

# Distribution of Dock Moth in Victoria

On

Project number DAW.057A

Meat and Livestock Australia Ltd

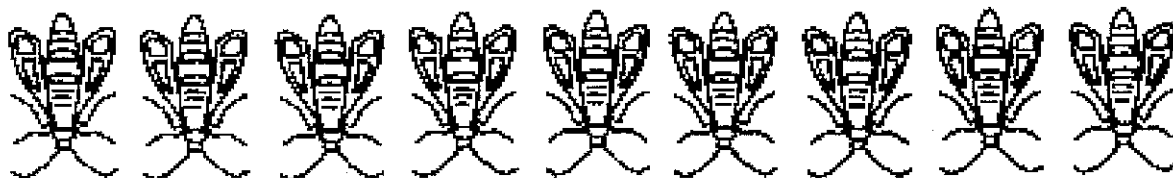
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**Project Report No. 5, September 1998**  
**Monitoring of Emergence and Demonstration Sites**

Keith Turnbull Research Institute,  
Agriculture Victoria,  
Department of Natural Resources and Environment



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**Project Title:** Distribution of Dock Moth in Victoria

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# **Meat and Livestock Australia Project: DAW.057a Distribution of Dock Moth in Victoria**

## **Project Report No. 5, September 1998**

### **Monitoring of Emergence and Demonstration Sites**

**Ian Faithfull**

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PO Box 48, Frankston, Victoria, 3199**

#### **Background**

In August 1996 the Meat Research Corporation (now Meat and Livestock Australia) reached agreement with the Keith Turnbull Research Institute to distribute the dock clearwing moth (*Chamaesphecia doryliformis*) in Victoria. Dock moth egg sticks air-freighted from Western Australia were used to inoculate 24 nursery sites around Victoria from October 1996 to February 1997. From November 1997 to February 1998 releases were made at six new sites in Victoria, and re-releases were made at two sites previously inoculated. Further releases are scheduled for the summer of 1998-99 with the Project to end in June 1999.

Report No. 1 (September 1996) detailed initial progress in establishing the Victorian distribution network and provided a partial overview of the 1991-93 releases. Report No. 2 (March 1997) provided data on the 24 dock moth release sites and 25 releases conducted in Victoria from late October 1996 to mid February 1997, along with results of monitoring of the 1991-93 release sites. Report No. 3 (September 1997) provided details of winter monitoring of the 24 1996-97 release sites. Report No. 4 (March 1998) gave details of monitoring of emergence at 1996-97 release sites and of the new 1997-98 releases.

This report provides data on monitoring of release sites during the period March to September 1998.

#### **Aims**

1. Develop a distribution network for the dock clearwing moth in Victoria.
2. Train and assist landholders in the identification of suitable release sites as part of their management plans and in the management of "nursery sites".
3. Establish five new release demonstration sites each year in 1996-97, 1997-98, 1998-99.
4. Monitor insect establishment for a period of two years after release.
5. Maintain the landholder network for the duration of the project.

#### **Report of Work March - September 1998**

##### **1996-97 Releases**

Table 1 provides monitoring data for the 1996-97 release sites. Table 2 summarises results of these releases. Inoculation was successful (dock moth larvae have been found) at 20 of the 24 sites. Emergence of adult moths occurred (pupal cases or second generation larvae were found) at 15 of these 20 sites. Evidence of emergence has not been found at 5 sites (pupal cases or second generation larvae not found). Second generation larvae have been found at 13 sites but their presence has not been determined at 2 sites where first generation pupal cases were found.

Dispersal of 10 m or more has been detected at 7 of the sites where second generation larvae have been found. Dispersal of 1 to 5 m has been detected at 5 other sites. Dispersal has not been assessed at 1 site where second generation larvae have been detected.

Based on failure to detect larvae or pupae at the most recent monitoring date, the agent is probably extinct at 10 of the 24 release sites and is dispersing at 11 sites. The status of the agent is considered uncertain at three sites.

The following paragraphs provide detail for each site under categorisations of successful (dispersal detected), unsuccessful (agent not detected in the most recent monitoring) and uncertain (not monitored since January 1998 and require further investigation).

### **Successful Sites**

Dromana Released 4 December 1996

Pupal cases were found and reduction in density of docks in the inoculated plot. Second generation larvae were found 10 m from site. Last monitored February 1998.

Zeerust Released 5 December 1996

In March 1998 pupal cases were found along with second generation larvae in plants 1 m from site.

Kaarimba Released 5 December 1996

Monitored March 1998. No pupal cases were found but several second generation larvae were found outside the release plot at a maximum distance of 10 m.

Tynong North Released 12 December 1996

Winter sampling found 90% of the inoculated plants contained larvae or pupae, many empty pupal cases and a high kill rate. The land owner estimates that 80-90% of the plants inoculated are now dead. Evidence of dispersal has not yet been sought.

