



# Pyura Elimination Trial: Field Guide

Version 2

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# 1. Introduction

An unusual sea squirt was reported to the MAF – Biosecurity New Zealand (MAFBNZ) in 2007 after a large population was found growing on rocks at Twilight Beach, near Cape Reinga in the Far North of the North Island. This sea squirt was identified as *Pyura stolonifera praeputialis*, an Australian species that had not been found in New Zealand previously.

A survey of the *Pyura* populations in the Far North was undertaken in October 2009. *Pyura* was found at 21 locations and was widespread between the area north of Herekino Harbour and Tauroa Peninsula.

It is possible that *Pyura* can spread and displace important native species and infest marine farms. This species has the potential to impact a number of core values in New Zealand – such as economy, the environment, and social and cultural well-being.

MAFBNZ has decided to remove *Pyura* from some locations in the Far North to test whether it is possible to eliminate this sea squirt from isolated areas. This is a pilot treatment for removing small populations of *Pyura* from high value sites. There will also be a monitoring programme to gather data on the success of the pilot treatment.

## 2. Objectives

Specific aims of this project include:

- Elimination of *Pyura* from Whareana Bay and The Bluff.
- Monitoring for changes in the density of the *Pyura* populations after it has been removed.
- Providing information to the local community and other interested parties on ways to manage *Pyura* infestations.

## 3. A Bit About Pyura

### WHAT IS PYURA?

*Pyura stolonifera praeputialis* – referred to as ‘*Pyura*’ – is a sea squirt (ascidian).

Individual *Pyura* are cylindrical, and can grow up to about 6-10 cm in diameter and 30 cm in height (Figure 1). Their outer surface (known as a “test”) is thick and hard, and sometimes has other animals or plants growing on it (such as sea lettuce).

*Pyura* populations may form dense aggregations appearing as mats on rocky outcrops (Figure 2) but are also found as small, discrete clumps of less than 10 individuals.

This species is common on rocky intertidal and shallow subtidal areas in Australia and New Zealand. It is known as “cunjevoi” in Australia. This sea squirt inhabits the space where native species would otherwise be found.

*Pyura* larvae are microscopic and live for approximately 1-3 hours after being released into the water. The larvae settle on hard substrates, such as rock or animal shells, or other adult *Pyura*.

### WHERE DOES PYURA LIVE?

Key points on where to find *Pyura*:

- Mainly in the mid to low intertidal zone, which is the part of the shore that is out of the water at low tide (Figure 3).
- *Pyura* can spread into shallow subtidal areas, just beyond the low tide level.
- On rocky platforms, outcrops and boulders (Figure 3).
- In rockpools, rock overhangs, on outcrops that may be separated by shallow water, on submerged rock substrate in less than 5 m water depth.
- Previously found growing with green-lipped mussels, sea lettuce and coralline turf algae (Figure 4).
- Also on man-made structures such as marine farms or boats that have been sitting in shallow water in the same place for a long time. It is unlikely that we will find any man-made structures during this work but they should be inspected if the opportunity arises.



Figure 1: Dense aggregation of *Pyura* growing on mussels.



Figure 2: Clumps of *Pyura*.



Figure 3: Intertidal rocky platforms where *Pyura* was found in October 2009.



Figure 4: A small clump of *Pyura* found in association with mussels, sea lettuce and coralline turf algae.

## 4. Treatment Sites

### THE BLUFF – ELIMINATION SITE

- *Pyura* is removed from the entire site.
- The population is at medium density (21-60% coverage) over an area of approximately 400 m<sup>2</sup> (0.04 ha).

### WHAREANA BAY – ELIMINATION SITE

- *Pyura* is removed from the entire site.
- The population is small and isolated, and is found at medium density (21-60% coverage) over an area of 10 m<sup>2</sup> (0.001 ha).

