Evaluation of tree injection methods of Using "Q-Pest TI" in controlling Erythrina gall wasp (刺桐癭蜂) Infestation in Erythrina variegate(刺桐)

By

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6 September, 2007

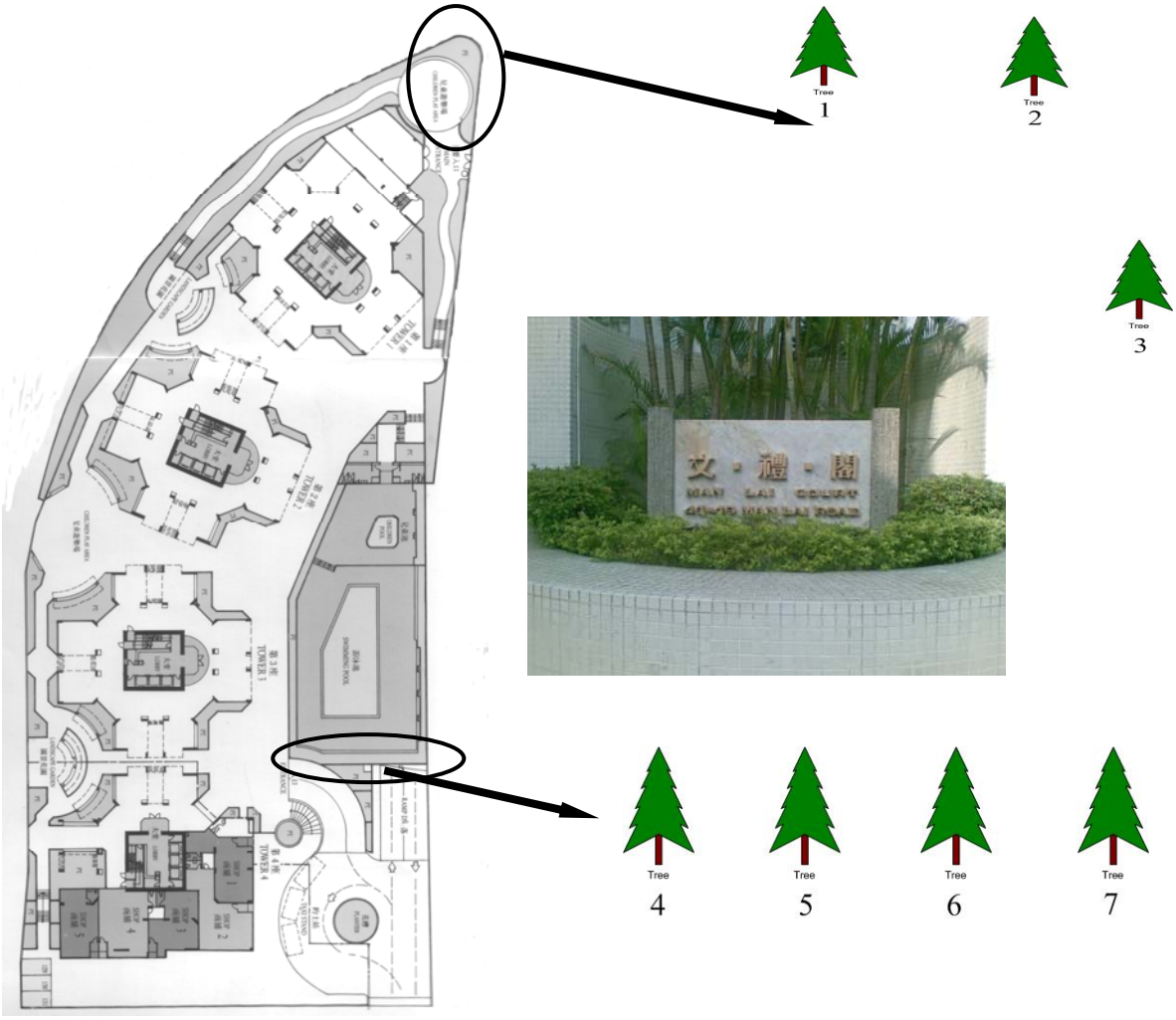
Chemical method to control Erythrina gall wasp (EGW) problem had been studied in Tai Hang Tung Estate Playground 2. In this study, application of systemic insecticide -- imidacloprid (the active ingredient of "Q-Pest") to infected trees by the soil drenches and hole application methods. In the study of chemical method to control EGW problem by University Of Hawaii at Manoa, their result shown that tree injection method have faster response than soil drenching method.