Waaia Released 20 December 1996

70% of plants sampled in September 1998 contained larvae. Dispersal 5 m.

Timor West Released 8 Jan 1997

Many pupal cases observed in January 1998 and a moth was seen. Emergence was observed over a 2-3 week period coinciding with running to seed of the docks. The site was inspected again on 25 August. Roots of 55 plants were examined. 80% of plants within the release area contained larvae or pupae. Infested plants were found 10 m east and 10 m south of the release area with dock moth larvae or pupae present in 30% and 20% of plants respectively.

Rathscar - Bradshaw Swamp Released 8 Jan 1997

35% of inoculated plants contained larvae or pupae in the winter after release. The site was monitored on 24 August 1998. Larvae and pupal remains were found in 30% of plants within the release area. 60 plants were dug up to determine dispersal. One infested plant was found 10 m east of the release area.

Wareek Released 8 Jan 1997

14% of inoculated plants contained larvae in the winter after release. A few pupal cases were found in the summer. Site was monitored on 24 August 1998. Within the release area 11 larvae were found in 20 plants. Few dead plants were apparent. 50 plants were dug up to determine dispersal. Larvae were found in 10% of plants 10 m north and 10 m west of the release site.

Timor Released 8 Jan 1997

60% of plants sampled in the winter after the release contained larvae or pupae. Summer monitoring showed 80% of plants at the release site were dead, many pupal cases with larvae and dead plants 80 m west of the release site. Inspection in August 1998 showed 90% reduction in dock density at the release site with 40% of remaining plants infested with larvae or pupae. 6/10 plants were infested at 10 m to the north of the release plot. Further north is a cultivated paddock lacking docks. 6/10 plants were infested 10 m south, 1/10 plants 20 m south and 1/10 plants 50 m south with 0/10 plants infested at 100 m south. 3/10 plants were infested 10 m east, 4/10 at 20 m east, 2/10 at 50 m E and 0/10 at 120 m east. Infested plants were not found at 100 m west of the release plot but 2 larvae were found in 1/10 plants at an isolated dock patch along a creek, 450-480 m west of the release site.

Yarra Glen Released 11 January 1997

Many pupal cases were found in March 1998 and 1 small larva 5 m from the inoculated area.

Coleraine Released 18 January 1997

This site was monitored by the land owners in winter 1997. No larvae were found and the inoculation was thought to have failed. Mature larvae were present in roots of plants in the release plot in January 1998 and 25% of plants in the plot were infested in August 1998. Minor dispersal was found to 20 m east and west of the release plot with 1 larva found in 10 plants sampled at each point.

### **Unsuccessful Sites**

Woorndoo Released 22 October 1996

Two sites managed by the Woorndoo Land Protection group were reinoculated in November 1997.

Bunbartha Released 14 November 1996

60% of sampled plants had contained larvae or pupae in winter 1997. The site was grazed and the surrounding paddocks were very heavily grazed. No pupal cases were found and no second generation larvae in the 45 plants sampled.

Gelantipy Released 19 November 1996 and 14 February 1997

This site has been inoculated twice. No evidence of larvae or pupal cases was found in December 1997.

Simpson Released 20 November 1996

Bush rats were responsible for elimination of the population of larval dock moth and destroying almost all the mature docks within the fenced release plot. The site was monitored on 6 August. Fresh rat burrowings were evident. No evidence of dock moth presence was found. Landowner willing to fence off a new area in same paddock and manage it by grazing to minimise dense growth of grasses and other plants which provide the cover for the rats. A second release therefore planned for summer 1998-99.

Euroa Released 12 December 1996

Monitoring revealed no pupal cases and no dead inoculated plants. There was no evidence of dock moth in April 1998. A site approximately 100 m away was inoculated by the land owner in 1991 or 1993 and this site also failed.

Wangaratta Released 13 December 1996

4 pupal cases were found in 20 minutes one year after the release. 38 plants were sampled in the release plot and adjacent areas in April 1998 but only 2 infested plants were found, 2 m from the area inoculated. The population is probably extinct.

Benalla Released 18 December 1996

No larvae or pupae were found in the winter after the inoculation. Probably extinct.

Mitiamo Released 9 January 1997

75% of inoculated plants sampled in winter at the Mitiamo site contained dock moth larvae in July 1997. Pupal cases were not detected. Plants infested with larvae were found during monitoring in March 1998 within the release site and outside the inoculation area, at a maximum distance of 5 m from the inoculation area. Roots of 4/46 plants sampled were infested. The site was monitored in November 1998. The release plot paddock had been renovated and no docks remained. 28 plants were sampled on adjacent channel banks and slopes. One dead larva was found.

Katandra West Released 18 January 1997

Monitored March 1998. No pupal cases or larvae were found on or around the release site. Probably extinct.

