



Australian Government

Department of Agriculture, Fisheries and Forestry

Australian Plague Locust Commission

Activity Report 2002-2003



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Introduction

The Australian Plague Locust Commission was established in 1974 and began operations in late 1976. The Commission is financed by the States of New South Wales, Victoria, South Australia and Queensland, with a matching contribution from the Australian Government. The Commission consists of six Commissioners: one from each contributing State, one each from the Department of Agriculture, Fisheries and Forestry Australia and the Department of the Environment and Heritage, and a Director assisted by permanent staff. The Director and staff are members of the Department of Agriculture, Fisheries and Forestry Australia (AFFA). The Commonwealth Scientific and Industrial Research Organisation (CSIRO) may provide an observer and other observers may be invited to attend Commissioners' meetings subject to agreement by Commissioners. The Commission is responsible to the Minister for Agriculture, Fisheries and Forestry and State Premiers.

APLC Charter

In August 2002, a Memorandum of Understanding (MOU) was signed between the Department of Agriculture, Fisheries and Forestry Australia (AFFA) on behalf of the Australian government, and participating member States effectively replacing the original (1974) Exchange of Letters under which the APLC was established. The MOU also incorporated a Charter that replaced the original terms of reference under which the APLC had operated since its establishment.

The purpose of the APLC, as defined in the Charter, is “ to control locust populations in those situations where they have the potential to inflict significant damage to agricultural industries in more than one member state.” In fulfilling its charter the APLC is required to:

1. Implement a preventive control strategy to minimise economic loss to agricultural industries caused by the Australian plague locust, spur-throated locust and migratory locust, with priority given to Australian plague locust.
2. Minimise risk of locust control to the natural environment, human health and markets for Australian produce.
3. Develop improved locust management practices through a targeted research program.
4. Provide a monitoring and forecasting system for operations conducted by APLC and member states.
5. Promote and facilitate adoption of best practice in locust control by member states.
6. Participate in cooperative national and international programs for development of APLC expertise.
7. Continually review APLC operations to ensure they keep pace with the expectations of industry, community and government.

Commissioners

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Review of the 2002-2003 season

The 2002-2003 season was characterised by persistent severe drought in much of eastern Australia and low numbers of locusts. As a result of the scarcity of locust populations, APLC survey operations were also scaled back and no control activities were undertaken. This was reflected in a significantly lower expenditure in 2002-2003 with the Commission posting an operational surplus of \$1.2 million. The low level of locust activity this year and in 2001-2002 has allowed the APLC reserve to accumulate to over \$3 million: a level that should allow for major control activity without resorting to requests for supplementary funding.

Whilst good progress was made in a number of research areas, the scarcity of suitable locust populations limited progress on the insecticide research program. One of the significant aspects of APLC research in recent years has been the involvement of external research partners from Australian and international organisations. Such collaborative research arrangements enable an extension of APLC research activities and access to external funding resources. The collaborative efforts between the APLC and various partners over a number of years in the development of the bio-pesticide *Metarhizium* from the research stage through to the commercialisation stage demonstrates the value in developing and strengthening such external linkages.

The year also saw a significant change to the governance arrangements for the Commission with the signing of a Memorandum of Understanding (MOU) in August 2002 by the Department of Agriculture, Fisheries and Forests Australia (AFFA) and all Commission member States. The MOU effectively replaced the original 1974 agreement (Exchange of Letters) establishing the Commission and provides an improved and contemporary governance framework for its operations and administration. The MOU also incorporates a Charter defining in contemporary terms the Commission's role and responsibilities. The Charter replaces the Terms of Reference under which the Commission had operated since its establishment in 1974.

Following a request by New South Wales, it was agreed to allow an observer representing the NSW Rural Lands Protection Boards to attend Commission meetings. The NSW Pest Animal and Insect Control Committee, a standing Committee of the Rural Land Protection Board State Council, nominated Mr J Wrenford.

