

particularly on the underside of leaves where larvae predominate.

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City of Melbourne's approach to elm tree management

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Abstract

This paper reviews the involvement of the City of Melbourne in the battle to save the city's elm trees.

Introduction

Elm bark beetle was discovered in Melbourne in 1974. Elm leaf beetle was discovered in the Mornington Peninsula in Victoria in February 1989. Dutch elm disease was discovered in Auckland, New Zealand in January 1990 and there was every indication that the disease could hop across the Tasman Sea to invade Australia. The elm trees of the City of Melbourne were in serious danger of peril. The City of Melbourne, being the manager and custodian of some 6000 elm trees in the capital city, has responded proactively to the State Government's plea to set up an advisory body (the Elm Leaf Beetle Liaison Committee), and offered to represent the Local Government bodies in this committee whose terms of reference include functions to monitor the spread, to research into methods of control, and to provide other forms of assistance as required for the containment and control of this urban forest insect pest. The scope of the Elm Leaf Beetle Liaison Committee later widened to cover Dutch elm disease also, though unofficially. The Melbourne City Council did that for obvious reasons as the elm leaf beetle and the Dutch elm disease (with the elm bark beetle) have the potential to threaten the very existence of the 6000 elm trees that line the principal boulevards of Melbourne, and constitute the landscape backbone of the major gardens and parks in this capital city if the pest were left to spread unchecked.

Elm Leaf Beetle Liaison Committee

This committee was not officially appointed until almost a year after the beetle was first discovered, and the Department of Agriculture was appointed as the lead agency in the first instance. As the Minister for Local Government did not see the need for his involvement in this committee, the role of municipal liaison on this committee fell on the Melbourne City Council. The Council saw the need to have an ongoing financial source to fund the various activities for the research, control and educational aspects of this committee; and in consideration of the fact that financial cash support from the State Government was an unlikely event in the circumstances, the Council started to lobby the businesses for public cash donations. BP Australia was the first

donor that contributed \$10 000 in cash to the Council. Part of this money was subsequently used to finance the very important consultancy visit to Victoria by the world renowned elm leaf beetle expert from USA, Professor Donald Dahlsten from the University of California Berkeley, in March 1990. It was during Dr. Dahlsten's visit to Melbourne when the Lord Mayor of the City of Melbourne, together with the Minister for Agriculture jointly launched the Lord Mayor's Save The Elms Fund.

Save The Elms Fund

The Lord Mayor's Save The Elms Fund was launched in March 1990. The use of the money is to be controlled by the Elm Leaf Beetle Liaison Committee. As the tax deductibility status of donations to this Fund was later found to be unclear with the Commissioner for Taxation, another Save The Elms Funds was negotiated with the National Trust with full tax deductibility for all donations. The total sum of money to be raised as an initial target was \$150 000 which was to be used to finance a biological control research project to be undertaken at the Keith Turnbull Research Institute under the direction of Dr. Ross Field with the support and assistance given by Dr. Don Dahlsten from California. Dr. Ross Field and Ms. Raelene Kwong have already given a detailed account of the research work undertaken so far with the biological control parasitoids introduced from California.

Funds are also to be used at the discretion of the committee for education and publicity purposes, including a visit in March 1993 to Melbourne by two eminent British scientists on Dutch elm disease, Dr. Clive Brasier and his wife Dr. Joan Webber.

Friends of the Elms

Through the tireless efforts of Mr. Peter Harrison, Manager of Parks and Gardens of the City of Melbourne, a group of influential and concerned private citizens formed in East Melbourne an association known as the "Friends of the Elms". The Friends of the Elms is a powerful lobby group and has been most helpful in fundraising and in publicity activities so far, organizing public lectures sessions, publishing a newsletter, including funding the research and publication of the Jenkins' Dutch Elm Disease Contingency Plan.

State Register of elm trees

The City of Melbourne initiated a

questionnaire survey amongst all 210 municipal cities and shires in Victoria in order to compile a state register of all council-owned and managed elm trees. This information is vital for the implementation of any strategy for the control of elm diseases and pest outbreaks. The response to this survey has been outstandingly successful and about 34 000 elm trees under councils' management have been registered in a computer database.

Elm leaf beetle control in City of Melbourne

The spread of the elm leaf beetle eventually reached Melbourne in January 1993. The initial discovery was along Victoria Parade, East Melbourne. Other sightings were reported in nearby Darling Square, Treasury Gardens and Yarra Park. Immediately a control strategy was implemented with all elm trees in Victoria Parade, Yarra Park and Darling Square sprayed with a 0.075% Malathion solution on their canopy foliage and a 2% Carbaryl solution sprayed on the bark of the tree trunk. At that stage, adult beetles together with larval caterpillars were found on the trees though the intensity of infestation was relatively low, i.e. less than 10% damage. It was believed the adults were the offspring of the first generation and chemical spraying was the preferred method of control as it was hoped at that time that an effective chemical spray might eradicate the pest. The political pressure was to ensure that all available means for eradication of the pest, no matter how remote the chances of total success, had to be employed and tried. Biological control was not contemplated at that stage as the only parasitoid available for release (the *Tetrastichus gallerucae* wasp) was not very promising. Malathion was used instead of Carbaryl because the former was considered much safer in a foliar canopy spray operation with considerable spray drift. The spraying was done in the night after midnight till dawn with an orchard mist-blower type spraying equipment. Prior to the spraying, all property owners and occupants along Victoria Parade and near Yarra Park and Darling Square were informed by letter-drop explaining in brief the nature and cause of the spraying. Public response was favourable and there were not any adverse critical comments from the general public. The EPA had been supplied with all relevant spray information prior to the actual spraying operation. There was no EPA objections.