#### **Status Uncertain**

Congupna Released 15 November 1996

The Congupna site had the highest inoculation success rate but was the smallest release, involving only 175 egg sticks. 100% of inoculated plants sampled containing larvae or pupae. Fresh pupal cases were observed from July until the end of November, the majority of moths emerging before dock flowering heads became visible. Dispersal has not been assessed. Not monitored since January 1998.

Kialla West Released 30 December 1996

Last monitored January 1998. Few pupal cases and few dead plants. Dispersal not assessed.

Mirranatwa Released 15 January 1997

Last monitored January 1998. No pupal cases or larvae were found. The land owner considers there is a major reduction in plant density on the inoculation site, due to the dock moth. .

#### **1997-98 Releases**

Table 3 provides summary data for 1997-98 release sites. Inoculation was not successful at three sites in the Casterton region in the south-west of the State. The reason for the failures is not known but climatic factors are suspected.

Woorndoo (Pagan) Released 27 November 1997

Re-inoculated after failure of first release. Monitored 5 August 1998. 13 of 20 inoculated plants sampled were damaged or infested. 3 pupae, 1 prepupa and 3 larvae were found.

Woorndoo (Richardson) Released 27-28 November 1997

Re-inoculated after failure of first release. Monitored 5 August 1998. 10 of 20 inoculated plants sampled were infested, each plant with a single larva, prepupa or pupa.

Canary Island Released 3 Dec 1997

Monitored 26 August 1998. 7 of 20 inoculated plants contained larvae with a total of 9 larvae in the 7 plants.

Sale Released 8 December 1997

Inoculated by the landowner who contacted Agriculture Western Australia directly. Mr Faithfull inspected the site after the release and discussed management requirements with the landowner, Mr Logan. Not monitored by KTRI.

Dunrobin Released 17 February 1998

Site monitored in August 1998. No evidence of successful inoculation. A second release is planned.

Lake Mundi Released 17 February 1998

Site monitored in August 1998. No evidence of successful inoculation. A second release is planned.

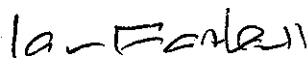
Lindsay Released 18 February 1998

Site monitored in August 1998. No evidence of successful inoculation.

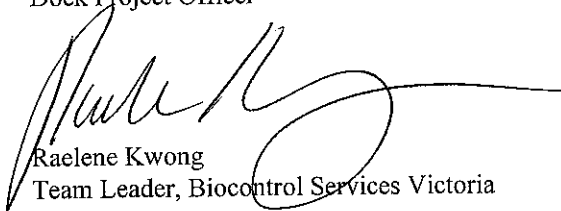
Balmoral Released 18 February 1998

Monitored 5 August 1998. 7 of 20 inoculated plants sampled contained larvae. 9 larvae in these 7 plants.

An article summarising the results for 1996-97 releases and new releases in the 1997-98 season appeared in the quarterly KTRI newsletter *Under Control - Pest Plant and Animal Management News*. Details of results at the Balmoral release site appeared in the *Combined Dundas Tablelands Landcare Newsletter*, Winter 1998. An article about the Dromana site appeared in a local newspaper in March 1998. Copies of these items are provided in Appendix 1.



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Dock Project Officer



Raelene Kwong  
Team Leader, Biocontrol Services Victoria

**Table 1. Monitoring data for 1996-97 Victorian dock moth release sites.**

Y = yes N = no  
 Status September 1998: E = probably extinct D = dispersing RR = rereleased at same site U = uncertain

