INVASION BY ALIEN AIR-BREATHING PREDATORS

BY PETER GEHRKE

Air-breathing fish such as striped snakehead, walking catfish and climbing perch have a distinct advantage when it comes to invading new territory: they can survive out of water for days. It is a trait that entices fishers to transport live fish between villages and islands. But even without this assistance, the air-breathing fish are known to waddle crudely between water systems in the manner of intrepid semi-amphibious missing links.

In their native range—which covers Southern and South-East Asia from China to Pakistan—they are an important food fish of considerable economic importance. But since their introduction in Indonesia, the species have proven voracious predators with a natural talent for spreading southward.

They entered Papua New Guinea’s Western Province from Indonesia during the 1980s and rapidly established wild populations in the Fly River system and surrounding catchments, where they are proving difficult to control and appear to be spreading. All three species were recorded in the Kikkori River, 150 kilometres east of the Fly, and unconfirmed reports also place climbing perch in the Port Moresby region.

From here, they are moving towards northern Australia, where they pose a threat to native species such as barramundi. Already climbing perch is established on the Australian islands of Saibai and Boigu in Torres Strait.

To better grasp the biosecurity implications of this alien invasion, ACIAR commissioned the Snowy Mountains Engineering Corporation (SMEC) to undertake a scoping study and assess the policy implications for Papua New Guinea.

ARRESTING AN ALIEN INVASION

Snakeheads are the most voracious of the three species, able to grow up to 1 metre long. They are expected to affect recruitment of species such as barramundi by preying on juveniles in nursery wetlands.

Climbing perch are smaller, growing to about 25 centimetres, and use strong fin spines and flexible sub-opercula to pull themselves over land. They feed on aquatic plants, shrimps and small fish. Predatory Australian species such as large fork-tailed catfish and barramundi have been found dead with climbing perch lodged in their throats.

Walking catfish grow to about 50 centimetres and have an omnivorous diet, feeding on insects and insect larvae, earthworms, shells, shrimps, small fish, aquatic plants and detritus.

If these species establish populations in Australia, potential effects on aquatic ecosystems and fisheries are likely to be significant through predation, competition for food, habitat damage, disease and parasites.

In addition to effects on freshwater species, commercial species that spend time in estuaries and coastal wetlands could also be affected.

For the time being, a strong public awareness campaign by the Australian Quarantine and Inspection Service appears to be preventing their spread further south from Saibai and Boigu islands.

Beside fishers, these predators have been found to have other means of invading Australia at their disposal. They can migrate along river channels, through coastal waters in low-salinity river plumes, overland between rivers and wetlands or aquaculture ponds, and through drainage channels alongside road networks.

Dead pelicans with climbing perch in their throats have been found on other islands, suggesting that birds may also be a vector for transport.

Available information suggests that climbing perch are spreading most rapidly, especially into Torres Strait, but it is highly likely that striped snakehead and walking catfish will follow within the next 10 years.

Options in Australia to reduce the potential impact on local environments and fisheries have been identified. These include working with Papua New Guinea to contain populations and prevent their further spread, including across Torres Strait.

Besides community education to reduce the incidence of human-assisted spread, a need was also identified to develop the capability to eradicate populations where it is feasible and practical to do so, especially at the island level.

While trade in invasive fish in Australia is prohibited under existing legislation, continued vigilance to prevent illegal importation of live fish is recommended.

Following the completion of the project, a workshop was held in Brisbane to raise awareness of the threats posed by these invasive species. Outcomes include a risk assessment of existing policies in Australia, identification of linkages between government agencies, assessment of communication processes, and identification of knowledge gaps on potential rates of spread, biology and impacts of invasive species, and control options.

The project was conducted with strong assistance from Boga Figa, formerly with James Cook University, and Jacob Wani, National Fisheries Authority of Papua New Guinea.

Achievements over the years

- A rapid diagnostic test for foot and mouth disease developed in an ACIAR collaboration with Thailand allows the confirmation of the disease in a matter of hours, saving vital time in containing a disease outbreak.
- The development of a reliable and accurate diagnostic test for bluetongue disease in cattle and sheep facilitated a change in Chinese quarantine policy to allow the importation of Australian live cattle. This ACIAR project provided the basis of a mutually acceptable quarantine procedure between Australia and China relating to the export of live cattle.
- In Australia, ACIAR projects underpinned methods now used for active animal health surveillance in Queensland’s extensive beef industry sector. This includes the adoption by the Australian Quarantine and Inspection Service of a method to identify and diagnose Trypanosoma evansi, a protozoan that can infect a wide range of animals.
- Graziers in Australia’s extensive cattle grazing areas benefited from the application of tick fever tests derived from ACIAR projects that aid decision-making regarding whether expenditure on vaccines is warranted.
- ACIAR research contributed to the effective papaya fruit fly eradication campaign in northern Queensland. Research on fruit flies in the South Pacific region contributed towards the development of regional quarantine strategies to manage fruit fly problems within neighbouring countries.

More information: Peter Gehrke, peter.gehrke@smec.com, www.smec.com