In the case happening in Manlai Court, most of the trees are in serious infestation. Soil drenching and hole application may not fast enough to treat the infected trees, therefore, we would like to treat the trees with tree trunk injection method. We think apply Q-Pest by hole method may enhance or extend the protection period.

The aim of tree injection is to utilize the trees natural transport system to distribute pesticides, fungicides and fertilizers to the areas where they are most effective without releasing any of these chemicals in the environment. In addition compounds can be injected which boosts the trees own defense mechanism. The injectors are placed in the tree by drilling a 4.2mm or 11/64" (wood dependent) hole 50mm deep then utilizing the self tapping tapered screw nozzle to secure the injector firmly in place, then release the device and inject the tree with the desired amount of chemical.

The new formulation of Q-Pest – called Q-Pest TI, is developed for tree injection purpose. It is a liquid formulation with 10% active content of imidacloprid and appropriate liquid inerts such as non-aggressive solvent. Those inerts can enhance the absorption of Q-Pest TI by the tree after injection with minimum damage of the injected tree.

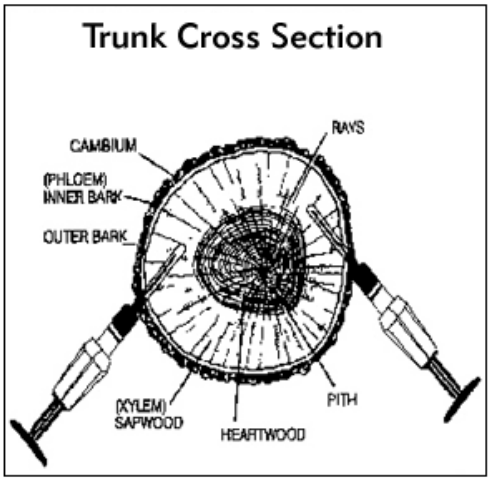
Testing Site: Manlai Court (43 – 49, Man Lai Road, Tai Wai, Shatin)



Trees location inside the Manlai Court and numbered as above diagram

Application method

1. Use a tape and place at the level of your chest to measure the tree circumference.
2. For every 1cm of diameter or 3cm of circumference around the tree at chest level, apply 2 ml of Q-Pest TI.
3. In a single injection, maximum injected volume of Q-Pest TI is 10ml
4. Drill appropriate number of holes into tree. (4.2mm drill bit) 30 & 50mm deep.
5. Draw chemical into injector by pulling the handle to the required dosage
6. Insert injector nozzle into pre-drilled hole. Release handle.
7. Note: Where the injector nozzle needs to be screwed into the tree, a 1/4" or 6.4mm hole 30-50mm deep is required. It is not necessary to screw injector fully into the tree. To obtain a complete seal, screw in until firm pressure is felt. A further half turn might be required if weeping occurs.
8. Completed injection time approximately 2 hours, varying in weather conditions and sap viscosity. When injection is slowing down, leave the injector to the following day.