Director
Australian Plague Locust Commission

Locust situation

Australian plague locust, *Chortoicetes terminifera* (Walker)

Overview

The 2002-2003 season was characterised by persistent drought conditions over much of eastern Australia and low numbers of locusts. Severe drought prevailed throughout most of the plague locust distribution area of eastern Australia and most of the small populations of bands present in a number of areas of New South Wales during spring declined so that only one significant infestation remained by mid summer: south west of Armidale, in the Northern Tablelands of New South Wales. Following heavy rain over much of eastern Australia in late February, low numbers of adults were captured in light traps at Fowlers Gap, Nooyeah Downs, and Longreach suggesting a redistribution of locusts that had survived the drought. While few adults were found on survey, low density nymphs were found in a number of districts in Queensland during March and April indicating that small scale breeding had occurred.

Fig 1 shows the location of meteorological districts that are referred to in this report.

New South Wales

Small scale localised hatchings occurred in the Northwest Slopes and Plains, Central West Slopes and Plains, Southwest Slopes and Riverina districts in the spring (Fig 2). Some small scale landholder control of bands was undertaken where nymphs concentrated in green crops. However, conditions throughout the spring became progressively drier except for some significant rain during November in parts of the Central West Slopes and Plains. By late December locust numbers had fallen in most regions, presumably due to mortality in very dry conditions, and only very low numbers of locusts persisted in the agricultural areas of New South Wales.

The only region where populations continued was in the Northern Tablelands district. Localised swarms were seen during December and these laid following rain mid month. Hopper bands formed during January 2003, and landholder control, together with APLC pesticide trials, were undertaken on these bands. Heavy rains fell over most of New South Wales in late February. A significant number of adults remained in the Northern Tablelands district and laid there, though a catch in light traps at Fowlers Gap (Upper Western NSW) and Nooyeah Downs (South West Queensland) indicate that there were some locust movements. Extensive surveys during March found only low numbers of adults (Fig 3). Moderate to heavy rain fell over a number of areas in New South Wales during mid April including northern parts of the Upper Western district but subsequent surveys in this area found only a few locusts.

Queensland

No significant rainfall was recorded over most of Queensland during the spring, apart from a localised light to moderate fall in the Noccundra-Nappa Merrie area (Far Southwest district) during late October. Conditions were therefore very dry and adverse for any significant locust breeding and APLC surveys during spring found very few locusts (Fig 2).

Light to moderate rainfall was recorded in the Warrego, Maranoa and Darling Downs districts during December and there were also lighter falls in parts of western Queensland from Windorah extending northwards towards Winton. Surveys in all of

these areas in late January found only isolated adults. All districts received moderate to heavy rainfall during February. Adults were caught in the light traps at Nooyeah Downs in late February and at Longreach during March indicating locusts were present though surveys in western districts in mid to late March found only isolated adults. However, low density nymphs were found in a number of districts between mid March and mid April indicating that small scale breeding had occurred (Fig 3). Further light to moderate rain fell over most of western and central districts of Queensland in early to mid April that should have ensured autumn laying by the low density populations present.

South Australia

Drought conditions prevailed throughout most of the pastoral areas of South Australia during the spring and early summer and locust numbers were very low. Following the heavy rain that fell over much of the State in late February 2003, low numbers of adults but no nymphs were found on survey (Fig 3).

Victoria

No significant locust activity was reported in Victoria during 2002-2003.

Spur-throated locust, *Austracris guttulosa* (Walker)

Regular wet season rains were limited to the Gulf Country and adjacent areas. In most remaining regions, there was a prolonged dry spring and summer, with no significant rain until February. As a result, the numerous to concentration adults found during autumn 2002 in the Central Highlands declined, so few locusts remained there by autumn 2003.

Migratory locust, *Locusta migratoria* (L.)

Migratory locust populations remained at low levels throughout the year in Queensland, with no control operations required.



