

## Vatthe Vine Control Project – Vanuatu – Summary of activities and results 2009-2010

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### Vatthe Conservation Area

Vatthe the largest Conservation Area, and most extensive lowland alluvial forest left in Vanuatu, is under threat from an invasive vine, big leaf (*Merremia peltata*), which is invading previously un-infested forest, and is causing the death of large numbers of canopy trees.

The Royal Forest and Bird Protection Society of New Zealand (Forest & Bird) has been working with the local landowners of Vatthe Conservation area to investigate options for controlling the vine infestation. Initial small scale trial work suggests that it may be possible to eradicate the vine from small newly established infestations and control it to manageable levels over larger areas by injecting glysophate into large stems and cutting all small stems.



Looking over Vatthe Conservation Area & Matantas Village. Vatthe's diverse wildlife includes the globally endangered, *Gallicolumba sanctaecrucis* and three vulnerable endemic bird species, *Megapodius layardi*, *Erythrura trichroa*, and *Todiramphus farquahari*. Vatthe is on the Vanuatu Government's tentative site list for World Heritage nomination.



Approximately 2,300ha (92%) of Vatthe forest has been invaded. Of this some 1,300 ha are beyond the ability to control and need to be replanted. Effective control is possible in the remaining 800ha surrounding a core area of 200ha which is free of big leaf.

Forest & Bird has teamed up with a Vanuatu NGO partner - Eco-Lifelihood Development Associates (EDA) who will take over management of the project. The two organizations have gained a \$US 50,000 grant from UNDP/GEF/SGP to develop landowner capacity to control the invasive vine, *Merremia peltata*. The project involves trialing hand cutting and herbicide methods aimed at reducing the extent and density of the vine to a level that can be controlled by hand cutting in the future. Initial trial work was funded by Forest and Bird, NZ Quakers and the Pacific Development Trust.



Cutting and applying vigilant gel killed only 70% of treated vines. This method over a large area would be expensive, and time consuming.

### Herbicide Trial Results

Our first trials indicated that cutting and pasting all climbing stems with Vigilant gel in June achieved kills of upto 70% of the smaller stems. However this method did not reliably kill stems greater than 5cm dbh. We also trialed scrapping larger stems 20cm along both sides with a 10cm overlap, (not a full ring bark) and applying vigilant gel to the scraped surface. This method killed all the trialed vines however we suspect that Vigilant may have been responsible for causing damage to a large *Dracontomelon vitiense* (Anacardiaceae). Scrapping is also time consuming and not feasible over hundreds of hectares.

Further trials were established by the Vatthe Landowners with the assistance of Forest & Bird volunteers in July 2009, to test the effectiveness of four different herbicides applied by injecting 10ml (50:50 water) into the main stump of large vines (>4.5cm dbh) vine.



Emily Tasale (EDA) using dyed water to test an injector fitted with a blind needle. These will be used to inject undiluted glysophate (Weedmaster) into large stems.

Of the four herbicides trialed, Weedmaster Duo- active ingredient 360g/L glyphosate was the most effective completely killing all four injected vines.

Victory Gold (active ingredient 50g/litre picloram plus 100g/litre triclopyr) killed most but not all. Least effective were Vigilant gel (active ingredient 43g/kg 4 amino, 3,5,6 – trichloropicolinic acid picloram) and Ultimate (active ingredients; 25g/litre metsulfuron-methyl & 75g/litre triclopyr).

Due to the possible impacts of vigilant and the good results obtained by injecting Weedmaster, which is easily obtainable in Vanuatu, is cheaper and has significantly less environmental and human risks than Vigilant (picloram), we have decided to proceed with a larger trial area using 5ml injections of undiluted weedmaster (glysophate), to all main stems greater than around 4cm dbh. In addition all stems less than 4cm will be cut at the point they climb into the canopy. No herbicide will be applied to these cut ends.

As it is cheaper and quicker to apply lesser amounts of Weedmaster we established further trials to test the effectiveness of injecting 2.5ml of undiluted Weedmaster in August 2010. We also trialed injecting 5 x 1 ml undiluted Weedmaster at random intervals in the ground running stems of large vines. The herbicide takes 9 or more months to completely kill a vine, so the effectiveness of these trials can not be assessed until next year. It is possible that the herbicide may work faster if applied in the wet season, but this has not been tested.

Ideally, given more time and resources, we would have had significantly larger trials with more intensive monitoring, and would have trialed differing application methods and timing. However our trials to date give us an indication of what can be achieved. There remain many questions to be answered, and further research is needed.

### Vine Cutting

Due to the extent of large tree deaths caused by the vine and the time it was taking to find a herbicide method we decided to do a large scale cutting only trial. All climbing stems in some 50ha of forest were cut twice; at shoulder height and ground level, where they climbed into the canopy in July 2009. The results have surpassed everyone's expectations. The forest canopy has recovered, with many previously unhealthy trees regenerating their crowns. Large canopy trees that last year looked on the verge of death have recovered. The death of the mass of vine stems covering the forest floor seems to have also enabled the development of a dense understory of young seedlings of the canopy species and a diversity of understory shrubs. This may be due to the death and decay of the mass of ground stems creating more space for plants as well as enriching the soil. Death of the vine in the



Maena Tavue cutting small big leaf stems. Cutting is already having dramatic results

canopy has temporarily increased the sunlight reaching the forest floor which may also be contributing to the increased shrub growth. This new shrub growth appears to be sufficient to prevent large amounts of the vine re-growing. We had anticipated that it would be two years before the vine recovered sufficiently to reach the canopy. However assessments this year suggest that it may be even longer and that those reaching the canopy are likely to come from missed vines rather than from extensive re-growth of cut stumps. We found very few examples of multiple re-growth of stems from cut stumps, despite a very wet season.

The vine cutters began work in earnest in June and July 2010 with six teams and more than 30 people cutting. They have now cut more than 100ha of densely infected forest.

There are thousands of vines per ha. The focus for the rest of this year will be on applying herbicide. Over the next two years we plan to re-cut the 'cut only' areas to test the effectiveness of two and three cutting cycles as this may be enough to create unfavorable growing conditions and sufficiently weaken the vine.



Donna Kalfatak – Department of Environment and Conservation and Rosina from Matantas surveying understory re-growth of canopy seedlings in the Vine cut area.

## Work program for large scale herbicide application developed



Emily Tasale, John Dodgson and Bill Tavue trialing the walking stick injector which will be developed to enable 1ml injections of weedmaster to ground running stems.

Forest & Bird volunteer, John Dodgson has developed specialized tools for herbicide application. These include a hole punch with a slide hammer to puncture the larger vine stems which enables the herbicide to be injected by injectors attached to drench packs. A walking stick stem injector (using disposable parts) has been developed and trialed. This concept works and will be developed for use with more robust parts. This will deliver 1ml injections to ground running stems.

The Vatthe landowners and members from Matantas and a nearby village – Talatas, have been trained in safe herbicide handling and the specific methods of application developed for Vatthe. Workshop materials were prepared in bislama (Vanuatu's national language) and will be used to train other communities.

The herbicide application began on August 9 2010, and is now in full swing with 50 people working. The development and training phase of this project has been completed. The focus now will be on the operational control of the vine and monitoring the impacts, to continually refine herbicide application.