

VIRUSES AND DISEASES



MARKET AND SOCIAL RESEARCH

# Report

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*Tomlinson Check Reaction*

## Potential for PCR Based Disease Diagnostic Services in the Nursery Industry

Supported by C-Qentec Diagnostics and the Horticultural Research Development Corporation

presented to

**C-Qentec Diagnostics and HRDC**

prepared by

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**HRDC PROJECT NUMBER:** NY0018

**PROJECT LEADER:** Trinette Duncan

**PURPOSE:** To examine the viability of a PCR based diagnostic test for Phytophthora as well as exploring the potential for tests for other relevant diseases in the nursery industry.

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# Media Summary

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*Decisions Research* was commissioned by C-Qentec Diagnostics and the Horticultural Research Development Corporation (HRDC) to examine the viability of a PCR based diagnostic test for Phytophthora as well as exploring the potential for tests for other relevant disease in the nursery industry.

A two-staged research design was adopted consisting of preliminary qualitative research comprising 3 focus groups and followed by quantitative telephone surveys with 205 Australian nursery proprietors and 20 growing media manufacturers.

The findings of the research indicate that Phytophthora is considered an important disease, with serious implications but perceived susceptibility among the nursery industry is extremely low. Satisfaction with current diagnostic service providers is very high.

Awareness and education are important considerations in heightening low perceived susceptibility and increasing the likelihood of adoption. The findings suggest limited knowledge and understanding of diagnostic techniques utilised to test for Phytophthora. The use of state-based agriculture departments in disseminating information is an important avenue for improving education and awareness.

# Technical Summary

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The potential for PCR based disease diagnostic services in the nursery industry, a market research project supported by C-Qentec Diagnostics and the Horticultural Research Development Corporation was conducted by *Decisions Research* in the final quarter of 2000. The potential for a unique soil diagnostic test based on DNA and which is not currently used within the nursery industry was the focus of the investigation which explored the viability of a PCR based diagnostic test for Phytophthora and the potential for tests for other relevant plant diseases.

A two-staged research design including both qualitative and quantitative methodologies was employed. Stage one comprised three focus groups conducted with 24 nursery proprietors in NSW, VIC and QLD. Stage two utilised, computer-assisted telephone interviewing (CATI) with 205 nursery proprietors and pen-and-paper telephone interviews with 20 growing media manufacturers in NSW, VIC, QLD, WA and SA. Participants were recruited from a list of nurseries sourced from the Nursery Industry Association of Australia (NIAA) and the Australian Telstra Yellow Pages. Both the facilitator's guide and the telephone survey were developed in association with industry input. Focus groups were designed to be completed within 1½ hours duration and telephone surveys within 20 minutes.

The findings of the research indicate that Phytophthora is considered an important disease, with serious implications but perceived susceptibility among the nursery industry is extremely low. Satisfaction with current diagnostic service providers is very high.

Awareness and education are important considerations in heightening low perceived susceptibility and increasing the likelihood of adoption. The findings suggest limited knowledge and understanding of diagnostic techniques utilised to test for Phytophthora. The use of state-based agriculture departments in disseminating information is an important avenue for improving education and awareness.

# 1. Introduction

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## PREFACE

This edition of the report has been adapted for public viewing. The full report is embargoed until 8 February 2002 and will be made publicly available from this date.

### 1.1 INTRODUCTION

*Decisions Research* was commissioned by C-Qentec Diagnostics and the Horticultural Research Development Corporation (HRDC) to examine the viability of a PCR based diagnostic test for Phytophthora as well as exploring the potential for tests for other relevant diseases and pests in the nursery industry. The focus of the market research was to explore the potential for a unique diagnostic test based on DNA, which is not currently used within the nursery industry. The extent of Phytophthora problems in the nursery industry and the potential use of more readily available, rapid and accurate diagnostic tests were not known at the time of this research.

A voluntary contribution from C-Qentec Diagnostics was proffered in support of this research and matched funds provided by the HRDC. Ian Atkinson, the Industry Development Manager for the peak industry body, the Nursery Industry Association of Australia (NIAA) endorsed this market research project during his term in office.

