

Alternative Pest Management At The Christchurch Botanic Gardens

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INTRODUCTION

In 1993 the Christchurch Botanic Gardens nursery and conservatory staff recognised a need to change from their traditional chemical “cocktail” approach of pest and disease prevention to an alternative system.

This change was brought about through concerns for staff and public safety, increasing environmental concerns related to using synthetic chemicals, restrictive health regulations, escalating chemical costs, increasing pest resistance, and the better availability of “how to” information for using alternative systems.

IDENTIFICATION OF PESTS

One of our initial tasks was to identify the pests involved. In the past our knowledge of entomology vaguely covered the main groups of pests. In each case we could distinguish an aphid but not go so far as whether it was a peach aphid or melon aphid, etc. By being species specific it meant we could have a better understanding of its life cycle and in turn the best way to deal with it. This sort of knowledge is not a necessity to using our system but because we are involved in staff training and providing information for the public, we deemed it an important focus in what we are doing.

Our staff also now view the nursery and conservatories as a complex ecosystem and that pest populations are part of this system. A shift in perspective is necessary when dealing with a complex biological community.

INTEGRATED PEST MANAGEMENT

Integrated pest management (IPM) is the use of a pest’s natural-found enemy to control it in conjunction with a suitable spraying programme that does not harm the predator. This means IPM can be used in conjunction with some synthetic chemicals, with the results being reduction of chemical use but not necessarily their elimination. We have taken the system one step further and developed the use of plant-derivative sprays (PDS) in conjunction with IPM. We believe this addresses our environmental concerns, reduces the chances of health hazards to our staff, and the general public and a recent study has shown it to be cost effective.

PLANT-DERIVATIVE SPRAYS

PDS are simply sprays that have been derived from plants. This includes old favourites like Derris Dust, a stomach poison derived from several tropical plants.

Pyrethrum, a toxic spray derived from the flower of a species of *Chrysanthemum*, through to more refined products like Safers, a spray made from the fatty acids of coconut oil.

We also use a range of anti-feedant sprays. These are simply sprayed onto the foliage of plants and taste terrible to a pest, causing it to move on. This includes garlic

concentrate, seaweed, compost tea, and the magic Indian neem tree long revered by Indians for its pest preventative properties. This list is being added to continuously as more plants and their products are found to be effective in management of pest prevention. We also use other products that seem more at home in the kitchen than the garden. As a good control for mildew, baking soda (sodium bicarbonate) has proved effective. This causes the leaf surface to become alkaline and unsuitable for this fungus.

Vegetable oil (which has been modified) is an integral product used as a sticker. It also holds the spray in suspension in water and once sprayed, gives lethal doses to the pests resulting in a much greater knockdown.

ENVIRONMENTAL CONSIDERATIONS

The microclimate in which the beneficial insects will live, may need to be monitored and adjusted to provide a favourable environment for the particular introduced insects. This can include increasing or reducing heat, humidity, and cultural treatment of plants in cultivation. Another consideration is to provide effective mulches for pupating insects in order to help their establishment. In Cunningham House this is a natural mulch as the central bed is a reflection of a rainforest and provides its own mulch. In order to help establish a complete ecosystem it is necessary to grow plants with shallow nectaries for feeding beneficial insects, such as, hoverflies. This may not be completely possible inside the conservatory or glasshouse because of the particular plants being grown. However, if consideration is given to the landscaping around the conservatory/nursery, you can integrate plants that provide shallow nectaries across the seasons. This can effectively provide a more complete ecosystem with the beneficial insects flying in and out of the glasshouse ventilation system.

CONCLUSION

Introducing new systems of pest and disease management to an established nursery where conventional treatments have been the mainstream does have its own set of problems. The layout of the nursery may not be ideal for planting nectar-feeding areas, therefore some adaptations may be needed. The saying "you can't teach an old dog new tricks" is often prevalent in a work place, especially if the old dog is comfortable and reliant on the old tricks. Sometimes the old dogs need a bit more encouragement and help to learn the new methods.

The management of pests and diseases in the Christchurch Botanic Gardens conservatories and nursery has evolved to suit our requirements. It may work differently in other areas. There is, however, a need for a continuing commitment to the least toxic solution, with both beginners and the already converted. New Zealand has a clean green image and the potential to capitalise on this in the future. We need to act now to protect ourselves from the mistakes made in the past by other countries. It is everyone's responsibility to protect our environment now and for the future from chemical and biological mistakes and to support those who are leading the way.

We need to preserve tomorrow's future, today.