Figure 1. Meteorological districts

Australian Plague Locust Distribution

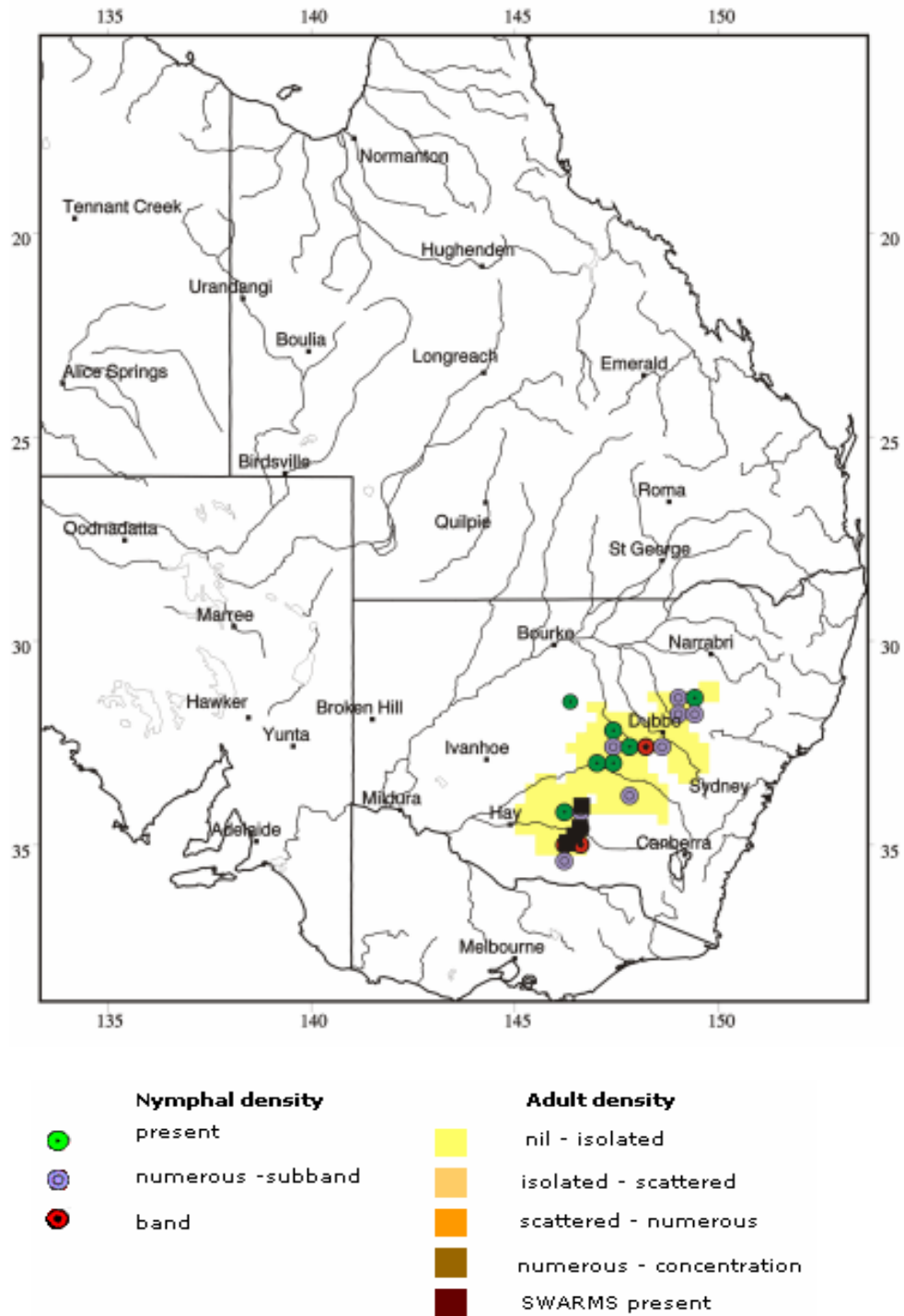


Figure 2. Distribution of Australian plague locusts: October 2002

Australian Plague Locust Distribution

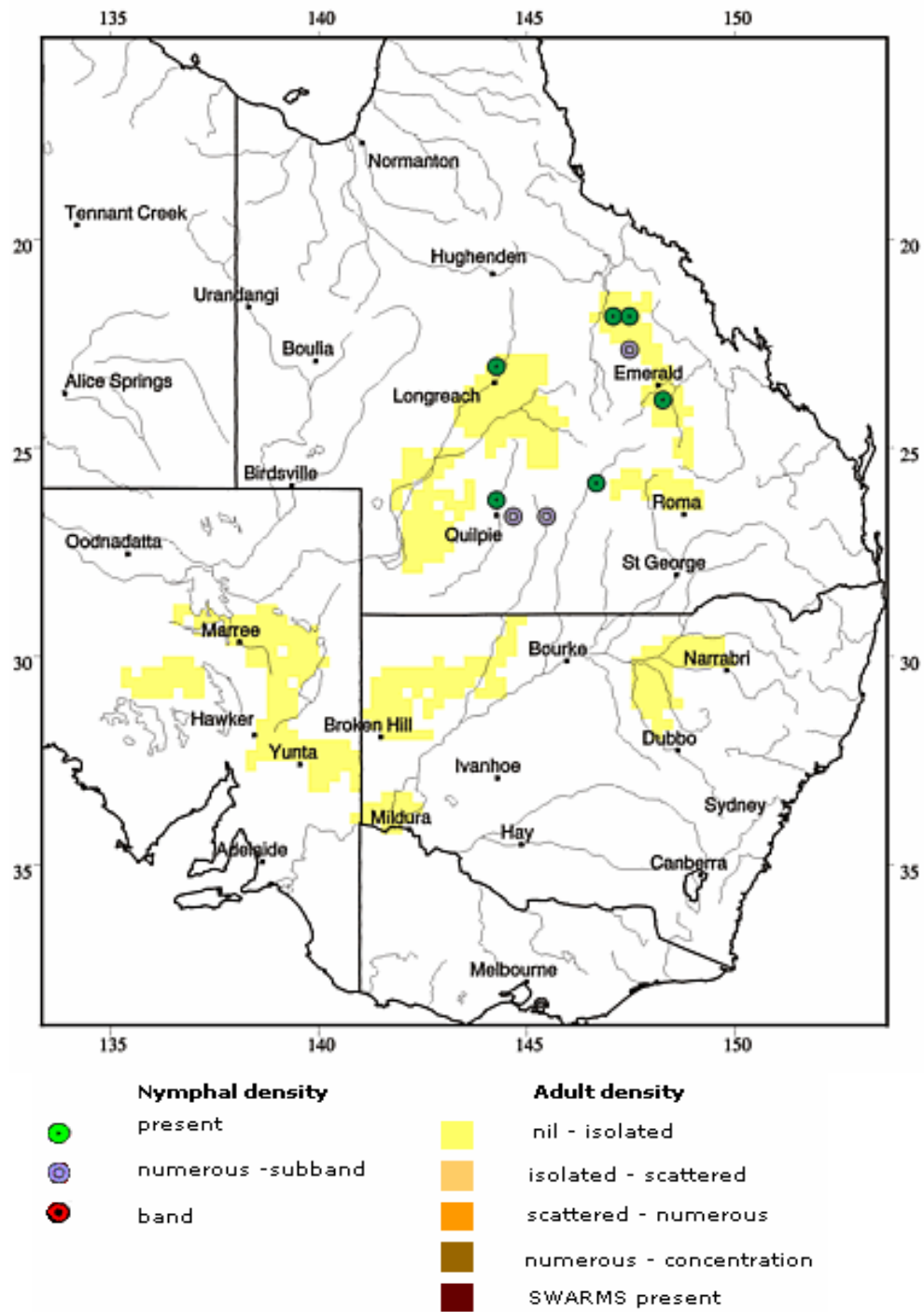


Figure 3. Distribution of Australian plague locusts: March 2003

Operations

As required under the MOU, the Director drafted the Operational Plan for 2002-2003 which was endorsed by the 46th meeting of Commissioners in August 2002. The plan defines expected outcomes to be achieved by the APLC during the year together with outputs and risks.

Forecasting Information and Survey

Nine issues of the Locust Bulletin were produced during the season. Surveys were conducted during the spring, but as part of the “smart survey” methods introduced in the previous year, few surveys were conducted during summer as dry conditions intensified. Following heavy rains in parts of Queensland and NSW during February, local landholders and Rural Lands Board Staff were contacted and regular surveys resumed.

Control Operations

The APLC moved to a mostly electronic, laptop based chemical application monitoring system in 2002-03. OpsManager® used by the QDNRM fire ant control group was developed and modified by Agriculture Environmental Management Systems (AEMS) and Brisbane developers Exa-Min Pty Ltd to meet and enhance the APLC’s control data capture requirements.

