

**CLIENT:** Ms Miranda Kimberley, Lincolns Inn, London

**BARTLETT OFFICE:** Bartlett Tree Research Laboratory, Shinfield, University of Reading, UK/Bartlett Tree Experts, Sevenoaks Office

**BARTLETT REPRESENTATIVE:** Dr Glynn Percival

***Report***

A site visit was undertaken by Dr G Percival (Bartlett Tree Research Laboratory) accompanied by Ms Miranda Kimberley (Lincolns Inn) on March 7, 2019 to provide opinion on an established *Paulownia tomentosa* in the New Square area. A previous report by Miss Emma Schaffert (Bartlett Tree Research Laboratory) identified a number of issues to include soil compaction and a foliar leaf blotch (report attached).

Observations on the day included an emerging *Ganoderma* sp. fungal fruiting bodies on the main stem which at this stage I do not believe to be an area of major concern.

Soil compaction caused by annual events/marques which would impact on tree health have been partially remediated by the use of a mulch *circa* 3 x trunk diameter at breast height. Further extension of the mulching area under the canopy was not, however, considered a viable option due to conflict with surrounding infra-structure.

The presence of a mature walnut tree in close proximity is an area of concern due to the allelopathic nature of this tree. It was suggested that the canopy be inspected when in full leaf as toxic effects would be visibly manifest in the *Paulownia* as leaves yellowing, smaller leaves, premature leaf drop and canopy die-back.

The multiple cankers present on the primary scaffold branches and reaction wood developing within the bifurcations are a concern. Cankers are opportunistic fungi/bacteria that become more prevalent in frequency and severity as a tree matures. At this stage it is considered these cankers do not form a direct threat to tree health or structure. However, it was observed that the tree canopy was limited in size. Consequently the leaf photosynthetic capacity would be insufficient to provide the tree with sufficient carbohydrates for growth, reproduction and secondary thickening. Basically the tree does not have sufficient leaf area to provide the necessary energy to keep the wood within the tree trunk and scaffold limbs alive. Overtime this will result in tree decline, deterioration of wood structure and increased canker severity. To overcome these issues and improve tree longevity the following remedial measures are recommended:

1. Use of Vogt soil de-compaction under the canopy area with simultaneously application of biochar and a suitable controlled release fertilizer. Details have already been submitted to Lincolns Inn.

2. Soil injection of phosphite based fertilisers to stimulate tree vitality and enhance resilience against further canker development

3. Soil injection of carbohydrate based fertilisers to enhance mycorrhizal associations and supplement tree carbohydrate reserves.

4. An annual inspection to ensure treatments are improving tree health.

In addition, twig samples were taken on the day of the site visit. Based on an electrolyte leakage bioassay (report attached) the *Paulownia tomentosa* is in good health at this specific moment in time.

**Diagnostician: Dr Glynn Percival**

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**PLANT DIAGNOSTIC REPORT**

12 March 2019

**CLIENT:** Ms Miranda Kimberley, Lincolns Inn, London

**BARTLETT OFFICE:** Bartlett Tree Research Laboratory, Shinfield, University of Reading, UK/Bartlett Tree Experts, Sevenoaks Office

**BARTLETT REPRESENTATIVE:** Dr Glynn Percival/

**SAMPLE DESCRIPTION: Electrolyte Leakage Measurements – *Paulownia tomentosa***

**Introduction**

Physiological tests of tree vitality are valuable because of their ability to identify low vigour or damaged plants that are performing poorly after planting into urban landscapes. Quality assessment of trees at present relies heavily on visual observation to record symptoms such as leaves yellowing and/or branch and crown die-back. Visual observation suffers from two disadvantages; i.) this form of measurement can be very subjective as they are based on human knowledge and interpretation that can significantly differ between individuals. ii.) leaf yellowing and crown die-back are the “end product” of stress i.e. the damage has already been done and the tree is in decline.

Field diagnostic tools can objectively evaluate stress disorders in trees that are used as a basis for manage­ment decisions on cultural practice and proactive monitoring in urban treescapes. These diagnostic instruments and methodologies detect stress before the visible symptoms of plant decline are manifest so make possible, effective remedial intervention and aid in decision making process.

One commonly used tree vitality measurement system is known as electrolyte leakage. This is the principal diagnostic system adopted by the Forestry Commission in the UK as a measure of tree vitality (McKay, H. M. 1992. Canadian.J.For.Res.22: 1371-1377). Three stem sections per tree located at Broadgate Tower, Primrose Street London were excised and placed in 30 ml Universal bottles containing 20 ml distilled water. Samples were stored at 22oC for 24 h in darkness prior to conductivity measurements using a Jenway conductivity probe and M4070 meter. Total solute leakage was obtained by autoclaving for 1h at 121oC and 0.103 MPa. Results are presented as percent solute leakage after 24h (Table 1).

**Table 1. Electrolyte Leakage Values of Trees Located at Tate Modern, BOSQUES 1-9**

|  |  |  |
| --- | --- | --- |
| Sample No | EL | % Chance of Survival if no Remedial Work is Undertaken |
| **1** | **22.4** | **96** |
| **2** | **21.0** | **97** |
| **3** | **24.2** | **95** |
| **4** | **20.5** | **100** |
| **5** | **27.7** | **92** |

**Correlation of electrolyte leakage Vs survival of trees (Ketchie et al (2002) J.Amer.Soc.Hort.Sci. 97(3): 403-406; Maki and Colombo. 2001. Forest Ecology and Management 154: 237-249 and Percival. Journal of Arboriculture. 2004. 30(2): 80-92.)**



**Conclusion**

Results of the electrolyte leakage bioassay indicate the *Paulownia tomentosa* is in good health. However, this is a mature tree of advanced age which is starting to show initial symptoms of decline. At present I would anticipate a longevity of another 5-10 years. However, with remedial treatments (please see site visit report) that were discussed on the day, tree longevity could be enhanced by another 5-10 years.

**Diagnostician: Dr Glynn Percival**