### PARENGARENGA HARBOUR ENTRANCE – SCIENTIFIC CONTROL SITE

- *Pyura* is only removed from the 'Cleared' Monitoring Plot(s).
- This site has been selected as a suitable place for a scientific control to enable comparison of the removal treatment versus no removal of *Pyura*.
- The population density is low (<20% coverage) to medium (21-60% coverage) over an area of 3,000 m<sup>2</sup> (0.3 ha).

## 5. Methods

### EQUIPMENT LIST

Sturdy footwear – for walking on wet, slippery rocks

Wet weather clothing – to keep you warm and protected from rain

Gloves – to protect hands from scrapes and grazes

Magnifying glass – for detection of small *Pyura*

Scraping tool – paint scraper, blunt dive knife or similar

Plastic bins or bags – for containing *Pyura*

Knotted rope grid (x2)

Handheld GPS

Camera (preferably waterproof)

Data sheets (and spare waterproof paper)

Clipboard

Pencils and marker pens

Waterproof epoxy (or similar) and stainless steel bolts – for permanently marking monitoring plot position

Ruler

Disinfectant for boot and gear wash



## DATA COLLECTION

The collection of information on the nature of the *Pyura* population is needed to measure the success of the pilot treatment and to determine whether this sea squirt can be eliminated from locations in the Far North. A monitoring programme has been designed to collect this information in a way that is practical, easy and quick to do but still scientifically accurate.

Data sheets have been prepared for recording this information in the field. One data sheet should be used for each visit to a new site. Record the date, time, site name and the names of the attending team members at the beginning of every visit to the site.

Prior to removal of any *Pyura*, the following steps should be followed for data collection at each site:

### Step 1 – Map the boundaries of the *Pyura* population at the site.

There are two ways of recording the extent of the *Pyura* population:

- a) Choose a starting point on the edge of the population. Record a waypoint with the GPS. Slowly walk around the edge of the *Pyura* population recording a waypoint on the GPS at every 3-4 foot steps until you reach the starting point again. Record the names of the GPS waypoints on the data sheet using a logical labelling system.
- b) Trace out the edges of the population onto a copy of an aerial photograph for the site.

### Step 2 – Estimate the overall density of the *Pyura* population at the site.

Use the percent coverage guide to determine the density of the entire *Pyura* population at the site. Record the percent coverage on the data sheet.

### Step 3 – Take photographs of the *Pyura* population at the site.

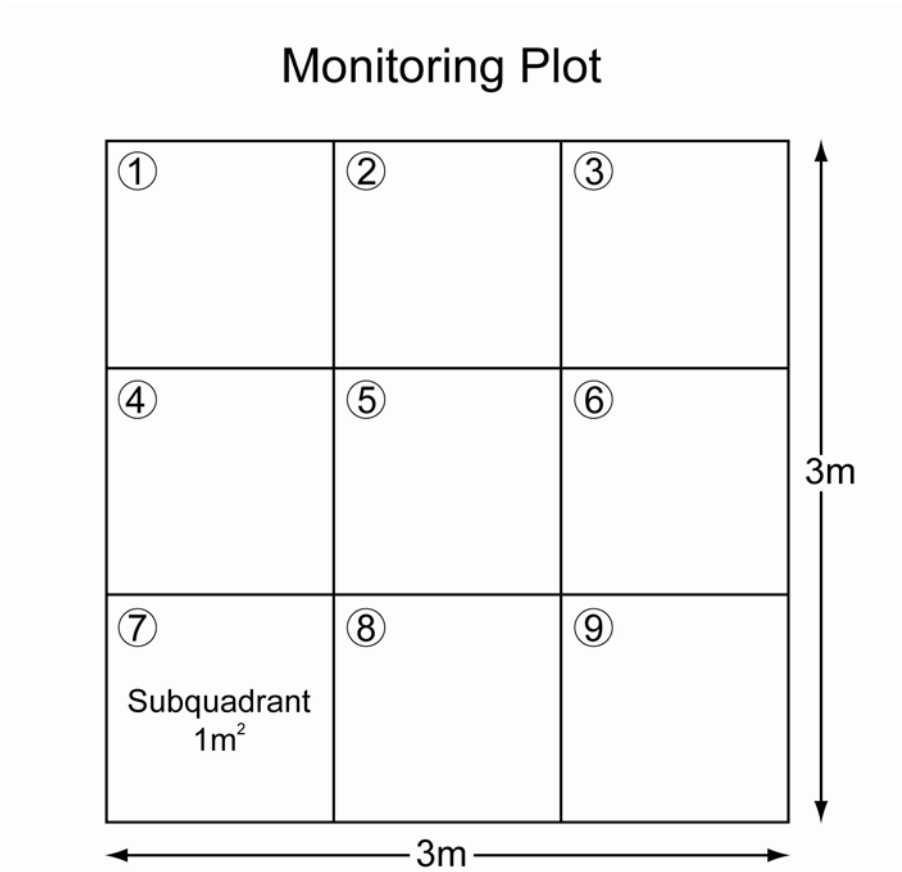
Photographs should include close-ups of the *Pyura*, images of habitat where *Pyura* is found (e.g., other animals, plants and/or type of substrate), wide-scale photos of the whole site, and images of any other features that may be of interest.