The OpsManager® system allows APLC staff involved in control to record all required application information, including chemical used, rates, exact location of application, property ownership and weather conditions. Notification records can be printed out, providing landowners with all the information required under the NSW Pesticides Amendment (Records) Regulations 2001 including a map of the area showing property boundaries and aircraft spray runs from the dGPS, providing exact area of application.

OpsManager® forms an integral part of the APLC’s EMS by providing the electronic infrastructure to ensure risk assessments are carried out prior to the spraying of a target area. Sensitive areas are included in the GIS mapping component together with property boundaries, ownership and contact information.

No locust control activity was undertaken in 2002-2003 due to the continued and widespread drought conditions which prevailed in eastern Australia. No pesticide replenishment was therefore necessary. Current pesticide stocks are shown in Table 1 whilst stocks of bio-pesticide are shown in Table 2.

Table 1: Pesticide Stock: Summary 2002-2003

	Fenitrothion ulv (tonnes)	Adonis 8.5 ulv (litres)	Adonis 3 ulv (litres)
On hand 1 July 2002	46.9	6,000	4,200
Purchased 2002-03	nil	nil	nil
Amount used 2002-03	nil	nil	nil
Stock 30 June 2003	46.9	6,000	4,200

Table 2: Bio-pesticide Stock: Summary 2002-2003

	Metarhizium (Kg)
On hand 1 July 2002	425
Purchased 2002-2003	100
Amount used 2002-2003	nil
Stock remaining 30 June 2003	525

Pesticide development and trials

Due to the limited locust populations no pesticide trials using aircraft were conducted against locusts in Australia during 2002-2003. However, during January/February 2003 trials against small bands on several properties south west of Armidale were undertaken using ground control with Green Guard[®] SC near waterways and with Regent[®] as a barrier treatment elsewhere. In the Green Guard treated areas there were declines of 51-88% and 78-93% at 8-12 and 14-16 days after treatment, respectively. At the same time there were declines of >90% in the Regent treated strips and 68-74% in adjacent untreated areas.

Trials were also conducted with *Metarhizium* against grasshoppers where landholders applied Green Guard, usually as an SC formulation in water, to grasshopper infestations at various locations. Where possible, grasshoppers were treated in pasture before they could invade adjacent valuable crops (vineyards, olive groves), though with some infestations there had been partial invasion of crops and some damage. With the 9 treatments undertaken at 50 g/ha during 2002-3 declined by 74-90% within 2-3 weeks where it was warm-hot and 3-6 weeks where it was cool. The 3 treatments at 25 g/ha declined by 75-82% in 2-3 weeks suggesting that this low dose is sufficient and should be tested further.

Environmental Management System

An environmental management system is a systematic approach for an organisation to manage its impacts on the environment. It identifies the organisations environmental impacts and legal responsibilities and then implements and reviews changes and improvements in a structured way.

The Australian Government Government is encouraging all Government Departments and Agencies to develop, adopt and implement an EMS by the end of 2002. Each Government Agency has also been encouraged to attain ISO 14001 accreditation for their EMS for at least one of their sections.

The APLC finished development of its ISO 14001 based EMS in January 2003. Major outcomes of the EMS for 2002-2003 have been established under a number of core objectives:

- Maintain excellence in all operational areas
- Ensure all waste is managed appropriately

- Protect the biodiversity of ecosystems by minimising the intensity, extent and duration of disturbance to native flora and fauna
- Contribute to our understanding of natural and managed ecosystems and their responses to perturbations
- Avoid disturbance to identified sites of cultural, historical, natural or scientific significance
- Ensure stakeholders are aware of our environmental obligations and that they assist the APLC achieve these
- Assist counterpart organisations to achieve high levels of environmental performance.

Competency Based Training and Assessment System

The APLC's competency based training package was finalised during 2002-03. The initial program covers the range of competency's the APLC requires a field officer to meet during their first two seasons.

To assist with internal training and assessment, a number of staff completed the Work Place Trainee Assessment component and the APLC's training officer Heath McRae also completed the Train Small Groups component of the CIT Work Place Trainer and Assessor training program.

International linkages

In December 2002 the Director attended the 23rd session of the FAO Commission for Controlling Desert Locust in South-West Asia held in Islamabad, Pakistan as an observer. The main purpose in attending this meeting was to promote the potential of fipronil and the bio-pesticide Green Guard for locust control. The Director also undertook an evaluation mission of the EMPRES program on behalf of FAO in February-March 2003.

