

SESSION 2 CASE STUDY 1

Partnership through the Treaty Village Fruit Fly Trapping Program: Papua New Guinea and Australia

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ABSTRACT



The Treaty Village Fruit Fly Trapping Program (TVFFTP) was established in 2022 to understand the population dynamics of Oriental fruit fly (*Bactrocera dorsalis*) within the Treaty Villages of Papua New Guinea's (PNG) Western Province. This work complements, and is an extension to, the extensive fruit fly trapping and eradication program that was established in Australia's Torres Strait in the 1990s. Improving our understanding of Oriental fruit fly populations and movement throughout this region is mutually beneficial for both PNG and Australia. For PNG there is potential to minimise fruit fly impacts on agriculture and improve food security in regions that rely on subsistence farming. For Australia, prospects of reducing fruit fly incursions via the Torres Strait offer vast benefits for national biosecurity risk mitigation. The success of the TVFFTP is attributable to the collaboration between NAQIA (Papua New Guinea National Agriculture and Quarantine Inspection Authority), DAFF (Australian Department of Agriculture, Fisheries and Forestry), INLOC Operational Group, and the Treaty Village Ranger Network, and it is a testament to the genuine long-term partnership between our two countries. The social and cultural connection between the PNG Treaty Village Rangers and DAFF Torres Strait Biosecurity Officers is strong and is part of this project's successful partnership. This connection has strengthened biosecurity collaboration across the region and builds on the long-standing connectivity across our close borders.

We are giving a joint presentation about the Treaty Village Fruit Fly Trapping Program (TVFFTP) for Papua New Guinea (PNG) and Australia, including linkages to the National Exotic Fruit Fly Eradication Program in the Torres Strait. We will cover the purpose of the TVFFTP, the collaborators, the challenges, benefits, outcomes and the link between Treaty Villages and Torres Strait islands, and the future plans for the program.

Treaty Village Fruit Fly Trapping Program

Between DAFF and NAQIA we have more than 20 years of partnership in conducting combined plant and animal health surveillance, and one such collaboration is the Treaty Village Fruit Fly Trapping Program. The program commenced in 2022 to understand the population of Oriental fruit fly. The Treaty Villages are located at the southern border of PNG, just above the Torres Strait Islands (Figure 1).

The Oriental fruit fly is one of the world's worst horticultural pests, with more than 400 host plants, and it causes detrimental impact to food security in the community. The Treaty Villages rely on food gardens for their livelihood which are at risk of Oriental fruit flies. The Oriental fruit fly also impacts biosecurity outcomes for both countries.

Fruit fly trapping is undertaken in 14 Treaty Villages and Daru island. Two traps are set up in the 15 sites, cleared on a fortnightly basis during January to June because of the wet season, and on a monthly basis during July to December because of the dry season. This program is an extension of the established National Exotic Fruit Fly Eradication Program in the Torres Strait, outlined below.

Treaty Village Fruit Fly Trapping Program (TVFFTP)

- Commenced in 2022 to understand Oriental fruit fly population.
 - Trapping undertaken in 14 Treaty Villages and Daru
- Successful partnership program: Papua New Guinea (NAQIA), Australia (DAFF), INLOC and the Treaty Village Ranger Network.
- Challenges – Geographical location, highly remote, only accessible by boats, weather/tides.
- Challenges are overcome through collaboration.

