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**Biological control ecology of *Aphidius colemani* Viereck (Hymenoptera: Braconidae: Aphidiinae) on *Myzus persicae* (Sulzer) (Hemiptera: Aphididae)**



**a thesis presented in partial fulfilment of the requirements  
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## Abstract

The solitary and koinobiont endoparasitoid, *Aphidius colemani* Viereck, is produced commercially for biological control of green peach aphid *Myzus persicae* (Sulzer) and cotton aphid *Aphis gossypii* Glover around the world. However, its production cost is still high and biological control efficiency is still uncertain, probably due to the lack of knowledge on its biological control ecology. To fill the knowledge gap, I investigated the biological control ecology of the *A. colemani*-*M. persicae* system. My results show that most emergence and reproductive activities of *A. colemani* occur during the photophase. After emergence, both sexes need about 2 hours for sex maturation, but once sexually mature, age of neither sex has any significant effect on mating success. Food supply to adult females is essential to mating success. The mating behavioural sequence is similar to that of many other braconid parasitoids. My findings suggest that *A. colemani* is an effective biological control agent of *M. persicae* because reproductive outputs of the parasitoid are twice as high as the aphid, the parasitoid reaches the maximum lifetime reproductive potential about a week earlier than the aphid, and parasitised aphids contribute little to their population growth and make limited damage to plants. The parasitoid prefers to attack larger hosts but such preference is counterbalanced by greater defensive ability of larger hosts, resulting in similar parasitism rate on hosts of all ages. As a result, parasitising mid-aged hosts allows *A. colemani* females to gain maximum fitness in developmental period, body size and parasitism of their progeny. Finally, my study confirms that *A. colemani* has a Type II functional response. However, it can still successfully control *M. persicae* regardless of pest density probably because parasitoid density has significantly more effect than host density on parasitoid reproductive fitness and the low mutual interference among the searching parasitoids encourages aggregation of the parasitoids on host patches of high density. The present study provides basic knowledge on the biology of *A. colemani* for development of effective measures for laboratory handling, rearing, and field release, and brings insight into the success of aphid biological control programmes using the parasitoid augmentation approach.

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## Table of Contents

Abstract.....	i
Acknowledgements.....	ii
Table of Contents.....	iii
List of Tables.....	viii
List of Figures.....	x
<b>Chapter 1    General Introduction</b>	<b>1</b>
1.1            Introduction.....	1
1.1.1          Aphids and their economic importance.....	1
1.1.2          Aphid management.....	2
1.1.3          Biological control of aphid pests.....	2
1.2            Relevance of the research.....	3
1.3            Aim and objectives.....	6
<b>Chapter 2    Literature Review</b>	<b>7</b>
2.1            Introduction.....	7
2.2            Origin.....	7
2.3            Taxonomy and identification.....	7
2.3.1          Taxonomy.....	7
2.3.2          Identification.....	7
2.4            General biology.....	11
2.5            Host range.....	12
2.6 <i>Aphidius</i> species in biological control.....	17
2.7            Host searching behaviour.....	18
2.8            Reproductive biology.....	18
2.8.1          Emergence.....	18
2.8.2          Sex maturation.....	19
2.8.3          Mating.....	20
2.8.4          Oviposition.....	20
2.8.5          Sex allocation and sex ratio.....	21
2.9            Aphid growth rate and parasitoid release rate.....	22

2.10	Effect of parasitism effect on aphid reproduction.....	23
2.11	Factors affecting parasitoid reproductive fitness.....	23
2.11.1	Host size and host preference.....	23
2.11.2	Parasitoid body size and fitness.....	24
2.11.3	Host and parasitoid density.....	25
<b>Chapter 3</b>	<b>General Methodology</b>	<b>27</b>
3.1	Introduction.....	27
3.2	General materials and methods.....	27
3.2.1	Insects.....	27
3.2.2	Host plant.....	27
3.2.3	Colony of <i>M. persicae</i> .....	28
3.2.4	Colony of <i>A. colemani</i> .....	29
3.2.5	Experimental parasitoids.....	30
3.2.6	Environmental conditions.....	31
3.2.7	Dissection and measurement.....	32
3.2.8	Behavioural recording.....	32
3.3	Key definitions.....	33
3.4	Statistical analysis.....	33
<b>Chapter 4</b>	<b>General Biology of <i>Aphidus colemani</i></b>	<b>34</b>
4.1	Introduction.....	34
4.2	Materials and methods.....	35
4.2.1	Circadian rhythms of emergence, mating and oviposition.....	35
4.2.2	Sex maturation period of both sexes.....	37
4.2.3	General mating behaviour.....	37
4.2.4	Factors affecting mating behaviour.....	38
4.2.5	Statistical analysis.....	39
4.3	Results.....	39
4.3.1	Circadian rhythms of emergence, mating and oviposition.....	39
4.3.2	Sex maturation period of both sexes.....	43
4.3.3	General mating behaviour.....	48
4.3.4	Factors affecting mating behaviour.....	51
4.4	Discussion.....	56