Dr Hunter visited China for research and development work on the use of Green Guard bio-pesticide. The visit was jointly funded by the APLC, China and the commercial supplier of Green Guard - Bio-Care Pty Ltd.

Heath McRae visited the USA during July-August to study locust management approaches and techniques. During November, there was a return visit by some of the US grasshopper experts that Heath had worked with. They visited small locust infestations in the field and studied the APLC Decision Support System including modelling using Dymex.

Peter Spurgin undertook two missions to Tanzania on behalf of FAO. The first mission was to provide technical assistance for the control of an outbreak of Red Locust. The second mission involved the provision of technical advice on *Metarhizium* trials against Red Locust in collaboration with CABI Bioscience.

Occupational Health & Safety

There were no reportable OH&S incidents recorded during the year. Heath McRae took over the role of OH&S officer for field operations.

Administration

APLC Commissioners' meetings were held on 13 August 2002 and 27 May 2003, with the latter conducted as a teleconference. Mr Jim Wrenford participated in the May 2003 meeting following agreement on his appointment as an observer on behalf of the NSW Rural Lands Protection Boards. In addition to his duties as the APLC Director, Dr Hamilton, also acted as the Australian Government's Chief Plant Protection Officer throughout most of 2002-2003.

Staffing

The Commission's staffing position at 30 June 2003 is shown in Table 3. Staff spent 783 days away from base (Table 2); a low figure compared to previous years reflecting the extensive drought conditions and lack of locust control operations. Three field officers left the Commission during the year. Two of these field officers had only recently joined perhaps reflecting to some degree the frustration of a year with very little locust activity.

Table 3: Staffing position at 30 June 2003 and days away from Base 2002-2003

Officer	Position	Period Employed	Days away
G. Hamilton	Director	Throughout	4
W. Spratt	Operations Manager	Throughout	15
D. Hunter	Entomologist	Throughout	58
P. Spurgin	Control Officer	Throughout	41
P. Walker	Forecasting Officer	Throughout	6
P. Story	Environmental Officer	Throughout	87
E. Deveson	GIS Manager	Throughout	6
I. Wright	Administration Officer	Throughout	0
S. Dennis	Lab Assistant	To 2.1.2003	0
R. Graham	OIC Broken Hill	Throughout	55
T. Jenkins	OIC Longreach	Throughout	68
J. Nolan	OIC Narromine	Throughout	64
M. Macfarlane	Field Officer	Throughout	40
H. McRae	Assistant Operations Manager	Throughout	10
D. Murray	Field Officer	From 13.9.2002	71
A. Pepper	Field Officer	To 24.4.2003	154
D. Price	Field Officer	To 15.7.2002	0
K. Sanson	Field Officer	Throughout	84
J. Wardle	Field Officer	To 21.11.2002	20

Finance

Revenue in 2002-2003 amounted to \$ 4.001 million (Appendix 1).

Expenses amounted to \$2.777 million (Appendix 2) resulting in a net operational surplus of \$1.224 million that was carried over to the following financial year (2003-2004) as an accumulated result to 2003-2004 (Appendix 3).

Research

Research Review Committee

The Research Committee (APLC Commissioners Dr M. Campbell, J. Holland and Dr Myron Zalucki of the University of Queensland) met with Canberra staff on 12 August 2002. APLC staff presented reports on research carried out during the year.

The Committee commended the increased collaboration between the APLC with Australian and international research organisations and access to external funding. The Committee made a number of recommendations:

- The APLC support the evaluation and adoption of *Metarhizium* outside Australia to increase the potential market and sustainability of the commercial production of *Metarhizium*;
- Research on control systems using barriers treatment with Fipronil be continued to the point of operational use;
- Research should continue to determine the minimum reliable dose levels for Fipronil;
- The use of real time NDVI images

External research collaboration

In 2002-2003 the APLC was involved in collaborative research through the following Australian Research Council (ARC) Agreements:

ARC Linkage Grant LP0348025 “*Forecasting locust outbreaks: Evaluation of an insect monitoring radar network*”. University of New South Wales.

ARC SPIRT Grant C00106571: *Organophosphate pesticides and locust control: sublethal effects on terrestrial vertebrates*”. Wollongong University.