Site No.	Release Date	Locality	Landowner (Contact)	Dock sp.	Date Monitored	Inoculation Success	Emergence Success	1st Generation Pupal Cases	2nd Generation Larvae	Greatest Dispersal 2nd Gen Larvae (m)	No. Dead Plants in Release Plot	Agent Status 1998	Notes
1	22/10/96	Woomdoe	Pagan	<i>pulcher</i>	Jan 1998	N	N	none	-	-	none	E (RR)	Site re-inoculated 27/11/97
2	22/10/96	Woomdoe	Richardson	<i>pulcher</i>	Jan 1998	N	N	none	-	-	none	E (RR)	Site re-inoculated 27/11/97
3	14/1/96	Bimbarra	Rutherford	<i>crispus</i>	Mar 1998	Y	N	0/10 min	0/45 plants	-	many	E	Evidence that larvae successfully completed development: roots with emergence holes
4	15/11/96	Congupna	Lambrecht	<i>crispus</i>	Jan 1998	Y	Y	many	-	-	many	U	Fresh cases from July until end of November. Majority emerged before flowering heads produced. Both inoculations failed
5	19/11/96 14/02/97	Gelaupfy	Henderson	<i>obusifolius</i>	Dec 1997	N	N	0/15 min	0/30 plants	-	none	E	Both inoculations failed
6	20/11/96	Simpson	Thompson	<i>pulcher</i>	Jan 1998 Aug 1998	Y	N	0/30 min	0/15 plants 0	-	few	E	Population of docks and dock moth destroyed by bush rats. Rerelease summer 1998-99.
7	4/12/96	Dromana	Gibb	<i>pulcher</i> <i>crispus</i>	Feb 1998	Y	Y	8/45 min	5/70 plants	10 N	few	D	
8	5/12/96	Zeebrugge Kaarumba	Lorans Lowe	<i>crispus</i> <i>crispus</i>	Mar 1998 Mar 1998	Y	Y	2/40 min 0/10 min	2/32 plants 5/65 plants	1 10	many many	D D	65 plants dug up on site and surrounds
9	5/12/96	Lynong North	Gorick	<i>conglomerata</i> <i>muscrispus</i> <i>obusifolius</i>	Mar 1998 Sept 1998	Y	Y	many	many	not assessed	few	D	Pupal cases in winter 80-90% reduction in plant numbers in inoculated area
10	12/12/96	Euroa	Cameron	<i>pulcher</i> <i>brownii</i>	Jan 1998 April 1998	Y	N	none	none	-	none	E	
11	13/12/96	Wangaratta	Fairfull	<i>pulcher</i>	Dec 1997 April 1998	Y	Y	4/20 min	2/38 plants	2 E	few few	E	Old pupal cases, no fresh ones late January
12	19/12/96	Benalla	Bartlett	<i>crispus</i>	-	N	N	-	-	-	none	E	
13	20/12/96	Waata	Dunn	<i>crispus</i>	Jan 1998 Sept 1998	Y	Y	few	5/7 plants	5	many many	D	
14	30/12/96	Kialla West	Brisbane	<i>crispus</i>	Jan 1998	Y	Y	few	-	-	few	U	
15	8/1/97	Warceek	Turnbull	<i>crispus</i>	Jan 1998 Aug 1998	Y	Y	few	11/70 plants	10 N & W	none few	D	11 larvae/20 plants in release area
16	8/1/97	Tinnor West	McKinley	<i>crispus</i>	Jan 1998 Aug 1998	Y	Y	many	4/5 plants in plot 5/50 outside plot	10 E, 10 S	many	D	First pupal cases mid Nov 1997, hatching over 2-3 week period. 80% of plants in release area infested
17	8/1/97	Tinnor West	McKinley	<i>crispus</i>	Jan 1998 Aug 1998	Y	Y	many	4/5 plants in plot 5/50 outside plot	10 E, 10 S	many	D	First pupal cases mid Nov 1997, hatching over 2-3 week period. 80% of plants in release area infested



Site No.	Release Date	Locality	Landowner (Contact)	Beetle sp.	Date Monitored	Inoculation Success	Emergence Success	1st Generation Pupal Cases	2nd Generation Larvae	Greatest Dispersal 2nd Gen Larvae (m)	No. Dead Plants in Release Plot	Agent Status Sept 1998	Notes
18	9/1/97	Timor	Saul	<i>crispus</i>	Feb 1998 Aug 1998	Y	Y	few	many 24/120	80 W 10 N, 50 S, 50 E, 480 W	many 90% reduction	D	Many larvae in dead plants Major dispersal, high kill rate, heavy infestation rate 60% of plants in release area infested
19	9/1/97	Rathscar - Bradshaw Swamp	Ipsen	<i>crispus</i>	Aug 1998	Y	Y	few	7/80 plants	10 E	few	D	
20	9/1/97	Mitiamo	Clymo	<i>crispus</i>	Mar 1998 Nov 1998	Y	Y	0/14 min	5/46 plants	5 S	many	E	1 dead larva in 28 plants sampled
21	11/1/97	Yarra Glen	Waters	<i>conglomer-</i> <i>atus</i>	Mar 1998	Y	Y	17/20 min	1/41 plants	5 E	many	D	>50% inoculated plants dead
22	15/1/97	Mirrnanawa	Paulsen	<i>pulcher/</i> <i>brunni</i>	Jan 1998	Y	N	none	-	-	many	U	
23	18/1/97	Katandra West	Coghlan	<i>crispus</i>	Mar 1998	Y	N	0/10 min	0/47 plants	-	few	E	47 plants dug up on site and surrounds.
24	18/1/97	Coletrane	Curran, Avalon Assocs.	<i>pulcher</i>	Jan 1998 Aug 1998	Y	Y	0/20 min	3/6 plants 5/20 plants	- 20 E, 20 W	few	D	Mature larvae found in January 1998 in release plot, 5 larvae in 6 plants. 2 year life cycle?

