

# "Is PAM easy?"

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A question most frequently asked me is "Why is it taking so much time, with so much spraying and at such a great cost to eradicate the Painted Apple Moth (PAM)?"

It is now over four years since operations began and the budget is over \$100 million. This is a great more of both time and money than was required for the eradication of the White-Spotted Tussock Moth (WSTM) two years earlier.

A year elapsed between the first discovery of caterpillars and the capture of the last WSTM insect - a male in a female-baited sticky trap. No more than seven months of spraying with the biological insecticide BTK was needed and the cost was only \$12 million.

Aucklanders are footing the bill and enduring the repeated sprays so are entitled to some good answers to this question. There are a number of clear measures of the two projects that allow a certain answer to be given.

The area originally occupied by the caterpillars provides the first comparison. A member of the public discovered each infestation. Trained staff from Forestry Research, independent consultants and the MAF combed the ground looking for caterpillars, pupae and egg masses. Data was combined and maps and area estimates provided.

**The PAM occupied less than five hectares, the WSTM occupied seven hundred hectares.** (G. Hosking, 20 March 2003, seminar at Auckland museum).

Every aspect of a program is made easier by a small area of infestation - fewer residents to be inconvenienced by searches of their property, less spray needed, a lesser chance that a resident might prove to be affected by the spray, less garden green-waste to keep track of etc. The smaller the area, the easier it should be to kill them all. This is a major difference.

The ability of the female to move around as it lays its eggs has a bearing on how quickly the infestations could spread.

**PAM females are completely wingless, but WSTM females do fly.**

The two summer generations of WSTM females have large, completely developed wings. They don't fly terribly well .... they could be considered as having flight powers similar to the Kakapo. Females of the autumn generation have brachypterous (partial) wings and no flight capacity at all.

MAF spokespersons considered that the flightlessness of the PAM had reduced the urgency needed (Metro magazine, October 2001). R. Frampton commented that PAM "is a very slow disperser and.....we do actually have time up our sleeve."

The inability of the PAM female to fly should have been considered as a bonus and no reason at all for less than maximum urgency. I agree that it is a difference

and that it may have been significant, but it is probably not the most important difference.

Tests on the ability of a pesticide to kill its intended target should properly precede any use of a pesticide. Caterpillars of both species and of all ages were provided with leaves sprayed with the biological insecticide BTK (*Bacillus thuringiensis*).

**There is an important difference in the vulnerability of the caterpillars of these two species.**

All sizes and ages of PAM caterpillars were killed. The largest WSTM caterpillars were able to consume the sprayed leaves and continue to develop into moths. (M. Kay, Forest Research, unpublished results).

An individual PAM has to make it to the pupal (non-feeding) stage before it is safe from BTK. Once over a critical weight, a WSTM caterpillar is safe.

The window of opportunity for a lethal impact of the spray is many more days longer for PAM. The project team can either spray at longer intervals or have the comfort of a larger overlap of the sprays. This is also a major difference.

Unmated female moths of both species are highly effective at attracting male moths to sticky traps. These traps provide vital information on the extent of the infestation.

The opportunity was present for equally effective monitoring systems to be in place from the beginning of both invasions.

Research began immediately on the effectiveness of these traps for WSTM and they were ready to be deployed as soon as the DC-6 spray aircraft left and provided vital information on the whereabouts of the surviving caterpillars.

Similar traps for PAM were only set up eighteen months after first discovery.

**Equally effective tools were available for both species, but the two teams differed greatly in the way that they were used.**

One of the most exciting Operational Science meetings of the whole WSTM "Operation Evergreen" program was held at short notice on the 30<sup>th</sup> December 1996.

We had been called in as New Years day approached to debate the meaning of our first catches of male WSTM in female baited cages. The first male had been caught on the day before Christmas with a total of 17 for the week. There was a feeling of triumph, a heady delight that we had a means to track the remnant of the pest.

The meeting "agreed that the placement of monitoring traps had been very effectively implemented and their distribution very acceptable." We directed additional traps to be laid out in support of the existing traps and asked that a reserve of traps be prepared for use when the next catches of moths were caught.

We made our predictions of the expected time of arrival of eggs and readied our search and spray teams. From this moment onwards no eggs, caterpillars, pupae or female moths were found.

The only means to keep in touch with the survivors was through the presence of males in traps. If a male was caught we considered that the surrounding area hid a few caterpillars and applied BTK spray on the area around the successful trap.

Ruth Frampton and Stephen Goldson were present at this meeting and had every opportunity to be fully informed of the effectiveness of these traps. They later became leader and member respectively of the science team directing the PAM project.

We must now ask why the PAM team did not deploy these traps till a year and a half after the appearance of PAM. You cannot catch what you can't see and without these traps you cannot see the expanding edge of the infestation!!

PAM had made good use of the absence of scrutiny and had spread widely. Male PAM have now been collected from an area of 35,000 hectares of Auckland city. (Audit Office report November 2002, p.76.).

WSTM was not allowed to spread beyond the original 700 hectares, but the PAM infestation increased from 5 hectares to 35,000 hectares. At its greatest extent, the PAM spray program has covered only a third of this area.

I conclude that the science group that made poor decisions in the critical first year of the PAM project, while an example of effective process was available to them, should now be required to offer an apology to the multiple-sprayed citizens of Auckland, the taxpayers of NZ, the guardians of the conservation estate and the commercial forestry industry. Every measure of the two projects shows that the PAM project should indeed have been easy!

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