultation of Experts on Ulcerative Fish Diseases adopted the name “Epizootic Ulcerative Syndrome” (EUS) to specifically refer to the Asian condition. The disease is characterised by large cutaneous ulcerative lesions which periodically cause the death of many species of wild and cultured freshwater fish.

The first reports of classic EUS came from peninsular South-East Asia, in 1979-80 from Malaysia’s Bekok River system and the next year, from its northern rice growing states, where freshwater rice-field species of fish succumbed to serious ulceration. In the course of the decade since then, the disease spread to almost all parts of South and South-East Asia, specifically Thailand, Laos, Myanmar, Vietnam, Cambodia, Bangladesh, India and Sri Lanka. In its westward spread from Australia, EUS’ latest occurrences have been reported from Kerala, Gujarat and Rajasthan in India.

The spread of EUS shows a certain pattern. Outbreaks are typically cyclical, with the first occurrence being particularly severe and recurrences over the next two to three years, less so- There is, however, no uniformity to this pattern. While the disease spread rapidly in some areas like Malaysia and Thailand, in other areas like Indonesia, its progression was slow. Moreover, in Malaysia there was a one year gap between outbreaks.

The mechanism of spread is also not clear. The disease has spread rapidly northwards where the rivers flow from east to west, and equally rapidly westwards in areas where the rivers are oriented from north to south. It would thus not be possible to attribute the transport of the pathogens to, say, monsoonal flood plains alone. Also mysterious is the spread of EUS to areas like Sri Lanka and some islands of the Philippines. (The unrestricted trade in live fish could be a mode of transmission.)

Investigations into the potential causative factors have focused on viral, fungal and bacterial agents. Environmental parameters have also been studied. These abiotic factors are believed to cause sublethal stress to the fish, initiating disease outbreaks. Potential causes of stressful environmental conditions include temperature, eutrophication, sewage, metabolic products of fishes, industrial pollution and pesticides.
The quality of water also appears to be significant from an aetiological point of view. Parameters like salinity, alkalinity, temperature, hardness and chloride concentration (many of which are seasonally variable) are known to predispose fish to attacks of EUS. Infected fish showed signs of improvement when transferred to clean freshwater ponds.

Also, in much of Asia’s paddy field systems, EUS occurred towards the end of the paddy cultivation period when the water level is low, decomposition of organic matter like grass and water weeds is common, and certain types of ferlilisers accumulate.

Yet, as Tonguthai points out, ultimately no definite conclusions about the cause of the disease can be drawn since ‘outbreaks are considered to be a complication of several factors’.

Correct diagnosis of EUS, focusing on symptoms of behaviour, external signs and histopathology, is the prelude to treatment. Both prophylactic and therapeutic treatment, usually involving the addition of quicklime, have reported satisfactory results. Yet, without large-scale comparative assessments across a variety of affected species, liming cannot be unequivocally advocated. In fact, lakes in Kerala, India, with high levels of natural deposits of lime, have also been the site for EUS outbreaks.

Prophylaxis revolves around good general husbandry practices including disinfection, opting for water from tube wells rather than irrigation canals or paddy fields, and ensuring disease-free stock and healthy fry. Apart from not overstocking ponds, other preventive measures include the use of antibiotics and chemicals.

Successful prophylactic and therapeutic treatments have generally involved the addition of quicklime (CaO), a relatively simple and inexpensive way of enhancing water quality. This fact only reinforces the need to overcome the environmentally degrading conditions which may predispose fish to disease.

Salt, potassium permanganate, bleaching powder and malachite green can also be recommended as alternative, or additional, prophylactic measures. Others include formalin, iodine and the peroxide disinfectant **Virkon S.** Claims of success have also come from ‘traditional’ home-spun remedies like the application of crushed tamarind or banana leaves or turmeric powder to the infected ponds. These methods, however, have not been scientifically tested. Antibiotics have been found useful in controlling secondary bacterial infections.

The aetiology of EUS is still shrouded in mystery. Clearly, more studies are needed, with particular emphasis on investigating the role of Oomycete fungi and

viruses in the pathogenesis of the disease. Also required are more detailed descriptions of the histopathological characteristics of EUS and similar ulcerative conditions.

Experience points to the need for an integrated approach to fish health, particularly general husbandry and management techniques. This, however, calls for more detailed studies quantifying preventive and curative treatments. Only such studies will produce workable techniques to control EUS in cultured fish populations, and perhaps in wild fish populations in enclosed and semi-enclosed waters.

Environmental factors like temperature, alkalinity, hardness and pH, are important in initiating EUS. But again, only further, more rigorous, experimental work can determine which ones are really relevant.

The absence of adequate data on the relationship between EUS and the environment. In this context, continuous and region-wide monitoring programme of selected environmental parameters, ought to help in elucidating these variables.

As a devastatingly chronic syndrome, EUS has few parallels in the history of fish diseases in inland water bodies in the Asia-Pacific region. Its seemingly relentless spread has only fuelled panic and despair amongst inland fisherfolk and aquaculturists.

While scientists are yet to come to firm grips with the aetiology of EUS, experiences from the affected regions suggest simple and invariably effective measures for treatment and prophylaxis.

Evidently, however, much more scientific research remains to be done on the aetiology and histopathology of EUS. Equally important would be further socio-economic analyses of its impact on the livelihood and working conditions of affected fisherfolk.

Significantly, the experience of affected countries reveal certain institutional and organizational lacunae. Few governments have any ready-made, adequately responsive institutional arrangements in the fisheries sector to tackle as major a crisis situation as that created by EUS. Not strangely therefore, action is often contradictory—at times slow and at other times, hasty and misdirected.

However, the experience of Kerala, India demonstrates the power of mass-based campaigns and agitation programmes by fishworkers organizations. Such grassroots action forcibly elicited responses from the state. These may not have been as effective as many fishworkers would pave desired. However, they certainly represented some form of redressal.

In this perhaps lies a pointer to the future of collective action. As the tides of confusion and ignorance continue to retard scientific progress in unraveling the mystery of EUS, only such campaigns can hope to bring succour to the affected fisherfolk. ■