**Table 2. Summary data for 1996-97 dock moth releases**

	No of Sites	% of Total Sites
<b>Total Sites Inoculated</b>	24	100.0
<b>Inoculation</b>		
Successful (larvae found)	20	83.3
Failed (no larvae found)	4	16.7
<b>Total</b>	<b>24</b>	<b>100.0</b>
<b>Emergence</b>		
Successful (pupal cases or 2nd generation larvae found)	15	62.5
No emergence (pupal cases or 2nd generation larvae not found)	5	20.8
<b>Total</b>	<b>20</b>	<b>83.3</b>
<b>Second Generation Larvae</b>		
Larvae found	13	54.2
Presence not determined (pupal cases of first generation only)	2	8.3
<b>Total</b>	<b>15</b>	<b>62.5</b>
<b>Dispersal (Sites where 2nd generation larvae found)</b>		
10 m or more	7	29.2
1 - 5 m	5	20.8
Not assessed	1	4.2
<b>Total</b>	<b>13</b>	<b>54.2</b>
<b>Agent Status at Sites - September 1998</b>		
Probably extinct (including 2 sites where initial dispersal was observed)	10	41.7
Dispersing	11	45.8
Uncertain	3	12.5
<b>Total</b>	<b>24</b>	<b>100.0</b>

**Table 3. Summary Data for 1997-98 sites**

Status September 1998: E = extinct S = surviving

Site No.	Release Date	Locality	Landowner	Dock sp.	Date Monitored	Inoculation Success	No. Dead Plants in Release Plot	Status Sept 1998	Notes
1	27/11/97	Woorndoo	Pagan	<i>pulcher</i>	Aug 1998	Y	Few	S	65% infested or damaged; 7 larvae and pupae in 20 plants
2	27-8/11/97	Woorndoo	Richardson	<i>pulcher</i>	Aug 1998	Y	Few	S	50% infested; 10 larvae and pupae in 20 plants
3	3/12/97	Canary Island	Whinfield	<i>crispus</i>	Aug 1998	Y	Few	S	7/20 plants infested; 9 larvae in 20 plants
4	8/12/97	Sale	Logan	<i>obtusifolius</i>					Not monitored
5	17/02/97	Dunrobin	Kerr	<i>pulcher</i>	Aug 1998	N	None	E	Inoculation failed
6	17/02/97	Lake Mundi	Headlam	<i>pulcher</i>	Aug 1998	N	None	E	Inoculation failed
7	18/02/97	Lindsay	Harvey	<i>pulcher/crispus</i>	Aug 1998	N	None	E	Inoculation failed
8	18/02/97	Balmoral	Watt	<i>pulcher</i>	Aug 1998	Y	None	S	11/20 plants infested or damaged; 9 larvae in 20 plants

# Appendix 1. Publications on the dock moth in Victoria

Ian Faithfull, Distribution of dock moth in Victoria. *Under Control* No.6, pp.8-9, July 1998.

## Distribution of dock moth in Victoria

In August 1996 the Meat Research Corporation commissioned KTRI to distribute the dock clearwing moth, *Chamaesphecia dorylifomis*, in Victoria. This insect is released as eggs attached to toothpicks, which are inserted into the cut stems of dock (*Rumex* species) plants. The egg sticks are produced by Agriculture Western Australia and air-freighted to Victoria. From October 1996 to February 1997 24 nursery sites were set up. From November 1997 to February 1998 releases were made at six new sites, and re-releases were made at two sites where previous inoculations had been unsuccessful. This report provides a summary of monitoring of older sites and details of the six new sites.

Inoculation was successful (larvae have been found) at 19 of the 24 older sites (Table 1).

Emergence of adult moths occurred (pupal cases or second generation larvae were found) at 13 of these 19 sites. Emergence was not successful at 4 sites. Eight sites have been monitored for second generation larvae, which have been found at 6 sites. Comprehensive monitoring for second generation larvae is scheduled for winter 1998. It is still too early to evaluate the impact of the agent. Establishment is good news, but what we want is control of the weed.

### Port Phillip Region

Pupal cases have been found at the Dromana site and reduction in density of docks in the inoculated plot is apparent. Second generation larvae were found 10 m from the site. At Tynong North winter sampling found 90% of the inoculated plants with larvae or pupae, many empty pupal cases and a high kill rate. The land owner estimates that 80-90% of the plants inoculated were killed by the agent. Evidence of dispersal has not yet been sought. Many pupal cases were found at Yarra Glen and one small larva, 5 m from the inoculated area, in March.

### Northern Victoria

Several releases have been made in the Shepparton district, on curled dock, *Rumex crispus*. The Congupna site had the highest inoculation success but was the smallest release, involving only 175 egg sticks. 100% of inoculated plants sampled containing larvae or pupae. Alan Lambrecht, the site manager, has reported fresh pupal cases from July until the end of November, with the majority of moths emerging before the weed produced flowering heads. At the Zeerust site pupal cases have also been found in large numbers, along with second generation larvae in plants 1 m from the site, indicating at least minor dispersal.