Equipments and apparatus

		Qty
1.	Q-Pest-TI (tree trunk injection solution)	One liter
2.	Fairturf-T (Tree fertilizer)	2kg
3.	NP-9 (cleansing detergent)	100ml
4.	Injector syringe	28pcs
5.	Portable electrical drill with 11/64” drill bit	0ne set
6.	Protective glove	2 set
7.	Eye goggle	2 set
8.	Plastic apron	2 set
9.	Dispensing container with cover	One
10.	Water bucket	Two
11.	Measuring tape (metric scale, one cm division)	One
12.	Digital Camera	One
13.	garbage bag	Three

Safety Precaution:

- Enclosed the area where treatment taking place
- Secure the area and avoid any un-authorized person entry
- Warn signs should be post around the area
- For person handling the Q-Pest-TI, should wear protective glove, eye goggle and plastic apron
- In case of spillage, washed the glove before handle another syringe
- Washed hands and face after finishing the application.
- During the period of injection, applicator should attend in the application site.
- Do not leave the injector on the tree without any authorized person

Treatments:

Tree number	DBH (cm)	Fertilizer application	Q-Pest-TI Volume Used	Injection (ml/injector)	Injection Time (ml/min)
1	88/3 (29)	Yes	60ml	10ml X 6	
2	94/3 (31)	Yes	60ml	10ml X 6	
3	90/3 (30)	Yes	60ml	10ml X 6	
4	68/3 (22)	Yes	40ml	10ml X 4	
5	50/5 (16)	Yes	30ml	10ml X 3	
6	50/3 (16)	Yes	4 packs 10g Q-pest		
7	55/3 (18)	Yes	30ml	10ml X 3	

Result evaluation:

By observation:

Take photo every week for each tree

Observe leaves and branches growth

Record rating with using 5 point rating scale

five-point numerical rating system

Rating	Description	Approx gall weight per 20g of leaf
1	Very light infestation, only very slight galling	<3g
2	Moderate galling	3-8g
3	Heavy galling of leaves but minimal leaf deformity	8-14g
4	Heavy galling moderate leaf deformity	14-18g
5	extreme galling and deformity with no expanded leaves	>18g

Tree number	1	2	3	4	5	6	7
Growing environment	✧ Planter attached on ground ✧ Loose soil ✧ shrubs growing around ✧ Grow on the same confined area			✧ Planter attached on building ✧ Loose soil ✧ Herbal plants and shrubs growing around the tree ✧ Grow on the same confined area			
Leaves density on 30 May	Very light and almost no leaves			light			Very light
Leaves Density on 25 July	Heavy			medium			light
Rating on May	5			3	4	3	3
Rating on July	0 to 1						
Galls distribution on July	Small amount of galls or even no gall were found on the outer canopy of tree						

Tree number 1, 2 and 3 showed very significant result in about one month. At the time of do injection the tree 1, 2 and 3 were in very bad condition. Most of leaves had been fallen and galls were found on new grown shoot and leaves. After one month, new leaves were appeared without any gall. Such situation is keeping recently (September, 2007).

For tree number 4, 5, 6, and 7, they were not badly infested by EGW and this condition was not going worst. After almost 3 months (end of August) of observation, they also have positive result. Newly grown leases and shoot have not shown any severe galling. The positive result of injection is not significant as tree number 1, 2 and 3. On the one hand, by comparing the result of tree number 6 (Q-Pest with using dig hole method) with tree number 4, 5 and 7, they have not shown any major difference.

Conclusion:

In this study, we believe Q-Pest-TI (10% imidacloprid solution) can control Erythrina gall wasp successfully by applying tree trunk injection method. By comparing our previous study of using Q-Pest by soil drenching and hole method, this method has faster response, better control, easily covers most of new grown leaves and shoots and working on severe infestation also. It provides an extensive control against EGW.

From our previous study of controlling EGW by Q-Pest with using soil drenching and hole method, the result did not show a successful control of EGW. This method could be related to the health condition of the infected tree. When the infected branches of the tree were trimmed away, the number of remaining healthy branches is very critical to the result controlling EGW by Q-Pest. The more healthy branches left, the more effective of controlling EGW by Q-Pest. This result also agree in this study, the tree number 6 have the same result with other trees which treated by tree trunk injection method.

