

24 September 2002

Mr John Carter,
Inquiry Secretary
Joint Committee of Public Accounts and Audit
Review of Australia's Quarantine Function
Parliament House
CANBERRA ACT 2601

Dear Mr Carter,

Review of Australia's Quarantine Function: Question on notice

During the public hearing on Tuesday, 3 September 2002 I was given a question on notice regarding the sufficiency of diagnostic capacity to support the North Australia Quarantine Strategy target lists of plant pests and diseases. CSIRO's response is attached.

Yours faithfully

Dr Rob Floyd
Portfolio Manager – Biosecurity and Natural Resources

Question on Notice

Joint Committee of Public Accounts and Audit
Review of Australia's Quarantine Function

CSIRO - 3 September 2002, Melbourne
Response provided by Dr Rob Floyd, Portfolio Manager,
Biosecurity and Natural Resources, CSIRO Entomology.

Does Australia have adequate diagnostic capacity to support the North Australia Quarantine Strategy (NAQS) target lists of plant pests and diseases?

The NAQS target lists of plant pathogens and pests as well as a separate list of exotic fruit fly species are appended to this document. The adequacy of diagnostic capacity in Australia for each list is treated separately.

Target list of plant pathogens

The answer to the question is not simple. However, some general points are:

The CRC for Tropical Plant Protection has established the Northern Australian Diagnostics Network, which develops diagnostics tests and applies them through out participating organisations, one of which is AFFA. Thus NAQS has access to those diagnostics services that are available.

The degree to which diagnostics tests are available for the NAQS target list is variable. For some pathogens, such as black Sigatoka Fusarium wilt tropical race 4 and moko disease of bananas, tests are will developed. For some other pathogens such as the Downy mildews (*Peronosclerospora* spp.), diagnostic tests are far from satisfactory. Diagnostic capacity for the majority of plant pathogens lie in the middle where basic diagnostic tests are in place but are far from fully developed. Many of these tests have not been adequately validated such that results can be guaranteed to be sensitive, only identify the particular organism in question, and is properly tested to international standards.

Target list of plant pests

Definitive diagnostic capacity for plant pests in Australia resides in specialists in various groups of insects supported by appropriate reference collections of Australian and exotic insect species. These specialists and collections are in a number of organisations with the Australian National Insect Collection at CSIRO Entomology having the most specialists and the largest reference collection. Adult specimens of most of the species listed in the NAQS target list can be identified by experts within Australia. The exceptions are all from the Order Hemiptera which contains a number of groups of serious pests that suck the sap from plants. The Order Hemiptera is not adequately covered by relevant taxonomic expertise in Australia and thus leaves us without sufficient skills to provide the necessary diagnostic support for this important group. In addition, it is necessary to place more

reference material of key exotic pest species in Australian collections for immediate access when a potential incursion is detected.

Immature stages of most of these species cannot be identified. This is of great concern since for many species it is more likely that immature stages will be detected before adults are found and the success of eradication programs is greatly influenced by the time elapsed from initial incursion to commencing an eradication effort. In some cases, identification from immature stages could be achieved by morphological examination and comparison with reference material if it was available in Australia (generally it is not present in Australian collections). However, in most cases, identification of immature stages would need to be achieved by DNA analysis. These tests have not been developed and are required.

Target list of exotic fruit fly

Prof Dick Drew of Griffith University is Australia's leading expert on fruit fly identification and is able to positively identify the adults of all the species of fruit flies on the NAQS target list, by morphological examination. However, fruit fly is often first detected as larvae and he can only identify about four species using larval morphology. Australian capacity to use DNA systems to identify fruit fly larvae has been developed but not fully tested for about 50% of the species listed.

Clearly, there is a need to enhance our DNA based diagnostic capacity so we can rapidly and accurately diagnose exotic fruit fly species.