Record the date and time that each photo was taken. Record the number of photos taken (and their file names if possible) on the data sheet.

**See TIPS FOR PHOTOGRAPHY at the end of this booklet.**

#### Step 4 – Establish monitoring plot(s) at each site.

- a) Choose an area with a high density of *Pyura* that is at least 9 m<sup>2</sup>.
- b) Place the monitoring plot grid (knotted rope grid) over the population with the centre of the grid positioned in approximately the middle of the population. The grid 3 m x 3 m divided into nine 1 m x 1 m squares.



- c) Record a waypoint with the GPS in the middle of the grid and note the location on the data sheet.
- d) Mark at least two opposing corners of the grid with a permanent, waterproof substance that will adhere to rock substrate (e.g., water resistant epoxy cement and stainless steel bolts). If some corners of the grid are on sand, mark the available corners that do occur on hard substrate and make a note of which corners were marked on the data sheet.
- e) Estimate the percent coverage of *Pyura* in each square of the grid using the percent coverage guide. Record the estimated coverage for each square on the data sheet.
- f) Take a photograph of each square of the grid. When taking the photo, place a ruler (for scale) at the bottom of the square and a label with the number of the square (1-9) that corresponds to the diagram on the data sheet. Record the date and time for each photograph on the data sheet.

- g) Take a photograph of the overall monitoring plot (See Tips for Photographs). Record the date and time for each photograph. Record the number of photos taken (and their file names if possible) on the data sheet.

**Note** – the number of monitoring plots at each site have been chosen by the technical experts during Stage One; there are at least 4 plots at Parengarenga Harbour entrance, 2 plots at Wharenan Bay and 4 plots at The Bluff.

## REMOVING PYURA

Once all the data has been collected, removal of the *Pyura* populations can commence as follows.

- Remove **ALL *Pyura*** from The Bluff and Whareana Bay.
- Only remove *Pyura* from within **TWO of the designated Monitoring Plots** at the Parengarenga Harbour entrance.
- It may be very difficult to see the **NEW *Pyura*** that have grown since Stage One. Use a magnifying glass to search for these small animals which can be only a few millimetres in diameter.
- Start by removing *Pyura* from the area closest to the water's edge and work towards the waterline as the tide recedes then up the shore as the tide comes in. The scientists in the field will also help organise how best to clear the *Pyura*.
- Use a blunt tool (e.g., paint scraper or blunt dive knife) to scrape off the *Pyura*.
- Wear sturdy boots for walking on slippery, wet rocks. Waders may be useful for areas of slightly deeper water (i.e, at The Bluff).
- Wear thick gloves (e.g., gardening gloves) to avoid scraping hands on barnacles and other sharp objects in the environment.
- Take care not to puncture the animal to avoid releasing its larvae during the removal process. Also try not to trample the *Pyura* for the same reason.
- Dispose of the *Pyura* into the bins or plastic bags provided. If plastic bags are being used, make sure that there are no holes in the bags (using two bags at a time can be helpful) where the *Pyura* may fall out.
- Only fill bags/bins to the point where they are not too heavy to carry.
- Once a bag/bin is full, remove it from the area of the intertidal zone so that it isn't accidentally washed away as the tide comes in. Place it in a pile further up the beach. Dispose of the *Pyura* as directed.
- Make sure to clean and disinfect all footwear and tools in between site visits in case *Pyura* larvae are spread into other areas.

