



PARTNER COUNTRIES: Thailand, Vietnam

PROJECT: Management of *Phytophthora* diseases of durian (PHT/1995/134)

DESCRIPTION: The popular tropical fruit durian is prone to fungal diseases, but by developing an integrated disease-management strategy, scientists have come up with ways to limit their impact

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The durian market at the ferry crossing at Thuy Tay village, in South Vietnam's Tien Giang province.

BRAD COLLIS

Economy ripens on durian rescue

A joint effort between Australia, Vietnam and Thailand is seeking to save the durian industry—and the livelihoods of thousands of small farmers

BY BRAD COLLIS

Life at the ferry crossing in Thuy Tay village in South Vietnam's Tien Giang province has a distinctive rhythm, set by the to-and-fro of the cable-driven ferry and the tide of heavily laden motorbikes that flood the deck for this brief river-crossing break in their rush to market.

On the outward leg the bikes are barely visible

beneath large woven baskets filled with freshly picked durian fruit, destined for adjacent villages or for transfer to a river boat that will take the fruit further north to bigger markets at My Tho City or even Ho Chi Minh City.

For anyone not directly involved in this steady flow of commerce, it is a heartening vista from the shade of a streetside coffee house, because the whole scene

is the ‘fruit’ of agricultural science. The motorbikes, their riders, the industrious ferry, the coffee shop (and its karaoke machine) are the manifestation of an agricultural economy that is the result of the science that saved the fledgling fruit industry and propelled it forwards.

Twenty years ago this was a poor rice-growing district and growing tropical fruit—in this instance, durian—was the Vietnamese government’s answer to a better future for traditional villages and, in the longer-term, a possible export fruit industry.

The land-use change needed considerable agronomic assistance from the start, but nothing compared with the research effort required when the mature durian orchards started dying.

As farmer Nguyen Thanh Nhung explains: “When the trees first started showing signs of disease everyone started applying pesticides, which was very expensive ... and didn’t work because that wasn’t the problem.”

However, researchers soon realised the attack was coming from the fungus *Phytophthora palmivora*, which thrives in the hot, moist conditions typical of the low-lying Mekong Delta. The challenge was how to manage it: tropical fruit, including durian, had introduced entirely new farming systems to the region so there were no off-the-shelf answers.

Saving the durian industry and the livelihoods of thousands of farmers became the focus of the ACIAR-supported project and broadened into a joint endeavour between Australia, Vietnam and Thailand. Durian is also grown in Queensland and the Northern Territory, so any new knowledge and management protocols had potentially far-reaching benefits.

Dr Nguyen Minh Chau, director of Vietnam’s Southern Fruit Research Institute (SOFRI), says the durian farmers were hit hard by the disease because it had become an important crop and was already supplying a significant proportion of farmers’ incomes. The disease was also a blow to the country’s long-term ambitions for a tropical fruits industry with export potential.

When a tree suffers from *Phytophthora* gummosis, caused by the organism *P. palmivora*, it oozes gum as the sap starts to leak from a spreading wound that gradually moves around the tree, ringbarking and killing it.

Dr Minh Chau says the disease usually strikes when the trees are seven to 10 years old and, if nothing is done, the tree can be dead in 12 months. He says the research project had to initially develop a control for trees already infected, then put in place longer-term strategies to prevent the disease recurring or spreading.

In the first instance researchers found that injecting phosphoric acid into the tree trunk changed the pH environment within the wood, making it hostile to the fungus.

Trees treated in this way recovered quite quickly.

Nguyen Thanh Nhung says the first thing he observed after he treated his infected trees with phosphoric acid was they became noticeably greener, and then the scarring started to heal over. He says the availability of this control tool has put his 1.1-hectare enterprise back on track and he hopes to soon be earning enough to buy more land and expand his durian orchards.

The next research focus was to develop improved varieties—rootstock with increased strength and *Phytophthora* resistance, and also varieties producing higher-quality fruit.

Dr Minh Chau says the resistant rootstock that has been developed is producing taller and more productive trees. However, this is only an option for new orchards or where farmers are replacing trees that have been killed. In either case, he says, it is important that farmers are educated about the new varieties and the need to eliminate the conditions that allow the fungus to thrive and spread.

“It starts with good nursery management to ensure all the soil used for growing new stock is sterilised,” Dr Minh Chau says. “Then it is about sustaining good practice on farms.”

One on-farm practice that has been developed is to build a mound of earth against each tree so that rain runs away from the base of the trunk and does not create the sodden, warm conditions that facilitate fungal growth.

Farmers are also encouraged to keep the ground beneath the trees clean and free of leaf matter, so the soil surface can remain as dry as possible. In the lowlands the mounds are typically 70 centimetres in height, while in the highlands 10 to 20 cm has been shown to be enough. The use of mounds is also now being used in rubber and cocoa plantations.

Dr Minh Chau says the development of a sustainable durian industry is part of a wider program to move subsistence rice farmers into horticulture, because the demand for fresh fruit in large towns and cities is growing. He says fruit can earn a farming family four to five times more than rice, with dramatic consequences for living standards and the establishment of a sustainable agricultural economy.

“It is giving people a chance,” he says. “No-one wants to stay in poverty.”

During the transition years from rice to fruit growing, farmers planted their trees on raised beds and grew rice in between. Now, in most orchards, the rice is gone.

“We want fruit growing to follow what we have achieved with rice,” Dr Minh Chau says. “In 1975, rice production was dominated by small-plot subsistence farming, but in 25 years this had been replaced by a modern export industry.

“This is what we also hope to achieve with fruit. We started in 1994 and our ambition is to be producing export-quality fruit by 2010–15.”