The Kaarimba site is in irrigated pasture and was graded to remove surface litter and pugging, but with minimal disturbance to crowns or roots of dock plants. Second generation larvae have been unearthed there at a maxi-

mum distance of 10 m from the release plot. At Kialla West a few pupal cases have been found and a few dead plants in the release area. A few pupal cases have also been found at Waaia where many of the inoculated plants were killed by the agent. Dispersal has not been assessed at these latter two sites. 60% of sampled plants at the Bunbartha site contained larvae or pupae in winter 1997 but drought and heavy grazing may have prevented the establishment of a second generation of the moth. No pupal cases have been found there and no second generation larvae were present in the 45 plants sampled. Similarly there is no evidence of success at Katandra West. 75% of inoculated plants sampled in winter 1997 at the Mitiamo site contained larvae. Monitoring in autumn revealed infested plants at a maximum distance of 5 m from the inoculation area.

The moth has been released at three sites in the North East. Pupal cases have been numerous at Wangaratta and second generation larvae have been found 2 m from the nearest inoculated plant. The Euroa site, mainly swamp dock, *Rumex brownii*, appears to have failed, as has one near Benalla where second generation insects have not been recovered.

### Timor

Four releases have been made in the Maryborough district. A few pupal cases were found at Wareek. Many were observed at the Timor West site in January and a moth was seen. Emergence was observed over a 2-3 week period, coinciding with running to seed of the docks from mid November, but dispersal has not been assessed. At Timor 60% of plants sampled in winter contained larvae or pupae and summer monitoring revealed many pupal cases and an 80% kill rate in the inoculation area, with larvae and dead plants found 80 m from the release site. At Bradshaw Swamp 35% of inoculated plants contained larvae or pupae in winter 1997.

Table 1. Summary data for 1996-97 dock moth releases

	No of Sites	% of Sites
Total Sites Inoculated	24	
<b>Inoculation</b>		
Inoculation successful (larvae found)	19	79.2
Inoculation failed (no larvae found)	5	20.8
<b>Emergence (sites successfully inoculated)</b>		
Emergence successful (pupal cases or 2nd generation larvae found)	13	54.2
No emergence (pupal cases or 2nd generation larvae not found)	4	16.8
Uncertain	2	8.3
<b>Second Generation Larvae (first generation adults mated &amp; laid eggs which hatched)</b>		
Second generation larvae found	6	25
Emergence uncertain, 2nd generation larvae not found	1	4.2
Larvae found mid summer, generation uncertain	1	4.2
Not monitored for second generation larvae	7	29.9

Table 2. Estimated kill rate of inoculated plants at 1996-97 dock moth release sites.

Kill Rate	No of Sites	% of Sites
Total Sites Inoculated	24	
No dead plants (site failed)	6	25
Few dead plants	8	33.3
Many dead plants	10	41.7

**Rat Attack**

A site near Simpson in the western Otways has been peculiarly affected. Monitoring in winter 1997 found 35% of inoculated plants contained larvae or pupae. In January the area surrounding the site had been heavily grazed, but the site itself was overgrown with dense grass and other plants and had been colonised by rats. These had created a network of runways connected to burrows and disturbed much of the ground. No runways or excavation were apparent outside the fenced plot. Numerous dock plants had been uprooted and their roots had been broken into pieces, gnawed, and in some cases apparently eaten. It is thought that predation by the rats has largely eliminated the dock moth colony.

No pupal cases have been found at Mirranatwa (Grampians), however the land owner sees a major reduction in plant density on the inoculation site. At Coleraine mature larvae were found in roots in the release plot one year after the release, and it appears that the moth may have slipped into a two-year life cycle. A site at Gelantipy in far East Gippsland has been inoculated twice but still appears to be a failure. On the first occasion eggs were killed by an unseasonal snow fall.

**New Releases 1997-98**

A release at Canary Island was conducted with the assistance of the Canary Island Landcare Group and DNRE Kerang staff. A uniform infestation of *Rumex crispus* covers the entire paddock and is believed to have originated from the planting of contaminated seed. Thanks to all those involved for your enthusiastic support, in particular Kym Whinfield.

Three fiddle dock (*R. pulcher*) sites were treated in the Casterton area thanks to CMO John Matthews. The Dunrobin site takes in a small area of a long-established 4,000 ha infestation and was inoculated with the assistance of the local Landcare group. The other two sites are at Lake Mundi and Lindsay, not far from the South Australian border. A release near Balmoral was organised with the assistance of Pawbybnyr Landcare and was incorporated into a field day in which members toured local properties to inspect and discuss various projects in which the group is involved. The site is located in a new tree plantation and there are extensive infestations of *pulcher* in this area.

A laser-levelled, irrigated clover/rye grass



Members of the Canary Island Landcare Group inoculating plants of curled dock with dock moth egg sticks.

pasture, near Sale was inoculated by the landowner after contacting Agriculture WA directly. Finally, two sites managed by members of the Woorndoo Land Protection Group were re-inoculated. It is thought that the original releases in October 1996 failed because of the effects of the tarpaulin covers placed over the sites to protect them from rain.