Publications

Barrientos-Lozano, L., V. Hernández-Velázquez, R.J. Milner & **D.M. Hunter** (2002). Advances in biological control of locusts and grasshoppers in Mexico. *Journal of Orthoptera Research* 11: 77-82.

Buttemer, W.A., **P.G. Story**, L. Astheimer & K. Fildes (2002). Functional performance: evaluating sublethal effects of organophosphate exposure in vertebrates. *Society of Environmental Toxicology and Chemistry Conference, November 2002, Salt Lake City, USA*

Deveson, E.D. & D. M. Hunter (2002). The operation of a GIS-based decision support system for Australian locust management. *Entomologica Sinica* 9: 1-12.

Fildes, K., D. Bain, J. Szabo, **P.G. Story**, M.J. Hooper, W.A. Buttemer & L. Astheimer (2002). Fenitrothion exposure and effects in native arid zone bird species during locust control. *Society of Environmental Toxicology and Contamination Conference*, Salt Lake City, USA

Hunter, D. M. & E.D. Deveson (2002). Forecasting and management of migratory pests in Australia. *Entomologica Sinica* 9: 13-26.

Milner, R.J. & **D.M. Hunter** (2002). Recent developments in the use of fungi as biopesticides against locusts and grasshoppers in Australia. *Journal of Orthoptera Research* 10: 271-276.

Milner, R.J, R.P Lim & **D.M. Hunter** (2002). Risks to the aquatic ecosystem from the application of *Metarhizium anisopliae* for locust control in Australia. *Pest Management Science* 58: 718-723.

Story, P.G, D.M.Hunter & P.W.Walker (2002). Environmental Issues Facing The Australian Plague Locust Commission. *Briefing Paper For The Lake Eyre Basin Ministerial Forum's Scientific Advisory Panel*.

Story, P.G., J.G. Hamilton, H. McRae, L. Astheimer, K. Fildes, P.W. Walker, P.A Spurgin & D.M. Hunter (2002). Environmental issues facing aerial locust control in Australia. A case study of the Australian Plague Locust Commission. *Proceedings of the Fenner Environment Conference*, Australian Academy of Science.

Appendix 1: Revenue 2002-2003 (\$'000)

Australian Government contribution	1,578
Member States contributions ⁽¹⁾	1,546
Australian Government: Additional funding for Overheads	149
Member States: Additional Charge for Overheads ⁽¹⁾	391
Other revenue	7
Adjustment: Unspent revenue from States	330
Total Revenue	4,001

(1) Member States contributions are made by NSW (32.5%), Victoria (10%), South Australia (5%) and Queensland (2.5%)

Appendix 2: Expenses 2002-2003 (\$'000)

Employee Expenses

Employee Remuneration	787
Superannuation	130
Leave expense	99
Other employee On Costs	40
Staff Training and Development	41
Total Employee Expenses	1,097

Supplier Expenses

Insecticide Expensed	-
Bio-Pesticide Expensed	-
Helicopter Charter	-
Fixed Wing Aircraft Charter	-
Aerial Spray Aircraft	-
Aviation Fuel	-
Control Operations: Equipment and Freight	10
Light Trap Operations	34
Other Technical and Field Expenses	58
Vehicles	314
Travel	128
IT, Communications & Office Equipment	184
Contractors inc CSIRO	32
Human Resource Services	12
Overhead Allocation (Internal Business Unit)	41
Other Administrative	8
Official Hospitality	1
General Office Supplies	16
Purchase of Publications and Data	61
Production of Publications	11
Property and Accommodation	27
Memberships and Conferences	5
Consultancy Services	-
Public Relations and Marketing	3
Grants	-
Legal Expenses	6
Total Supplier Expenses	950
Depreciation and Amortisation	69
Corporate Expenses (Funded)	391
Corporate Expenses (Unfunded)	260
Total Write Down of Assets	10
Total Other Expenses	730
Total Expenses	2,777
Total Revenue	4,001
Net Operational result	1,224

Appendix 3: Accumulated results (\$'000)

Accumulated results carry over: 30 June 2002	1,855
Net result 2002-2003: Surplus	1,224
Accumulated results carry over: 30 June 2003	3,079