



## TERTIARY TREE CONSULTING PTY LTD

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## DYLAN TEMPEST – ARBORICULTURAL CONSULTANT

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AQF Level 3 Certificate 3 of Arboriculture (Cert III Arb)

Gold Australian Arborist Industry License No: AL2360

QTRA Quantified Tree Risk Assessor User No. 5637

5 Million Professional Indemnity Insurance

20 Million Public Liability Insurance

# Elm Leaf Beetle *Xanthogaleruca luteola*

## FAST FACTS:

- Elm Leaf Beetle was first detected in Australia in 1989 and in Adelaide during the 2010-2011 life cycle season.
- Elm Leaf Beetle will again emerge from overwintering this spring time, feeding on the leaves of elm trees damaging them until mid to late autumn. This damage weakens elm trees enabling secondary pest and disease attack while severely diminishing the amenity value of Adelaide's beautiful trees.
- Elm Leaf Beetle have no natural predators in Australia.
- Biennial vascular system injections that are correctly administered by a Consulting Arborist are an essential tree defense component. While receiving your injections an integrated pest management strategy (IPM) will be advised to increase tree health and defense.
- Elm trees are ring porous. This means they produce large vessels (their transport system) in their early wood from spring to mid-summer. These new vessels are the part of the tree a Consulting Arborist must inject into for the injections to be effective.
- Call 0400 259 505 now to book your quote for Elm Leaf Beetle tree injections.



### DAMAGE AND RECOGNITION:

Early in the season damage presenting as shot holes appear on the elm leaves followed by skeletonization of leaves as the season progresses. The leaves are left looking brown with no chlorophyll leading to early leaf drop (Crawford 2015).

Repeated elm tree defoliation by Elm Leaf Beetle weakens the host tree. The damage to the leaves reduces the amenity value of the host tree as the leaves become skeletonized, turning brown with shot hole damage (Crawford 2015; Lefoe 2014).

### HOST TREES:

The majority of elm trees in the Australian landscape today are European species and so are susceptible to attack and defoliation from Elm Leaf Beetle (Lefoe *et al.*, 2014).



**Figure 1: *Ulmus procera* leaves with skeletonization and shot hole damage. Photo (Tempest 2018)**

### DESCRIPTION, IDENTIFICATION AND BIOLOGY OF LIFE HISTORY STAGES:

#### Eggs:

The Elm Leaf Beetle eggs are small and yellow. They are laid on the underside of the leaves in rows generally two wide, with each egg cluster containing 15 to 20 oblong shaped eggs (Crawford 2015; Lefoe *et al.*, 2014, Huerta *et al.*, 2011; Dahlsten *et al.*, 1998). The eggs become grayish in colour after approximately ten days, signaling, they are about to hatch and produce the first instar of the larvae phase (Crawford 2015).

#### Larvae:

There are three instar stages in the larvae phase of Elm Leaf Beetle taking between twenty to twenty-eight days to complete their instar phase (Lefoe *et al.*, 2014), with 2 molts through this part of its life cycle (Crawford 2015; Huerta 2011). The larvae grow to approximately ten millimeters long appearing yellow green with longitudinal black stripes and a black head (Crawford 2015). The third instar migrate down the tree trunk to pupate in furrows, crevasses, beneath loose bark and on the ground commonly at the base of the tree (Crawford 2015; Lefoe *et al.*, 2014; Dahlsten *et al.*, 1998).

#### Pupae:

The pupae of Elm Leaf Beetle are yellow to orange and approximately six millimeters in length. It takes approximately ten days for the adult beetles to emerge from this life cycle phase (Crawford 2015).



**Figure 2: Eggs of *Xanthogaleruca luteola* Elm Beetle on *Ulmus procera* leaves**  
Photo (Tempest 2018)



**Figure 3: *Ulmus procera* leaves with Leaf *Xanthogaleruca luteola* Elm Leaf Beetle**  
Photo (Tempest 2018)

### Adult Beetle:

Adult Elm Leaf Beetle are able to fly. They are approximately six millimeters long. Their colour can be from yellow to olive with three black stripes presenting longitudinally on their backs. Upon emerging from the pupation period, adult beetles begin feeding on elm leaves and dispersing looking for more host elm trees to feed on. They soon begin to lay eggs on the underside of the elm leaves continuing the life cycle of this exotic pest (Crawford 2015).