Ian Faithfull  
Phone: 03 9785 0105

## BIOLOGICAL CONTROL OF DOCK MOTH TRIALED

By Ian Faithfull  
Project Officer, Keith Turnbull Research  
Institute.

One thousand plants of *Rumex pulcher*, fiddle dock, on the property of Gerard and Sabrina Watt were inoculated with eggs of the dock moth, *Chamaesphecia doryliformis*, on 18 February this year. The site, within the Pawbymbyr Landcare Group is in a recently created tree plantation on what used to be sheep pasture, and is protected from grazing. The eggs were produced in the laboratories of Agriculture Western Australia. The larva of the dock moth lives inside the root of the weed and feeds on root tissue. If there are enough larvae, or the root is small, the plant is killed by larval feeding.

In areas of Australia where this biological control agent has been successful, such as the Riverina of NSW and in south-west Western Australia, it has reduced the density of dock plants at some sites by over 90%. This translates into a substantial benefit for graziers. The pasture composition is improved and there is less dock

seed to contaminate the fleece of sheep. The weed is controlled without the use of chemicals and control continues indefinitely into the future without cost to the landowner.

I inspected the site on 5 August and found that the inoculation had been successful. Twenty inoculated plants were dug up and their roots broken open to find evidence of larvae. Seven plants contained large larvae and two had damage caused by the agent but no larvae present. Eleven plants had no larval damage. As yet no plants appear to have been killed by the insect.

Larvae are expected to pupate in early spring and moths should emerge from the pupae later in spring. An inspection of the site in spring should reveal empty pupal cases protruding from the base of the dock plants. If there are enough moths, and they mate and lay eggs successfully, a new generation of larvae will develop. If, in the winter of 1999, we find plants outside the release area that are infested with larvae, there is a good chance that the dock moth will establish at the site and start to exert some worthwhile control of the weed.

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One site near Coleraine shows apparent reductions in dock density and infested plants have been found 20 m to the west and the east of the release area. Data from Western Australia indicates that after five years the insect has dispersed an average of about 130 m per year and a maximum of 1.5 km. So it will be many years before the benefits of the dock moth are felt

throughout a particular district. Releases of the dock moth are funded by Meat and Livestock Australia (formerly the Meat Research Corporation) and DNRE.

The Combined Dundas  
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Gratefully acknowledges  
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### Soil & Water Kit

Anyone wishing to test water or soil for pH, salinity, etc. Contact your local kit representative: Paul Rowe, Barry Little, Chris Hindhaugh, Michael Leeming or Liz Cummins.

Arrangements can also be made for the kit to be demonstrated at a Landcare meeting.

# WAR DECLARED ON DOCK - moth to the rescue

Dromana farmer, David Gibb, has found a new ally - a small African insect whose survival depends on devouring dock weed.

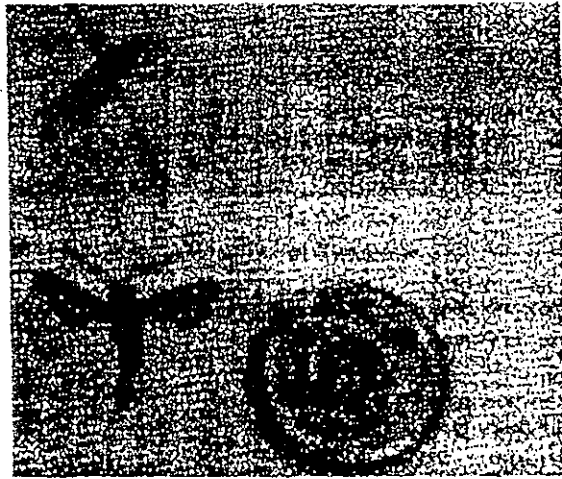
Like many other cattle farmers on the Mornington Peninsula, Mr Gibb's pastures at Sussex Farm on Dunns Creek Rd have been affected by dock weed, an introduced plant from Europe which is characterised by its reddish-brown stalk and small round burrs.

Mr Gibb said that dock weed had been a long-standing enemy of farmers, significantly reducing the quality and quantity of available fodder for their stock.

Farmers in Western Australia, West Gippsland and now the Mornington Peninsula, however, are starting to see the benefits of trialling a tiny Moroccan clearwing moth which uses the dock weed to perpetuate its life cycle, destroying the weed in the process.

In 1996, Mr Gibb, a member of the Dunns Creek Landcare Group, volunteered a 22x10 metre

plot on his farmland for the purpose of raising the dock moth.



The dock moth grows between 12-15mm long and has a waspish appearance.

In December, 1,000 toothpicks, each containing about 10 moth eggs, were air-freighted in Eskies from Western Australia and delivered to Sussex Farm.