Conclusion

Currently, there is an activity supported by AFFA and Plant Health Australia to enhance the diagnostic capacity for high-priority pests and pathogens of plant industries in Australia. This program has a very small budget and is seeking to provide some seed funding to strengthen our national capacity. We are still well short of having adequate diagnostic/taxonomic capacity in Australia to protect our plant industries and urgently require an injection of significant funding to develop diagnostic protocols and maintain the skill base of specialist taxonomists and diagnosticians.

NAQS TARGET LIST OF PLANT PATHOGENS

Dossier No.	Pathogen	Entry potential*	Colonisation potential*	Spread potential*
1	Banana bract mosaic potyvirus	M	H	H
2	Banana bunchy-top nanavirus	M	H	H
3	Blood disease bacterium	H	H	H
4	<i>Fusarium oxysporum</i> f. sp. <i>cubense</i> race 4	H	H	M
5	<i>Mycosphaerella fijiensis</i>	H	H	H
6	<i>Ralstonia solanacearum</i> race 2 biovar 1	M	H	H
7	<i>Ralstonia solanacearum</i> race 2A biovar 1	M	M	M
8	Citrus tristeza closterovirus – stem pitting strains	H	H	H
9	<i>Elsinoe fawcettii</i>	H	H	H
10	<i>Liberobacter asiaticum</i>	H	H	H
11	<i>Xanthomonas axonopodis</i> pv. <i>citri</i>	H	H	H
12	Coconut cadang-cadang viroid	M	M	M
13	<i>Hemileia vastatrix</i>	H	M	H
14	<i>Cryphonectria cubensis</i>	M	H	M
15	<i>Pseudomonas syzygii</i>	M	H	M
16	<i>Puccinia psidii</i>	L	H	H
17	<i>Ralstonia solanacearum</i> race 1	M	H	L
18	<i>Physopella ampelopsidis</i>	H	H	H
19	<i>Pantoea stewartii</i> subsp. <i>stewartii</i>	M	H	H
20	<i>Peronosclerospora philippinensis</i>	H	H	H
21	Peanut stripe potyvirus	M	H	H
22	<i>Claviceps sorghi</i>	M	H	H
23	<i>Peronosclerospora sorghi</i>	H	H	H
24	<i>Peronosclerospora sacchari</i>	H	H	H
25	Ramu stunt	H	H	H
26	Sorghum mosaic potyvirus	M	H	H
27	Sugarcane mosaic potyvirus	M	H	H
28	<i>Stagonospora sacchari</i>	M	H	H
29	Sugarcane Fiji disease fijivirus	H	H	H
30	<i>Ustilago scitaminea</i>	H	H	H
31	<i>Xanthomonas albilineans</i>	H	H	H

*H means a high potential; M is a moderate potential and L is a low potential.

Pathogens in bold either have taxonomic uncertainty or inadequate diagnostic tests available.