As the temperature cools through autumn, the beetles look for protected areas to overwinter (hibernate) until the weather warms the following spring, signaling the reemergence of Elm Leaf Beetle (Crawford 2015).



**Figure 4: Mature *Xanthogaleruca luteola* Elm Leaf Beetle on an *Ulmus glabra* leaf** Photo (Tempest 2018)

## CONTROL:

### Chemical Control:

Stem injections can be administered by a suitably qualified consulting arborist, entomologist or plant pathologist into the vascular system of elm trees with systemic imidacloprid (Crawford 2015). Imidacloprid injection programs have been found to be an effective means of control as the insecticide is translocated into the leaves of the tree within days (Lawson and Dahlsten 2003; authors observations). This method delivers good results and if applied early in the life cycle season (spring time) (Lawson and Dahlsten 2003; authors observations), while these ring-porous elm trees are producing their earlywood vascular xylem (Lilly *et al.*, 2010), it will begin to control this exotic pest in its first life cycle (Lawson and Dahlsten 2003; authors observations).

As subsequent life cycles of Elm Leaf Beetle occur, they too are controlled by this systemic tree injection method reducing damage to elm trees. (Lawson and Dahlsten 2003; authors observations).



**Figure 5: Stem injections on  
*Ulmus glabra*  
Photo (Tempest 2018)**

### Healthy Trees:

Healthy trees are better able to deal with adverse situations such as a pest attack. The ability of the healthy tree to use  $C^6H^{12}O^6$  gained from photosynthesis for all growth, including thigmomorphogenesis to maintain and grow sufficient structure and store starch in parenchyma cells, which can be called upon as energy when required to help deal with the stress of a pest attack (Hirons and Thomas 2018; Lilly 2010; Lonsdale 1999; AS4970-2009). Correct tree care such as prescribed watering and mulching will aid in achieving this result (Lilly *et al.*, 2010).

### Coordinated Control:

Though there is a vast amount of information available to assist in the control of Elm Leaf Beetle, Australia has no coordinated national strategy to contain the spread of this exotic pest. For this it is unfortunately expected, that this exotic pest will continue to spread across Australia where their host trees are successfully grown, providing the food source that Elm Leaf Beetle rely on to be successful (Lefoe *et al.*, 2014).

### NATURAL ENEMIES:

In Australia Elm Leaf Beetle have no natural enemies (Crawford 2015; Lefoe *et al.*, 2014).

## INTEGRATED PEST MANAGEMENT STRATEGY:

Integrated pest management (IPM) is the concept of employing a tailor-made multipronged approach to deal with a pest problem such as Elm Leaf Beetle on elm trees. The IPM method was devised by arborists and plant managers to reduce over-reliance on chemicals in combating tree health issues including pest attack. Often a managed strategy of physical and chemical control, coupled with correct tree health management can deliver the best tree care results (Lilly *et al.*, 2010).

Figure 6 below displays an *Ulmus glabra* Golden Elm managed by the author. Though mulching is yet to be incorporated into the management of this tree due to budget constraints, an integrated management plan is in place. This plan includes biennial (every two years) stem injections of imidacloprid to kill both the beetles and larvae when they eat the leaves, an irrigation strategy to ensure good tree transpiration, respiration and production of photosynthates (Lilly *et al.*, 2010), and banding of the stems with outward-facing duct tape to kill larvae as they migrate down the branches and stems seeking a location to pupate (Crawford 2015)



**Figure 6: *Ulmus glabra* managed by an integrated pest management strategy  
Photo (Tempest 2018).**

## ABOUT THE AUTHOR:

Dylan Tempest is a passionate Consulting Arborist with 18 years of experience in the industry. He has been successfully managing *Xanthogaleruca luteola* Elm Leaf Beetle within Adelaide since its unfortunate arrival in 2010.

Dylan has studied extensively in the field of arboriculture throughout his career receiving first class honours for all subjects in his arboriculture degree at The University Of Melbourne.

Dylan continues to study, and is now embarking on his Masters Degree of Arboriculture and Urban Forestry with the University of Central Lancashire and Myerscough College in England. Dylan is undertaking this degree online while he works and resides here in Adelaide.

Dylan lives with his wife, their 2 young children and the family dog.



Kind regards

A handwritten signature in black ink, appearing to read 'Dylan'.

**Dylan Tempest** Grad Cert Arb, Dip Arb, Cert III Arb, QTRA, Lic AL2360  
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