This market research explores the potential for a unique soil diagnostic test based on DNA, which is not currently used within the nursery industry. Development of the proprietary technology has been undertaken by the Cooperative Research Centre for Tropical Plant Pathology and was sponsored by the Rural Industries Research and Development Corporation. An assessment of the potential for this new diagnostic test for plant diseases in nurseries is required to understand the requirements of end users and analyse the match between this product development and those requirements.

'Integrated Pest and Disease Management' (IPDM) has been identified as a priority for action within the Nursery Research and Development Plan for 1996-2001 under the key activity area of 'Production and Handling'. The NIAA is committed to working with those sectors of industry that participate in and add value to industry initiatives. Adoption of IPDM as the technologies and practices become available is an important strategy within their plan for the progression of the industry. The first step in any IPDM is correct identification of disease. The primary focus for this diagnostic test in development is Phytophthora, a major disease of plants in the nursery industry.

Phytophthora, one of the world's most damaging plant pathogens is a fungal disease affecting a variety of plant species. Annual losses caused by the pathogen in Australia are estimated to be \$200-\$300 million. It is a major pathogen of containerised nursery plants. A soilborne organism, Phytophthora is easily transported in soil and water and the spores are capable of surviving for extended periods of time. The organism attacks the root system of plants causing root rot and infection often results in death of the plant.

Currently sanitation and nursery hygiene are considered the most effective means of limiting the spread of Phytophthora in nurseries. Tests are available for Phytophthora in plant pathology laboratories run by the state departments of agriculture but appear to be not well known and under utilised within the industry. For example, the Queensland Department of Primary Industries performs approximately 1,000 tests per year for Phytophthora at a cost of about \$60. Australian diagnostic laboratories have not adopted many rapid diagnostic services, tending to use more traditional techniques. These procedures can take up to three weeks to complete and make it difficult to handle large numbers of samples.

Many new tests have been developed for diagnosing disease in Australian plant industries, however, it appears that market research with the end users of tests has not been investigated. For the commercialisation of a diagnostic test to succeed, the perceived needs of the nursery industry should be



examined and the potential use for diagnostics explored. This will ensure the industry benefits for the technology of a test, which is geared towards long-term commercial and public benefit. New diagnostics technologies such as PCR for Phytophthora can improve the timeliness and accuracy of delivery of plant disease diagnostic services to end-users.

The market research was designed as a two-staged study and commenced with qualitative research undertaken by *Decisions Research* in August 2000. Three focus groups (24 participants in total) were conducted with Australian nursery proprietors in NSW, VIC and QLD. The results of the qualitative research were used to inform the development of the survey for a larger quantitative study in stage two. *Decisions Research* conducted stage two, a telephone survey with nursery proprietors and growing media manufacturers in November 2000.

**This report comprises two main sections. The first section of the report documents the outcomes from stage one, followed by the findings obtained from stage two and concludes with conclusions and recommendations.**

Outcomes from the research will be beneficial to the development of commercialisation of diagnostics for plant diseases in the nursery industry.

### **1.3 RESEARCH OBJECTIVES**

The objectives of this research were primarily to develop an understanding of end-user requirements, including:

- Need for a predictive diagnostic service for Phytophthora;
- The price growers are prepared to pay for diagnostics in the nursery industry;
- What other diseases and pests could be diagnosed with a DNA test;
- How samples would be collected;
- The likely demand for diagnostics;
- An appropriate distribution channel for diagnostics; and
- What disease diagnostic support is required.

## 2. Methodology

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## 2.1 RESEARCH DESIGN

A two-staged approach including both qualitative and quantitative methodologies was employed to address the objectives of the research.

Stage one comprised three focus groups held with nursery proprietors in NSW, VIC and QLD. Once agreeing to participate, participants were mailed or faxed a confirmation of attendance detailing the date, time and venue for the discussion. On the day prior to the scheduled discussion group each group participant was contacted by phone to confirm attendance. Groups were facilitated by an experienced facilitator and also attended by an observer. Participants were provided with refreshments and a cash incentive of \$30 to encourage attendance at the focus group. Each group was audio-taped and transcribed in full.