The entire canopy spraying operation was completed by the end of January 1993. Bark banding spraying with carbaryl was completed in February 1993. The success of the eradication attempt had to be assessed again in spring 1993.

Second season

Spring 1993 was an important time to determine if the spraying done at the beginning of 1993 had been successful. Volunteers from the Friends of the Elms and the Shell Volunteers offered to keep watch on the elm trees in Treasury Gardens and Darling Square and the staff of the University of Melbourne also volunteered to keep watch on the elm trees in the university's Parkville campus and the surrounding environs such as Royal Parade. These volunteers together with all Parks and Gardens staff of the Melbourne City Council were given educational instruction as to how to detect and recognize the symptoms of elm leaf beetle and Dutch elm disease. All Melbourne City Council depots were visited by Peter Yau to train the staff about the pests and disease symptoms and control. An evening session was held in the East Melbourne Library for the "Friends of the Elms" and other interested parties. Media publicity was stepped up, including articles printed in the press and radio interviews in 3AW's Tony Charlton program. By November 1993 sightings of elm leaf beetles were reported again from Victoria Parade, East Melbourne. No other positive and confirmed sightings were reported from other fringe areas and parklands though numerous similar symptoms were found without the actual beetles nor larvae. The occurrence of a second season sighting meant that the first season spraying eradication program had not been totally successful. The overall strategy had therefore to be reassessed with the emphasis put on long term control and management rather than total eradication.

Together with Raelene Kwong of the Keith Turnbull Research Institute, a biological control trial spray with the bacterial insecticide *Bacillus thuringiensis* var. *tenebrionis* (Novodor®) was conducted. This bacteria culture has been tried with success in laboratory experiments at Keith Turnbull Research Institute in reducing the larval population of the elm leaf beetle. Since the action of the bacteria is very specific and is considered environmentally very friendly (it acts only on the juvenile larvae of the elm leaf beetle and is totally harmless to other insects), it was decided to conduct field trials in Victoria Parade to test the replicability of the laboratory experimental results out in the field conditions. The peaks and troughs of the egg-clusters density together with the density of the various larval instars (based on Berwick data) were charted by Raelene Kwong. From the chart it was decided to spray the elms with *Bacillus thuringiensis* var. *tenebrionis* in the week prior to Christmas 1993. The public health hazards of *Bacillus thuringiensis* var. *tenebrionis* were cleared with the State Health Department to confirm that the bacteria would not

cause any public health problems to humans. Prior to the spray, letter drops were done to keep local residents and occupants informed. The actual spray however had to be postponed for almost a week because of the delay in the issue of the experimental licence, because of the delay in shipment of the Novodor® from Tasmania by the supplier (Nufarm Chemicals) and due to extremely poor weather conditions at Christmas time that made spraying totally impossible. The spraying was finally done on 2 January 1994 and a 3% (30 mL per litre) Novodor® solution was used. This higher dose rate was used instead of the originally agreed 15 mL per litre dose rate because of the maturation of the larvae due to the delays mentioned before.

From Raelene Kwong's data in Berwick, the Novodor® sprays achieved a 70% reduction in larval counts. In our case, we did not have a control group for comparison. However our own observation and analysis of larval counts on samples of skeletonized branches (30 cm length) in Victoria Parade at the end of the first week of February 1994 could not detect any larvae nor egg clusters on the leaves. Skeletonization damage ranged from 20 to 40% of leaf blade area. The absence of larvae on the branches could be due to the Btt action and the emergence of adult beetles from the pupae. However, there were no significant numbers of adult beetles observed either. It is intended that another Malathion spray might be given in mid-late February if the second generation adult beetle population becomes significant. These actions might just reduce the beetle population for next spring to a comfortable level.

This Novodor® spray seems to be doing the job satisfactorily, is environmentally harmless and is safe for humans. It could be one of our weapons in the control of the elm leaf beetle.

Management strategies for elm leaf beetle and Dutch elm disease

The City of Melbourne has endorsed a management strategy for the control and monitoring of the elm leaf beetle in the City. A \$50 000 budget was requested for the control of elm leaf beetle for 1994, though it is unlikely that the total amount would be spent. The management of Dutch elm disease which has been published earlier (Yau 1992) and recently (Jenkins 1993) will be a major concern to the Council as the areas of responsibility span across state and federal boundaries. It is expected that further debate and discussion about the Dutch Elm Disease Management Plan (Jenkins 1993) at all levels and in all circles will produce the desired response from state and federal politicians, and a strategy will be mapped out accordingly.