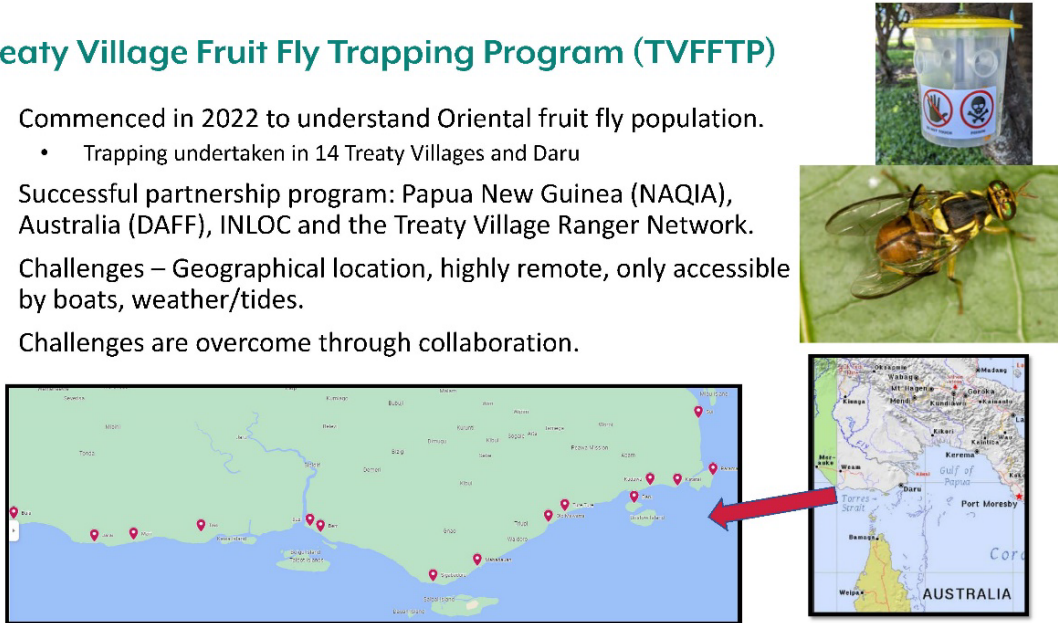


Figure 1. An adult Oriental fruit fly (6–8 mm long), and a trap; and maps showing the Treaty Village locations along the south-west coastline of PNG.

The program is co-designed and co-delivered between NAQIA in PNG and DAFF in Australia, involving multiple partners in their respective roles and responsibilities. INLOC (a training and operational support group) and the Treaty Village Ranger Network conduct the operational support to collect and maintain fruit fly traps. Since 2022, more than 50 rangers have been trained on the field monitoring of fruit fly traps. Fruit fly traps are cleared by the rangers and the collections are sent by INLOC to entomologists in DAFF to undertake analysis and species identification.

The Treaty Villages are accessible only by boat, and access is dependent on the weather and the tides, but these challenges are being overcome through the strong partnership that has been developed.

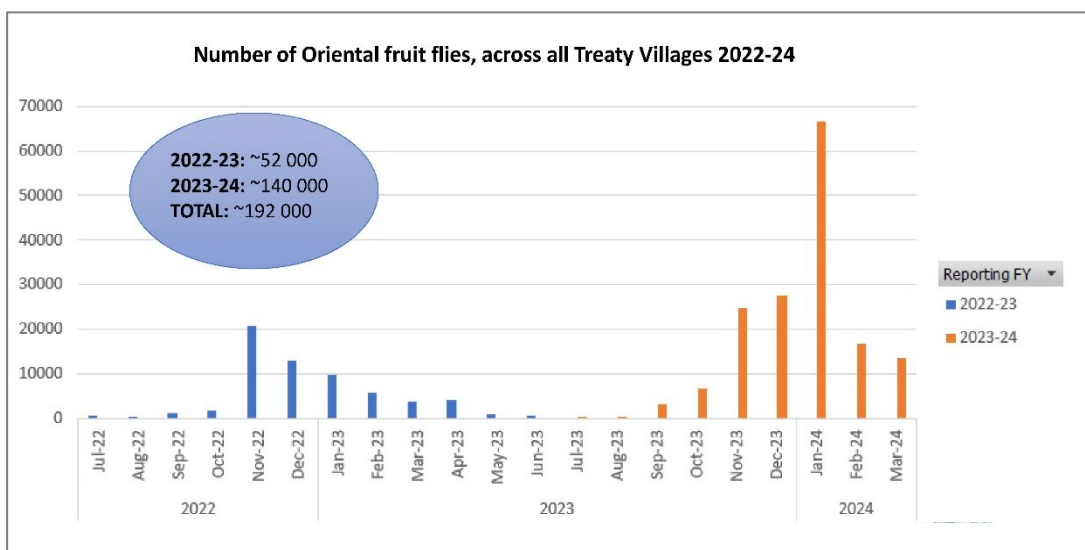


Figure 2. Outcomes of the Treaty Villages Fruit Fly Trapping Program.

The graph (Figure 2) indicates the number of Oriental fruit flies that have been collected in traps since 2022. There is a seasonal trend in fruit fly numbers, which coincides with the wet season when mango and other host species are fruiting in the area. We had a lot of flies trapped in the fruiting season for 2023–24 (Figure 2). We do not have a clear reason for that increase, and therefore we will continue trapping to find a way to manage these flies. The seasonal trend is not unique. A similar trend of fruit fly numbers is seen in the Torres Strait. Oriental fruit fly first spread to Torres Strait in 1993, soon after its incursion into Papua New Guinea.