A quantitative methodology utilising computer assisted telephone interviewing (CATI) with a target group of nursery proprietors and growing media manufacturers in NSW, VIC, QLD, WA and SA was employed in stage two. Interviews with nursery proprietors was conducted utilising computer-assisted telephone interviewing (CATI) and interviews with growing media manufacturers were conducted simply using pen-and-paper over the telephone.

Participants were recruited from a list of nurseries sourced from the Nursery Industry Association Of Australia (NIAA) and the Australian Telstra Yellow Pages. Potential group participants were recruited on the basis of postcode eligibility within a reasonable commute to the location of each group. In addition, group participants were screened so that only wholesale nurseries with three or more employees were invited to participate and the proprietor or manager of the business was targeted. No incentive was provide in stage two of the research.

## 2.2 SAMPLE SIZE AND STRUCTURE

Forty growers were recruited to participate in the group discussions, with 24 growers eventually participating. Three focus groups were conducted in August 2000 in the states of NSW, VIC and QLD.

The groups were conducted in the following locations:

- Knoxfield, Victoria;
- Rouse Hill, New South Wales; and
- Acacia Ridge, Queensland.

Stage two aimed to complete 200 telephone-administered interviews with nursery proprietors and at least 20 interviews with growing media manufacturers. The sample for nursery proprietors was stratified to reflect the existing relative proportions of nursery production businesses in the major production areas of Australia. There are a limited number of growing media manufacturers in Australia and attempts to contact most of them were made.

Table 1 below provides the total and relative proportions by each state for the sample size of 200. The standard error associated with a sample of 200 is +/-6.7%. A standard error of +/-6.7% means that if 70% of respondents provided a particular response to a question, we can be 95% confident the true proportion lies between 63% and 77%.

**Table 1: Sample Size and Stratification by State**

STATE	APPROX. TOTAL POPULATION <sup>1</sup>	%	SAMPLE
NSW	1,434	43%	86
VIC	643	19%	38
QLD	751	23%	46
SA	231	7%	14
WA	261	8%	16
<b>TOTAL</b>	<b>3,320</b>	<b>100%</b>	<b>200</b>

## **2.3 INTERVIEW PROTOCOL**

Interviewers conducting the CATI fieldwork were fully trained according to the MRSA code of professional behaviour and to IQCA/ESOMAR standards. Ten percent of every interviewer's work was validated and interviewers were supervised daily. Special statistical tests were made on every interviewer in order to avoid 'interviewer bias'. The field team received a formal briefing on the project prior to conducting interviews.

## **2.4 QUESTIONNAIRE DESIGN**

A facilitator's guide for the focus groups was developed in conjunction with relevant industry input. The guide was designed to address the objectives of the research and to be completed in approximately 1½ hours. A funnelling strategy was applied, where a broad approach was utilised in the first instance, narrowing down to the specific disease issue of interest: Phytophthora.

The questionnaire for stage two was developed on the basis of information obtained from the focus groups and was distributed to NIAA, HRDC and C-Qentec for input. The questionnaire was developed to result in an average maximum interview duration of 20 minutes.

## **2.5 DATA COLLECTION**

Focus groups were facilitated by a team of 2 experienced and qualified facilitators with an assistant in attendance.

Interviews with nursery proprietors were conducted by telephone using CATI facilities. Individuals were randomly selected via the databases created by *Decisions Research* for this project and then contacted via telephone and invited to participate. All interviews with growing media manufacturers were conducted by a single interviewer.

Use of a CATI system ensured data collection was performed both time-efficiently and accurately. Coding of any open-ended responses was performed at the same time and a minimum 10% validity

<sup>1</sup> 1996/97 ABS Census of the Australian Nursery Industry, cited in [www.niaa.org.au](http://www.niaa.org.au).

check was undertaken. Each interviewer's work was validated within the 10% total validation and was conducted by the interviewer supervisor / team leader at the CATI facility.

## 2.6 FIELD WORK DATES

Stage one was conducted in August 2000 and stage two was conducted in November 2000.

