

THE SEARCH FOR RED IMPORTED FIRE ANTS *SOLENOPSIS INVICTA* BURREN (HYMENOPTERA: FORMICIDAE) IN NEW SOUTH WALES

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Summary

Active and passive surveillance with a public awareness campaign was undertaken in New South Wales following the detection of Red Imported Fire Ants at Brisbane, Queensland, in February 2001. Between February 2001 and June 2002 1072 sites were inspected and 666 ant samples submitted for identification. In 2002-03 2902 sites were inspected and 1190 ant samples submitted. No fire ants were found during the first 29 months of operation. The public awareness campaign was conducted using a generic brochure, presence at field days, public displays, and a toll-free telephone number.

Keywords: Fire ants, *Solenopsis invicta*, detection, New South Wales

INTRODUCTION

Red Imported Fire Ants (RIFA) *Solenopsis invicta* Burren (Hymenoptera: Formicidae) is a pest of agriculture and urban environments. It is thought to have originated in South America (McCubbin and Weiner 2002). In the 1930's, RIFA was introduced into North America and has since infested many States. In Texas, managing fire ants costs an estimated US\$4580 million annually with the greatest impact on the household sector (Lard *et al.* 2001).

RIFA was first detected in Australia at Brisbane in February 2001 (Mound 2001). RIFA has the potential to cause significant disruption to leisure and lifestyle activities and can cause anaphylaxis in some humans after being stung (Solley *et al.* 2002). RIFA can also interfere with agricultural and livestock enterprises, and threaten wildlife (McCubbin and Weiner 2002, Malony and Vanderwoude 2002). The potential economic impact of RIFA in Australia, if uncontrolled, was estimated at \$8.9 billion over 30 years (McCubbin and Weiner 2002).

The Australian States and the Australian government agreed to a cost sharing approach to attempt eradication. An initial commitment of \$123 million over five years (McCubbin and Weiner 2002) was subsequently increased to \$146 million. While the majority of the funding was scheduled for the control program in Brisbane, it also included funds to support a public awareness campaign and site inspections in all Australian States to ensure the pest had not been inadvertently introduced into other States.

The surveillance program initially ran from February

2001 until June 2002, however additional funds became available to continue the national program until June 2003. This paper summarises the public awareness and surveillance activities in New South Wales (NSW) between February 2001 and June 2003.

METHODS

NSW Department of Primary Industries (NSW DPI, formerly NSW Agriculture) was nominated as the lead government agency to coordinate all RIFA activities in NSW. As part of the response to possible RIFA introductions into NSW, legislation was enacted to prohibit the introduction of RIFA and products contaminated by RIFA. In addition, the use of pesticides to treat potentially contaminated materials and sites was approved by the Australian Pesticides and Veterinary Medicines Authority.

Risk assessment

NSW DPI staff performed several risk analyses to determine high-risk sites and enterprises. Introductions into two Brisbane locations appeared to have occurred via shipping containers. Consequently, port authorities, container handling sites and breakdown depots initially received the highest priority for inspections in NSW. Domestic residences were also deemed high-risk because the first positive identification in Queensland was at a domestic residence. Plant nurseries were deemed to be high-risk enterprises, as some of the early distribution of RIFA in Brisbane appeared to have occurred due to movements of infested nursery stock. Other enterprises that moved material that had been in contact with potentially infected soil were also targeted for inspection.

NSW was divided into three zones for risk analysis and surveillance purposes. The Sydney basin was targeted because of its large population and many plant and other enterprises which imported high risk material from Brisbane. The northern NSW coast, immediately south of Brisbane, was also targeted for active surveillance due to its close proximity to the infested area. Inland NSW was deemed to be of comparatively low risk and was accordingly given a low level of surveillance activity.

Passive surveillance

Following the decision to conduct a public awareness campaign, a toll free hotline was established for the public to contact authorities. Additionally 130000 brochures, based on a pamphlet designed for the Queensland campaign, were distributed to all NSW DPI and local government offices, as well as industry organisations such as plant nurseries, pest controllers, eco-groups and landscapers. The brochure explained basic identification, how to collect ants for submission and how and where to send samples for identification.

Passive surveillance was initiated in all three zones. This was based on contacts from the public, and resulted in ant samples being sent to the Agricultural Scientific Collections Unit (ASCU) (at the Orange Agricultural Institute (OAI)) by the public. Public assistance was solicited by the toll free telephone hotline and a mail-out of brochures, along with brochure distribution at industry displays, field days and gardening exposés.