## 6. Things to Remember

- Follow all health and safety instructions given by the field team organisers. We want to make sure everyone is happy and safe while working in an environment that can sometimes experience rough weather conditions and dangerous seas.
- It is only possible to work in water depths of 0.5 m or less to ensure the safety of our field team members.
- Almost all *Pyura* is underwater when the tide level is at about 0.8 m. Therefore, tides need to be near low to find and remove *Pyura*.
- Only work in the water when sea conditions are relatively flat and calm with minimal current flow.
- Keep an eye on the weather conditions while you are at the site and discuss whether work should continue if the conditions appear to be deteriorating.
- Use gloves and other protective clothing to avoid cutting or scraping your hands or feet on the rocks.
- Take care not to spread the larvae or adults of *Pyura* around the coast or between sites during field work.
- Make sure to clean and disinfect all footwear and tools in between site visits to avoid spreading *Pyura* larvae to other areas.
- It is thought that *Pyura* larvae may survive for some time on rocks that aren't covered by the tide. Handle *Pyura* carefully and try to avoid having them squirt out their larvae.



## 7. Further Reading

Check out the MAFBNZ website for more information on Pyura:

<http://www.biosecurity.govt.nz/pests/pyura>

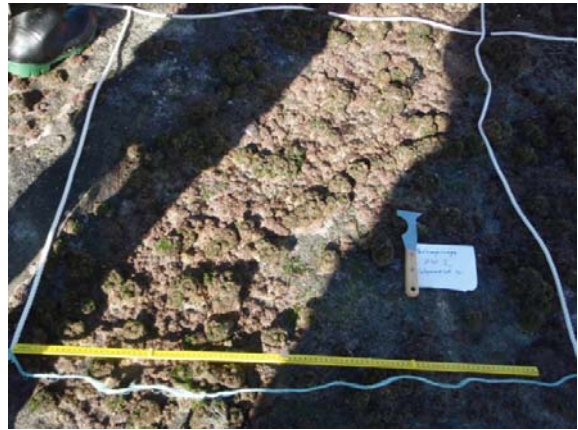
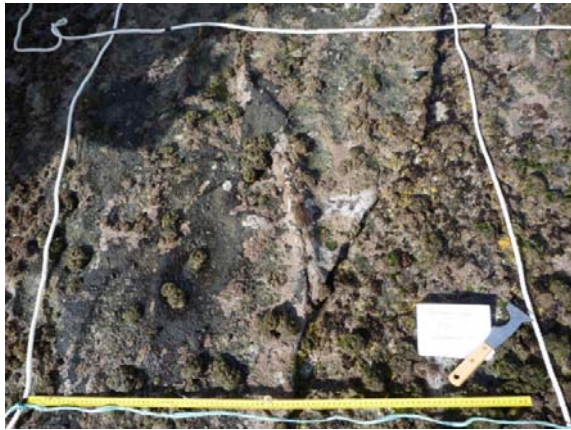
## TIPS FOR PHOTOGRAPHY

Here are some tips for taking good photographs that we can use for scientific assessments once we've finished with the fieldwork:

- Make sure there are no shadows to obscure the object of the photograph.
- Take the photo from directly above the quadrat so that the perspective does not distort the image.
- Make sure all edges of the quadrat are in the photograph.
- Use a label and ruler in the photograph.



No shadow



Correct perspective