## 2.7 FIELD ACHIEVEMENT RATES

A total of 2,937 telephone calls were made to 1,148 nursery proprietors to achieve a sample of 205, a response of 18%. A summary of the field statistics is given below.

**Table 2: Telephone Interviews Contact Report**

<b>RESPONSE</b>	<b>NUMBER</b>
Non-contactable	1386
Screen failures	28
Call-backs	948
Refusals	357
Terminated	13
Completed	205
<b>TOTAL CALLS</b>	<b>2937</b>

The average interview duration was 16 minutes.

# 3. Qualitative Results

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### 3.1 PARTICIPANTS

The growers who participated in the focus group research came from a variety of sectors, ranging from propagation nurseries and producers of seedlings to large trees and from single person operations to large companies. Sources of nursery stock from the growers represented in the groups included cut flowers, bulbs, potting stock, tube stock, indoors and outdoor plants, climbers, ornamentals, shrubs, groundcovers, native grasslands, re-vegetation, small and large trees, including olive trees.

All group participants were from the wholesale nursery sector and supplied a vast range of clients including propagation nurseries, the cut flower market, other wholesalers, landscapers, councils, retailers and chain stores such as Kmart and Woolworths. Many growers had interstate and export clients. Eleven group participants were members of the NIAA.

### 3.2 GENERAL INFORMATION

Growers expressed some concern for the economic viability of the horticulture industry in Australia. The small size of the horticulture industry, relative to the agriculture industry, and the limited research and development expenditure in horticulture was considered a barrier for future development of the industry. Group participants raised issues such as the vast range of, and the lack of knowledge about, diseases and insects within the nursery industry.

Group participants expressed a feeling of being the 'poor relation' to farmers with little support from the government and chemical companies, whose primary focus is on farmers because of the magnitude of crops they grow. Growers are aware of the economic opportunity farmers offer chemical companies compared to nursery industry growers who grow such a large variety of plants with an enormous range of pests and diseases.

*"The nursery industry knows very, very little about pests and disease."*

*"The scope of different problems is so wide and every crop has its own particular problems."*

*"I've always maintained the trouble is the horticultural industry in Australia is just so small, that none of the fungicide companies have really pulled their finger out and got stuck into solving it...the research hasn't been done."*

*"If we can get a fraction of the money that is spent on cotton, spent on research into our industry, we'd be laughing..."*

**NOTE: Sections 3.3 to 3.6 are not available for viewing until 8 February 2002.**

## 4. Quantitative Results

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## 4.1 DATA ANALYSIS

Data were analysed using SPSS for Windows (Version 10.1) and Microsoft Excel 97.

Whenever sub-group comparisons are appropriate, it is important to distinguish between differences that are reliable (i.e., statistically significant) and those that are not (and therefore could be due to chance sample fluctuations, or sampling error). Statistical significance has been tested at 95%. In this report, the sub-group comparisons most commonly discussed are:

- Enterprise size: number of employees 1 to 3, 4 to 7, more than 7.

All proportions have been rounded as required. Significant differences are denoted by a box in tables or graphs.

## 4.2 SAMPLE DEMOGRAPHICS

The profile of the respondents is shown in Table 3 and 4 below. Of the 205 nursery proprietors, 70% of respondents were male and 40% were aged between 40 and 49 years. Just under half the sample (43%) were from NSW. Given the relatively small population of Growing Media Manufacturer's no sample quotas were applied. Of the 20 growing media manufacturers interviewed, 85% were male and 65% were aged between 30 and 49 years of age.

**Table 3: Nursery Proprietors Sample Composition**

	<b>TOTAL</b>
<b>Base: All Respondents</b>	<b>205</b>
	<b>%</b>
<b>Gender:</b>	
Male	70
Female	30
<b>Age:</b>	
18 to 24 years of age	3
25 to 29 years of age	4
30-39 years of age	22
40-49 years of age	40
50-59 years of age	25
60 years of age or over	4
Refused	1
<b>State:</b>	
NSW	43
VIC	19
QLD	22
SA	7
WA	8