Torres Strait Exotic Fruit Fly Eradication Program

There is also a National Exotic Fruit Fly eradication program undertaken in the Torres Strait. There are a series of over 100 permanent traps installed right across the islands and the northern peninsula area. These islands are numerous and isolated, and helicopters are required to have access to these locations (Figure 3).

We have two different types of trap: ME (metal eugenol) traps and Cue-lure traps. These have to be cleared on different days and flies are kept in separate sample boxes to avoid cross-contamination. Biosecurity officers from Thursday Island access these locations to collect fly samples, and then send the samples to entomologists in Cairns for analysis.

As already mentioned, the Torres Strait has a similar trend of flies caught in the traps, but the numbers are not as high. This is why there is a program in place to eradicate exotic fruit flies in the Torres Strait before they get to mainland Australia. Torres Strait is like a buffer zone (see the map in Figure 3). When a high number of exotic fruit flies are detected, the response program starts, under the direction of the scientists in Cairns.

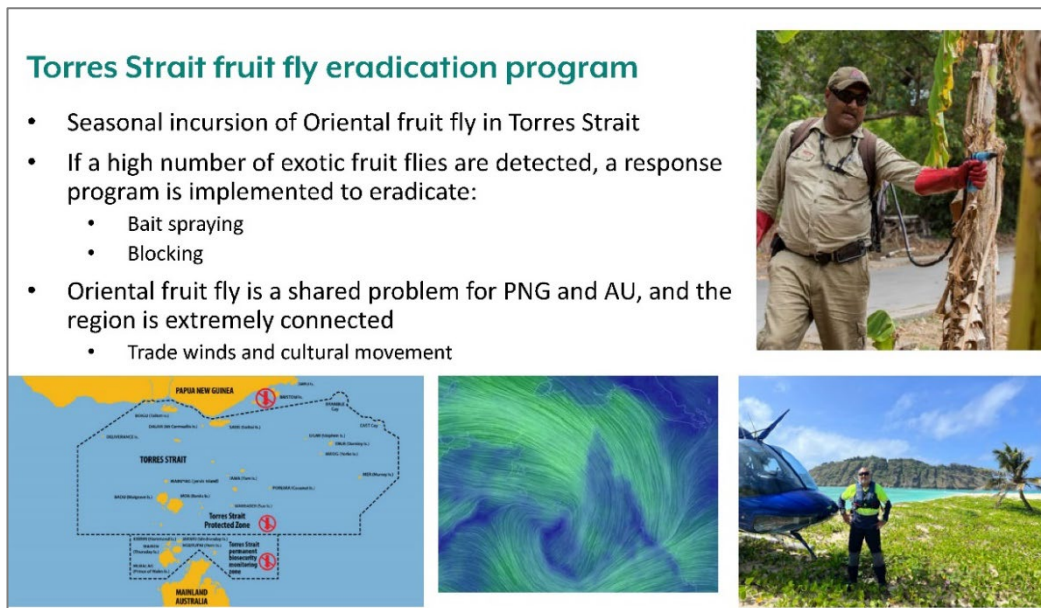


Figure 3.

- Response activities include bait spraying and bait blocking:
Bait spraying is done by biosecurity officers on the island. This mixture of a lure, natural pesticide and water is sprayed on edible-fruit trees, on and under leaves or on the trunks of the trees, avoiding the fruit. This spray kills female flies. The task varies depending on the size of the island. It can take three hours or more to spray, occurring once a week for 12 weeks, or until no more flies are detected. It is better to spray in the morning when the flies are more active.
- Blocking is coordinated by Biosecurity Queensland. A pesticide block, which is nailed onto trees, kills male flies.

The region between PNG and Torres Strait is extremely connected, meaning the impact of exotic fruit fly is a shared problem that we need to manage together. The Torres Strait Treaty between PNG and the Torres Strait permits cultural movement of people between Torres Strait Protected Zone – the one in the middle in the map in Figure 3 – and the Treaty Villages of PNG. Travel must be for traditional purposes only, as there are strict conditions attached to the Torres Strait Treaty: for example, a wedding, church activities, funeral, bartering or trade. But there is still a strong connection here.