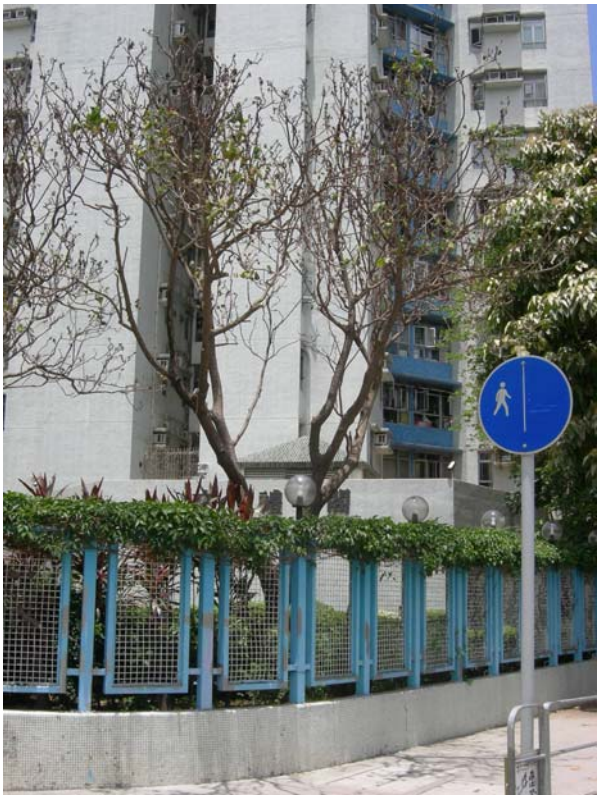
Unfortunately, tree trunk injection cannot apply frequently, because drilling holes around the tree trunk create wound on the tree. This kind of wound could not completely heal within few months. We think tree trunk injection method may not possible to be applied every year. We will keep observing the drill wound for another few months.

Tree number 1

20070514

20070529

20070530



20070604

Tree number 1

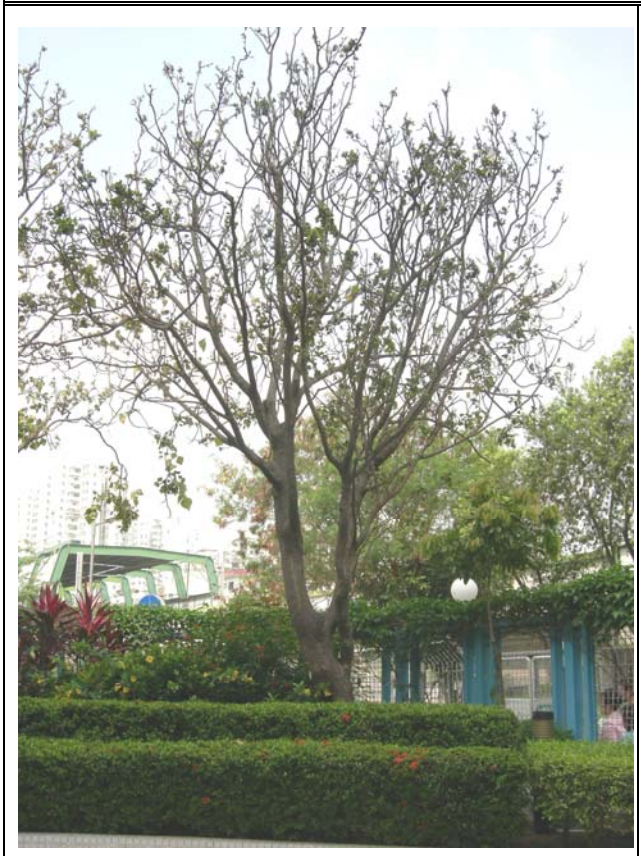
20070611

20070616

20070622

20070703

Tree number 2



20070514

20070529

20070530

20070604

Tree number 2

20070611

20070616

20070622

20070703

Tree number 3

20070514

20070529

20070530

20070604

Tree number 3

20070611

20070616

20070622

20070703

Tree number 4

20070514

20070529

20070604

20070611

Tree number 4

20070616

20070622

20070703

20070725

Tree number 5

20070514

20070529

20070604

20070611

Tree number 5

20070616

20070622

20070703

20070725

Tree number 6

20070514

20070529

20070604

20070611

Tree number 6

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