NAQS TARGET LIST OF PLANT PESTS

Dossier No.	Pest	Common name	Entry potential*	Colonisation potential*	Spread potential*
1	<i>Aleurocanthus woglumi</i>	citrus blackfly	H	H	H
2	<i>Aleurodicus dispersus</i>	spiralling white fly	H	H	H
3	<i>Aleurolobus barodensis</i>	sugarcane whitefly	H	H	H
4	<i>Amblypelta cocophaga</i>	squash bug	H	H	H
5	<i>Asterolecanium pustulans</i>	oleander pit scale	H	H	H
6	<i>Bruchophagus muli</i>	gall wasp	H	H	H
7	<i>Ceratovacuna lanigera</i>	sugarcane wooly aphid	H	H	H
8	<i>Chilo auricilius</i>	sugarcane internode borer	H	H	H
9	<i>Chilo infuscatellus</i>	shoot borer	H	H	H
10	<i>Chilo polychrysus</i>	dark headed rice borer	H	H	H
11	<i>Chilo sacchariphagus</i>	spotted borer	H	H	H
12	<i>Chilo terrenellus</i>	stem borer	H	H	H
13	<i>Citripestis sagittiferella</i>	citrus fruit borer	M	H	H
14	<i>Coptotermes curvignathus</i>	rubber termite	M	H	H
15	<i>Deanolis albizonalis</i>	redbanded mango caterpillar	H	H	H
16	<i>Diaphorina citri</i>	Asian citrus psylla	H	H	H
17	<i>Erionota thrax</i>	banana skipper	H	H	H
18	<i>Eumetopina flavipes</i>	sugarcane leafhopper	H	H	M
19	<i>Helopeltis</i> spp.	mirids	H	H	H
20	<i>Hypothenemus hampei</i>	coffee berry borer	H	M	M
21	<i>Odoiporus longicollis</i>	banana stem weevil	M	M	L
22	<i>Oxymagis horni</i>	longicorn beetle	H	M	H
23	<i>Perkinsiella saccharivora</i>	sugarcane planthopper	M	H	M-H
24	<i>Perkinsiella vastatrix</i>	sugarcane planthopper	H	H	M-H
25	<i>Perkinsiella vitiensis</i>	sugarcane planthopper	H	H	M-H
26	<i>Pyrilla perpusilla</i>	sugarcane leafhopper	H	H	H
27	<i>Rastrococcus invadens</i>	mango mealy bug	M	H	H
28	<i>Rhynchophorus ferrugineus</i>	red weevil	H	M	M
29	<i>Scirpophaga excerptalis</i>	sugarcane top borer	M	H	H
30	<i>Scirpophaga nivella</i>	top borer	M	H	H
31	<i>Sesamia grisescens</i>	pink stalk borer	H	H	H
32	<i>Sesamia inferens</i>	purple stem borer	H	H	H
33	<i>Sternochaetus frigidus</i>	mango pulp weevil	H	H	M
34	<i>Tetramoera schistaceana</i>	grey borer	M	H	H
35	<i>Zeuzera coffeae</i>	red borer	H	H	H

*H means a high potential; M is a moderate potential and L is a low potential.

NAQS Exotic Fruit Fly Target List

Species name	Author	Common name	Lure	Nearest known location
HIGH PRIORITY				
<i>Bactrocera carambolae</i>	Drew & Hancock	Carambola fruit fly	me	Sumbawa, Indonesia
<i>Bactrocera cucurbitae</i>	(Coquillett)	Melon fly	cue	PNG (Daru, Western Province)
<i>Bactrocera papayae</i>	Drew & Hancock	Asian papaya fruit fly	me	PNG (Western Province) & northern Torres Strait
<i>Bactrocera trivialis</i>	(Drew)		cue	PNG (Western Province)
MEDIUM PRIORITY				
<i>Bactrocera philippinensis</i>	Drew & Hancock		me	Philippines
<i>Bactrocera tau</i>	(Walker)		cue	Java, Indonesia
LOW PRIORITY				
<i>Bactrocera atrisetosa</i>	(Perkins)		none	PNG (Central Province)
<i>Bactrocera correcta</i>	(Bezzi)	Guava fruit fly	me	Thailand, Vietnam
<i>Bactrocera decipiens</i>	(Drew)		none	PNG (New Britain)
<i>Bactrocera dorsalis</i>	(Hendel)	Oriental fruit fly	me	Vietnam
<i>Bactrocera kirki</i>	(Froggatt)		cue	Tonga
<i>Bactrocera occipitalis</i>	(Bezzi)		me	Palau, Sabah, Malaysia
<i>Bactrocera passiflorae</i>	(Froggatt)	Fijian fruit fly	cue	Fiji
<i>Bactrocera trilineola</i>	Drew		cue	Vanuatu
<i>Bactrocera umbrosa</i>	(Fabricius)	Breadfruit fly	me	Torres Strait ¹ PNG, Indonesia
<i>Bactrocera xanthodes</i>	(Broun)		me	Fiji
<i>Bactrocera zonata</i>	(Saunders)	Peach fruit fly	me	Thailand

¹Occasionally detected in traps on Boigu, Saibai and Dauan Islands (close to PNG). No available host plants on those islands to enable establishment.