Between 12 and 15 Dunns Creek Landcare volunteers applied the egg sticks to the designated weed patch, under the supervision of Department of Natural Resources and Environment (DNRE) dock weed biological control officer, Ian Faithfull.

## Progress

Mr Faithfull has monitored the site since December 1996, and a week ago he and Mr Gibb observed the moths' progress to date.

"We have found larvae outside the release area, which proves the first generation of moths which hatched from the original eggs, have gone on to lay eggs of their

own," Mr Faithfull said.

"It takes close to a year for a moth to emerge from

When temperatures warm, the larva chews an exit hole in the crown of the plant or the base of the stem and pupates down in the larval tunnel.

After two weeks the pupa pushes through the exit hole and the moth emerges from its pupal case.

Mr Faithfull said that early trials of the dock moth in Victoria were not successful, but that the new method of placing the egg laden toothpick inside the snipped stem of the dock weed had been proved to work.

The moth was first released in Western Australia in 1989, with a subsequent 90 per cent reduction in dock weed.

"Since then the moth has been introduced to hundreds of sites in Western Australia and 35 sites in Victoria.

"Sussex Farm is the only site on the Mornington Peninsula where the moth has been released."

## Small price

Mr Gibb said the dock moth project is jointly funded by the Meat Research Corporation and the Federal Government.

"It's a small price to pay for improving pasture and farming productivity.

"We have found the larvae at least 10 metres from the original release site, and it really is proof that the first stage of the project has worked.

"Now we just have to wait and be patient for the moth to do its work, clearing away the weed."

Moroccan moth trialled for control of dock. *Casterton News* 25 February 1998. [Ian Faithfull]. Releases of *Chamaesphecia doryliformis* for biological control of docks in the Casterton area.

# District rural news

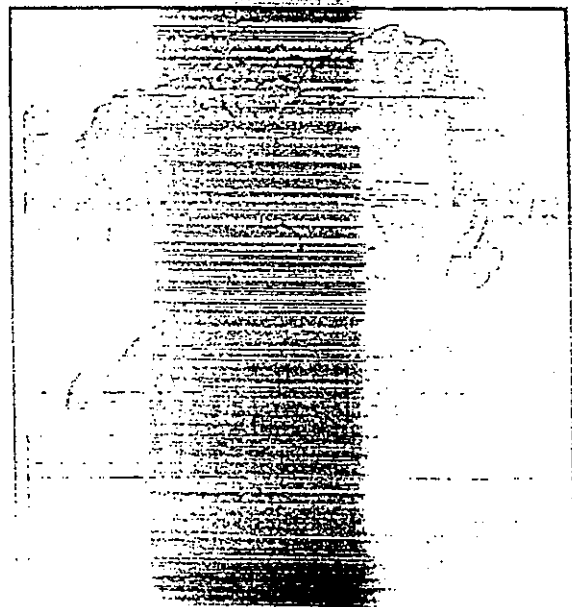
## Moroccan moth trialled for control of dock

THE first of three local releases of a biological control agent for dock took place at the Dunrobin property of Stuart Marj Kerr on February 17.

Ten Dunrobin farmers heard Department of Natural Resources and Environment representatives and Keith Turnbull Research Institute extension officer Ian Faithfull explain the program works.

Mr Faithfull said the program has been going since 1980, and funded by the Meat Research Corporation, Agriculture Western Australia and the DNRE.

On a stand of dock, the tops of the plants are cut off and small impregnated



sticks inserted into the stem of the weed.

The larvae bore into the dock plants where they feed. The larvae eat out the growing tissue of the plant root and kill the plant. Mr Faithfull said.

During the winter months, the insect goes into an inactive state before pupating in the spring. An adult moth emerges in late spring or summer and lays eggs which will continue the cycle.

The program near Casterton will be monitored three times a year, beginning in winter, when 20 plants will be dug up and the number of larvae counted.

KEITH Turnbull Research Institute extension officer Ian Faithfull instructed Dunrobin farmers last week on the release of a moth to be trialled for biological control of dock.

In summer, checks will be made for pupae shells as the pupae emerge from the plant around the crown, and the final check will occur six months later with an inspection for larvae outside the inoculation area Mr Faithfull said.

Mr Faithfull said, like many biological controlled programs, the dock control program is a long term project. The insect disperses slowly, about a kilometre a year, and it is expected to take a minimum of six years to cover a single infestation.

Mr Faithfull said the first release of the larvae was in Western

Australia in 1989, the most successful saw a reduction in plants of about 90 per cent, which meant significant savings on control and freed up pasture for better plants.

Mr Faithfull said he not sure if the same results will happen in Victoria.

"Trials commenced 1991 with a different method used to release the insects, and so far the Institute can establish, the four sites have all failed," Faithfull said.

Mr Faithfull said the Moroccan type clearwing moth does not perform well in the term in southern Victoria, the Institute would consider re-importing the temperate clearwing moth for release.