Why worry about the elms?

This is a vexatious question that has been asked by many people who advocate planting native and indigenous vegetation. Their argument is that the elm has so many problems, is not native and therefore we should not worry too much if they all perish. This argument is naive and demonstrates ignorance of the real issues of conservation. The reasons why we should not give up on the elms are summarized by Heybroek (1993):

- *The beauty of the elms.* Beauty is one of the ultimate human values which makes a person more sensitive and human. Meeting beauty can dissolve stress. Investing in elms is investing in beauty.
- *The functional properties of elms,* especially as urban trees. It can tolerate a range of unfavourable conditions and maltreatments including pollarding and root mutilation. It can grow in poor soils, wet and poorly-aerated clay soils.
- *Their cultural history.* Elms have as many as 5000 years of association with human culture and civilization.
- *Their contribution to biodiversity.* Elm trees provide a habitat for many organisms; many species of insects and epiphytes depend on elms for existence. The death of all elms in a locality will decrease local biodiversity of course. Also the death of a species and the loss of the gene pool of that species is irreversible. People should realise that the threat to the elm is a threat to biodiversity.

Conclusion

Despite some of the problems associated with elm trees, particularly with the beetles and the impending threat of Dutch elm disease, elm trees deserve proper protection and care. The City of Melbourne has taken a responsible and proactive approach to the management of the elm trees. The Council will continue to take up a leadership role in all aspects of urban forest management in the future and will continue to develop its arboricultural expertise in order to assist any other municipality in their arboricultural pursuits.

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Getting the message across to the community

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Introduction

Working at 'grass roots level' is a familiar phrase, one that is particularly appropriate in the management of pests and diseases involving community icons. "Community icons" is, I believe, a fair description for elm trees in Victoria. The trees are old and long established, they bestow character, they typify Melbourne, particularly the inner suburbs and their seasonal change – an elm tree is beautiful at all times of the year – is a real asset.

The management of pests and diseases in these trees necessarily involves expert knowledge, scientific research and public money where the trees grow on public land, but as well, there is a real role to be played by people on the street, at the grass roots – by people who have elm trees in their own gardens, people who use parks where elm trees grow, people who take an interest in places where elm trees grow, people who take an interest in places where elm trees sucker and all too often receive little or no care and attention. Such people can become eyes and ears for the experts. They can back up and broaden their work.

Members of the community in general believe that trees planted on public land are not their responsibility. This is a local assumption: indeed, as a ratepayer, I expect my local council to take overall responsibility for the trees planted in its parks and along its streets and medium strips, just as I expect the railways to care for trees on railway embankments, Melbourne Water to maintain the trees on land it manages, and the state government to look after trees in national parks. However, I recognize that as a member of the public, I can help by informing these authorities when something is amiss – a fallen tree or branch, a tree that looks particularly unwell. And when it comes to elms, I know, thanks to Friends of the Elms, what to look for.

Friends of the Elms

Our community group, Friends of the Elms, sees it as one of our roles to marshal and inform the public, to tell them what can go wrong with elm trees and how to deal with it, and in so doing, to advance the cause of elm trees in Melbourne and Victoria and make people more aware of them. Let me begin by telling you about our group, how it began and exactly what it does.

More than three years ago I wrote an article for The Age that highlighted the

existence of the elm leaf beetle on the Mornington Peninsula, and of Dutch elm disease then newly discovered in New Zealand. The article posed questions about the long-term future of Melbourne's elms. Then by chance, at a drinks party, I was introduced by a friend to Alison Leslie, who had read the article and who felt concerned about the possible fate of the elms that give Melbourne so much of its charm and historic character. "We must do something; we ought to get together", she said. Alison is an energetic person who has done time as president of the Royal Women's Hospital and she knows the value of community workers. She felt we should form a group to take a special interest in elm trees. So we each suggested a few people who might join, and we called a meeting. A committee was set up, Friends of the Elms was born late in 1990, and the group has met almost monthly since that time.

Our first aim, of course, was to build membership. Each committee member persuaded a few friends of family members to join, which gave us a nucleus. I should add here that of the original committee, some were friends, some acquaintances and others family members of Alison or myself, some lived in areas rich in elm trees, and others were asked to join for reasons of particular expertise. Beyond the common interest in elms, this mix provided some depth and continuity for our working group, made meetings and functions most pleasant affairs, and has been, I believe, a factor in its continued existence. Then we had a brochure printed, which detailed our aims and the threats to the elms in an effort – which continues – to enable lay people to distinguish between the elm leaf beetle and the elm bark beetle. We distributed our brochure, free of charge, as an insert in a variety of magazines and newsletters. We took paid advertisements in a couple of gardening magazines. We sought free publicity and were lucky enough to get mentions on Burke's Backyard, in The Age and in the Australian Garden Journal. Our membership was soon more than 200 and the enthusiasm was very real.

I quote from letters written by some early subscribers:

"I live in close proximity to Temple Park Brunswick. I would be willing to record and monitor the health of the two avenues of elm trees in the park. My