<b>Chapter 5</b>	<b>Life History Strategies of <i>Aphidius colemani</i> and <i>Myzus persicae</i></b>	<b>59</b>
5.1	Introduction.....	59
5.2	Materials and methods.....	61
5.2.1	Insects.....	61
5.2.2	Survival and reproduction of parasitoids and parasitised and unparasitised aphids.....	61
5.2.3	Parasitism rate in relation to host stage.....	62
5.2.4	Population growth of parasitoids and parasitised and unparasitised aphids.....	62
5.2.5	Statistical analysis.....	63
5.3	Results.....	64
5.3.1	Survival and reproduction of parasitoids and parasitised and unparasitised aphids.....	64
5.3.2	Parasitism rate in relation to host stage.....	66
5.3.3	Population growth of parasitoids and parasitised and unparasitised aphids.....	67
5.4	Discussion.....	68
<b>Chapter 6</b>	<b>Trade-off between Fitness Gain and Cost in <i>Aphidius colemani</i></b>	<b>71</b>
6.1	Introduction.....	71
6.2	Materials and methods.....	72
6.2.1	Insects .....	72
6.2.2	Parasitisation, host defensive behaviour and fitness gain rate...	73
6.2.3	Effect of host age on parasitism, and progeny development and body size.....	74
6.2.4	Effect of female parasitoid body size on reproductive potential.....	74
6.2.5	Statistical analysis.....	75
6.3	Result.....	76
6.3.1	Parasitisation, host defensive behaviour and fitness gain rate...	76
6.3.2	Effect of host age on parasitism, progeny development, body	

	size and reproductive potential.....	79
6.4	Discussion.....	81
<b>Chapter 7</b>	<b>Functional Response of <i>Aphidius colemani</i></b>	<b>84</b>
7.1	Introduction.....	84
7.2	Materials and methods.....	85
7.2.1	Insects.....	85
7.2.2	Effect of parasitoid age and host density on parasitoid fitness..	86
7.2.3	Effect of parasitoid and host density on parasitoid fitness.....	86
7.2.4	Statistical analysis.....	87
7.2.4.1	Functional response.....	87
7.2.4.2	Demographic response.....	88
7.2.4.3	Mutual interference.....	88
7.2.4.4	Data computing.....	89
7.3	Results.....	89
7.3.1	Functional response.....	89
7.3.2	Effect of parasitoid age and density and host density on parasitoid fitness .....	95
7.3.3	Demographic response and mutual interference .....	100
7.4	Discussion.....	102
<b>Chapter 8</b>	<b>General Conclusions</b>	<b>105</b>
8.1	Introduction.....	105
8.2	Adult activity patterns.....	105
8.3	Life history strategies of both aphid and parasitoid.....	106
8.4	Host stage preference.....	107
8.5	Functional response in relation to parasitoid age and host and parasitoid density.....	108
8.6	Conclusion.....	109
	<b>References</b>	<b>111</b>
	<b>Appendix: Publications from My PhD Studies</b>	<b>147</b>
	<b>Khatri D., He X. Z. &amp; Wang Q. 2017. Effective biological control depends</b>	<b>148</b>