There are also trade winds (Figure 3) that blow across from PNG to the Torres Strait, which could be helping exotic fruit flies from PNG to jump to the Torres Strait during the monsoon season.

Cultural connections are important

As a result of my (Patrick's) experience in managing fruit fly in the Torres Strait, I was able to support the Treaty Village Rangers by attending training in PNG last November, to share my experience and knowledge with the rangers. I opened the training session with cultural acknowledgement, to acknowledge the traditional owners of the land, to reassure them, to 'Eso them' (thank them) from the team delivering the training, and to share connection between Torres Strait and the Treaty Villages. I also shared that 'This is a two-way street: we are here to learn as well. This is your place, your home, your culture. You have the local knowledge. We are not here to deliver to you, but to learn from you as well.'

We demonstrated the fruit fly management techniques that are undertaken in Torres Strait including spraying and blocking, between myself and our scientists in DAFF (Figure 4). There was also a demonstration of cultural management techniques, including banana leaf wrapping, from a representative from PNG villages. The Treaty Villages don't have shops nor resources, so this is the next best thing to protect their crops.



Figure 4.

This opportunity was very special to me, as my family bloodline goes back to PNG. I shared the Torres Strait Creole language to strengthen the connection, shared jokes and icebreakers. During this training, there was support from Treaty Village Rangers for trial of fruit fly management to be done within the Treaty Villages to help reduce the number of flies and the damage that they see on their crops.

Future plans for the TVFFTP

- The future plans for the Treaty Villages Fruit Fly Trapping Program include trials of fruit fly management techniques in the Treaty Villages, which will benefit the food security and biosecurity of Treaty Villages, PNG and Australia. The outcomes of this study can be applicable across PNG and other Pacific Island countries. Community engagement and support are key in these collaborations.

- Ongoing refresher training will be held for the Rangers; e.g. a session is scheduled for October 2024.
- We are also collaborating with AgriBio in a genomic study to understand if there are any genetic links between the Oriental fruit fly in the region.
- Social and cultural connections between Papua New Guinea Treaty Village Rangers and DAFF Torres Strait Biosecurity Officers are very strong, and are part of this project's successful partnership. Connections have strengthened biosecurity collaborations across the region, and they build on a long-term partnership across our close borders.



Figure 5. Treaty Village Rangers receiving their certificates after completion of the fruit fly training.

Anastasia is an entomologist with 28 years of experience working with fruit flies, from identification to understanding their biology, conducting host testing and damage assessment on commercial cultivated and wild fruits and establishing trapping as early warning systems for detection of exotic species. Additionally, she has conducted field management studies on fruit flies using integrated pest management techniques. She has been involved in five ACIAR-funded projects and Department of Agriculture and Livestock (DAL) entomology-related trials on fruit flies, Red Banded Mango Caterpillar, Mile a Minute weed, and weevil and viruses in sweet potatoes. Anastasia joined the National Agriculture Quarantine Inspection Authority (NAQIA) in 2014 as the Regional Plant Protection Officer overseeing plant health issues in the New Guinea Islands region based in Kokopo, East New Britain province. In 2018 she moved from the Technical Division (Plant Health) to Operations Division within NAQIA. In this role, as the Regional Agriculture Quarantine Officer for the New Guinea Islands region, Anastasia is responsible for the administrative management of regional operations program activities covering border control programs and management and administration of staff and resources. With her wealth of experience, she is fortunate to be part of the Treaty Village Fruit Fly Training Project and able to impart skills and knowledge to the biosecurity rangers. Community engagement is very important to conduct surveillances in very remote villages. Understanding their lifestyle and allowing community members to express their views in understanding fruit fly species and which species infests which common food crops is important for the rangers. Anastasia has a Graduate Diploma and a Masters Degree in Plant Protection from The University of Queensland Gatton campus.

Patrick Nai was born and raised on Thursday Island and his family background is from Yorke Island, situated in the Central Torres Strait and part of the Kulkalgal Region of the Central Islands. He commenced his role as a Biosecurity Officer for the Department of Agriculture and Water Resources in 2016, and was involved in a range of projects including plant health and animal health survey assistance and small vessel surveillance. Patrick is currently based at the Thursday Island Office working on Operations, Public Awareness and Scientific programs. His current role is Biosecurity Officer in the Operations Program. He is involved in activities associated with Avian Influenza and Asian Citrus Phylid Trapping. He is also involved in the annual animal and plant health surveys and the all-year-round Fruit Fly Activities.