Active surveillance

Only an overview of the general active surveillance strategy is outlined here. The specific details of the methodology of the program are beyond the scope of this paper. Active surveillance was initiated in the Sydney basin and the northern NSW coastal zones. Inspectors were assigned premises to visit with information recorded on a standard survey form. Premises managers were asked where produce (hay, plants, soil, bark chips, machinery, bricks etc.) came from, and were given a copy of the RIFA brochure and legislation requirements. The premises were then inspected for the presence of ants (visual assessment) with an ant sample being taken if suspect ants were found. Depending on the circumstances, the perimeter of the property up to 20m from the fence line was also inspected if the inspector assessed the threat to be high. The sting of RIFA is relatively distinctive and given the lack of reports of these stings by premises managers, visual assessment was used rather than other more time-consuming

sampling methods requiring return visits. It was also considered more important to visit more premises to make some assessment of potential RIFA presence and to rapidly identify the sites of possible incursion.

Ant activity is known to increase with rising temperature. Active surveillance started in the north of the State as temperatures increased in spring and progressively surveillance increased in more southern parts of NSW; this pattern was reversed with the onset of autumn. Property inspections, in response to calls to the toll-free hotline, continued all year however these calls also declined with the onset of cooler weather. Inspectors initially collected any ants however by July 2001, they were directed to collect only red ants less than 1cm long (RIFA grow up to 6mm). All survey forms were recorded if ant samples were taken.

During the interview with the premises manager, any enterprise that indicated that regular shipments of material from risk areas in Brisbane was considered to be an on-going high risk. Local co-ordinators (Sydney and northern NSW coast) examined information on survey forms and scheduled additional inspections for premises with the inspection schedule being based on the level of risk; one month being a common re-inspection interval.

Tracing and consignments

A trace forward system was also used to schedule visits. All Plant Health Certificates issued by Queensland authorities for the movement of risk materials into NSW, were sent by facsimile (by the Queensland authorities) to the northern co-ordinator who advised other centres if a particular premise should be inspected. In peak months, over 1000 certificates per month were received.

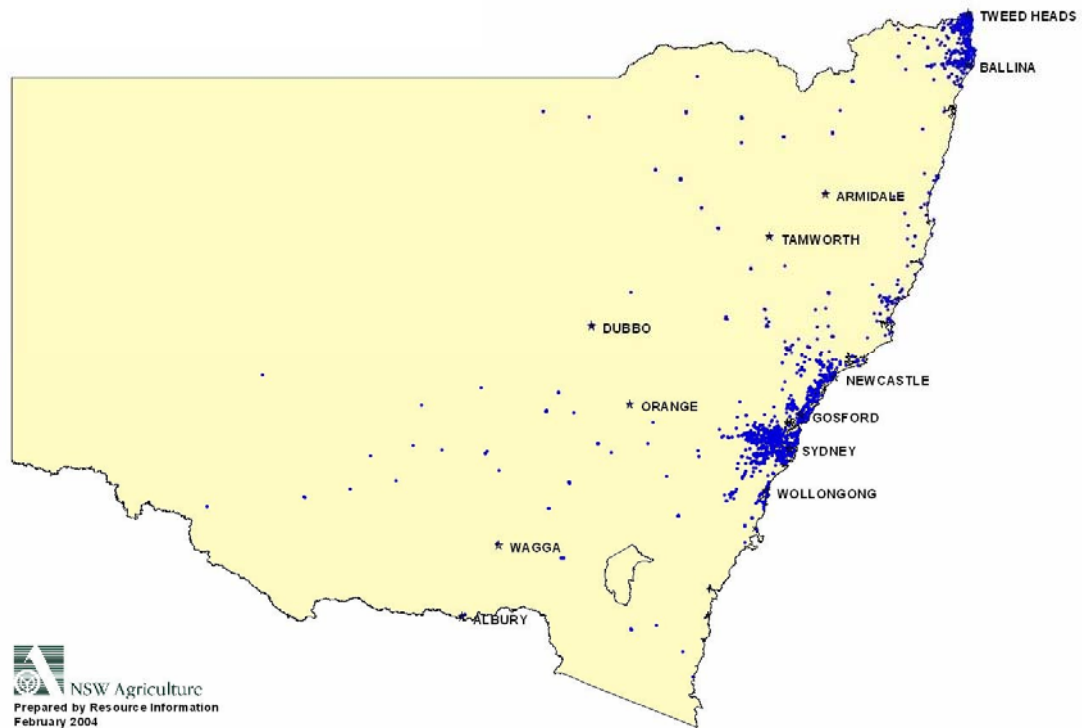
Identification of samples

In NSW, identifications were conducted by ASCU staff. Ants submitted were identified only to a point where they were determined not to be RIFA. All data was entered onto a database (summarised in Table 1, Figure 1). In the "sample taken" column of the database, the information was recorded as either (1) no ant sample taken, or (2) sample ant not RIFA.

RESULTS

Initially, any ant found in the field was sent for identification. The number of samples submitted then declined as field inspectors were directed to send only ants less than 1 cm in length. On average, there were 62 samples submitted per 100 inspections

Figure 1. Distribution of Fire Ant Samples and Inspections. Activities from February 2001 to June 2003 across NSW.



during the first 17 months of survey period compared with 41 samples per 100 inspections during the final 12 months. In the first 17 months, the main focus was on shipping container facilities (30% of visits), nurseries (30%) and residences (24%). These results are summarised in Table 1. After all site inspections, including many repeat visits, had been completed during the initial 17 months period, inspections of shipping container sites took a lower profile.

In NSW, the public awareness program initially focussed on contacting high-risk groups and industries, and gaining public assistance to find any RIFA infestations. Although we had expected the level of public support to increase with time, the number of calls to the hotline declined progressively and it became difficult to maintain public interest, particularly as no RIFA were detected in NSW. Nevertheless, the public submitted 132 samples during the entire period and most of the 537 residences inspected resulted from contact via the toll-free hotline or from promotion at public displays. In absolute terms the public contribution remained reasonably constant during the first and second periods (Table 1) but declined proportionally as the level of departmental inspections increased. Interactions with the public contributed a maximum

of 23% of all contacts (residences and samples received by mail) during the first period. For the twelve months ending June 2003, the general public contributed about 10% of all contacts. For the entire program there was about one contact from the public for every 242 brochures distributed.

There was an average of 63 activities per month during the first initial 17 months period, compared with 241 activities per month for the 2002/2003 financial year. This was partly due to the initial expectation that the program would not be funded beyond June 2002. During the second period the use of contract inspectors was developed and expanded in 2003 to cope with the workload. This also contributed to the increased number of activities in the 2002/2003 year.

In the second period, the emphasis was shifted to possible secondary routes of incursion. Inspections focussed on the plant nursery industry with the number of inspections increasing from 321 in the first period to 1337 in the next 12 months, a four-fold increase. There was a similar increase between the first and second periods in inspections of landscape material supply sites, furniture removals businesses and transport depots. Enterprises, which were not

Table 1. Premise types which provided samples or which were inspected between February 2001 and June 2003.

Premise type	No. of sites inspected or providing samples		
	Feb 01-June 02	July 02-June 03	Total
Container depots and port facilities	323	86	409
Bee Hives	0	2	2
Brickyards	0	15	15
Timber/building supplies	0	11	11
Commercial	33	88	111
Earth moving	2	17	19
Farm suppliers	0	22	22
Farmers/growers	7	11	18
Hardware stores	7	23	30
Landscape related	41	189	230
Nurseries	321	1337	1658
Parklands	9	489	498
Removalists	25	91	116
Residences	252	285	537
Roadside/roadworks	8	39	47
Storage	0	71	71
Transport related	11	62	73
Other	33	64	97
Total	1072	2902	3974
Samples received from the public	61	71	132
Ant samples sent for identification	666	1190	1856

inspected in the first period, such as beekeepers, timber suppliers, brickyards, and farm merchandise suppliers were inspected in the second period. Parklands received considerable attention in the second period because of the fear that RIFA may be transported in infested soil.

Following advice that fire ants could be transported with bee hives, 3300 beekeepers were contacted by mail, requesting samples of any suspicious ants to be sent for identification. However, the severe drought had restricted apiary activities with many beekeepers ceasing operations. As a result only two samples were received.

By 30 June 2003, following 3974 inspections and or other contact with the public, there had been no positive identifications of RIFA in NSW.

DISCUSSION

The detection of RIFA in Brisbane has substantially increased the risk of introduction of the species into NSW. During the initial surveillance period from February 2001 to December 2002 the extent of the infestation in Brisbane continued to expand as delimiting surveys detected additional infested sites. During the 29 months period reported in this paper, a nest of RIFA was discovered at Port Melbourne, Victoria, in shipped material from Texas in the United States of America. The nest and ants were

destroyed before they could escape (Scammell 2001). The two separate incursions into Brisbane came from genetically distinct sources (Timmins 2002). These events highlight the need for continued vigilance by all Australian States authorities against further introductions from overseas.

In early March 2001 a single mature RIFA nest found within the security area at Auckland International Airport New Zealand (Pascoe 2001) was destroyed. New Zealand authorities initiated an intensive surveillance and targeted awareness program. With no further detection following a two-year program, the ant was declared eradicated. This was the first successful RIFA eradication in the world (Pascoe 2003).

Human activity and development has been linked to the spread of RIFA (Forys *et al.* 2002) in the Florida Keys and in Texas (Bhatkar 2001). This is consistent with the experience in Brisbane where natural flight dispersed ants for several kilometres however this is trivial compared with the extensive dispersal of ants over far greater distances caused by the movement of contaminated materials by humans. Ants in pot plants were also transported thousands of kilometres south (through NSW) into Victoria in 2001 (Anon, 2002). That site was subsequently treated and the ants eradicated. Surveys, enforcement of quarantine requirements, certification of pest-free areas, and other regulatory activities has reduced the human spread of RIFA in Texas (Bhatkar 2001). A similar approach has been used in all Australian States to minimise the chance of RIFA being transported from Brisbane. The program has just been extended and is expected to end by June 2005.

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