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## List of Tables

<b>Table 2.1</b>	Common <i>Aphidius</i> species present in New Zealand and their diagnostic characters	8
<b>Table 2.2</b>	Aphid species parasitised by <i>A. colemani</i> and their host plants	12
<b>Table 4.1</b>	Premounting, mounting and mating duration (seconds) of <i>A. colemani</i> during bihourly bouts after lights on in photophase and lights off in scotophase	42
<b>Table 4.2</b>	Mating behavioural parameters in <i>A. colemani</i> (n = 52)	49
<b>Table 5.1</b>	Life table parameters of <i>A. colemani</i> and parasitised and unparasitised <i>M. persicae</i>	68
<b>Table 7.1</b>	Logistic regression analysis of functional responses of <i>A. colemani</i> parasitising <i>M. persicae</i> : effect of parasitoid age	90
<b>Table 7.2</b>	Logistic regression analysis of functional responses of <i>A. colemani</i> parasitising <i>M. persicae</i> : effect of parasitoid density	91
<b>Table 7.3</b>	Statistical results of modelling Type II functional response of <i>A. colemani</i> parasitising <i>M. persicae</i> : effect of parasitoid age	93
<b>Table 7.4</b>	Statistical results of modelling Type II functional response of <i>A. colemani</i> parasitising <i>M. persicae</i> : effect of parasitoid density	93
<b>Table 7.5</b>	Searching efficiency ( $a$ , $h^{-1}$ ) and handling time ( $T_h$ , h) and their confidence limits (CL) for Type II functional response of <i>A. colemani</i> parasitising <i>M. persicae</i> : effect of parasitoid age	94
<b>Table 7.6</b>	Searching efficiency ( $a$ , $h^{-1}$ ) and handling time ( $T_h$ , h) and	95

their confidence limits (CL) for Type II functional response of *A. colemani* parasitising *M. persicae*: effect of parasitoid density

## List of Figures

<b>Figure 2.1</b>	Male and female adults of <i>A. colemani</i>	10
<b>Figure 3.1</b>	Chinese cabbage plants grown in a glasshouse	28
<b>Figure 3.2</b>	Wooden cage used for insect rearing	29
<b>Figure 3.3</b>	Experimental cylinder	29
<b>Figure 3.4.</b>	Micro-centrifuge tubes	30
<b>Figure 3.5</b>	Aspirator	30
<b>Figure 3.6</b>	<i>A. colemani</i> oviposition	31
<b>Figure 3.7</b>	Maintenance of parasitoid-exposed aphids	31
<b>Figure 3.8</b>	<i>A. colemani</i> mummification	31
<b>Figure 3.9</b>	Mummies in tubes	31
<b>Figure 3.10</b>	Pairing parasitoids in a tube	31
<b>Figure 3.11</b>	Stereomicroscope and image system	32
<b>Figure 3.12</b>	Behavioural recording	32
<b>Figure 4.1</b>	Emergence rhythms of <i>A. colemani</i> : (A) daily emergence, and (B) hourly emergence	40
<b>Figure 4.2</b>	Proportion of male courting (A) and mating success of <i>A. colemani</i> (B) during the 24-hour cycle. Bars with the same letters are not significantly different ( $P > 0.05$ )	41

<b>Figure 4.3</b>	Number of hosts parasitised by <i>A. colemani</i> in the photophase and scotophase. Columns with the same letters in the photophase or scotophase are not significantly different ( $P > 0.05$ )	43
<b>Figure 4.4</b>	Proportion of males of different age courted ( <b>A</b> ) and mated ( <b>B</b> ) with 1-d-old females in <i>A. colemani</i> . Bars with the same letters are not significantly different ( $P > 0.05$ )	44
<b>Figure 4.5</b>	Proportion of females of different age courted by ( <b>A</b> ) and mated with ( <b>B</b> ) 1-d-old males in <i>A. colemani</i> . Bars with the same letters are not significantly different ( $P > 0.05$ )	45
<b>Figure 4.6</b>	Duration (seconds) of precourting ( <b>A</b> ), courting ( <b>B</b> ), mounting ( <b>C</b> ) and mating ( <b>D</b> ) of males of different age when paired with 1-d-old females in <i>A. colemani</i> . Bars with the same letters are not significantly different ( $P > 0.05$ )	46
<b>Figure 4.7</b>	Duration (seconds) of precourting ( <b>A</b> ), courting ( <b>B</b> ), mounting ( <b>C</b> ) and mating ( <b>D</b> ) of 1-d-old males when paired with females of different age in <i>A. colemani</i> . Bars with the same letters are not significantly different ( $P > 0.05$ )	47
<b>Figure 4.8</b>	Mate mounting	48
<b>Figure 4.9</b>	Mating pair	48
<b>Figure 4.10</b>	Ethogram of mating behavioural events shown by <i>A. colemani</i> within 10 minutes of pairing	50

- Figure 4.11** Effect of male (Mage) and female age (Fage) on mating success (A), premounting duration (B), mounting duration (C) and mating duration (D) in *A. colemani*. (A) Columns with the same letters are not significantly different ( $P > 0.05$ ); (B) premounting duration =  $\exp(3.4881 + 0.1007\text{Mage} + 0.1110\text{Fage})$ ,  $R^2 = 0.0604$ ,  $F_{2,134} = 4.31$ ,  $P = 0.0154$ ; (C) mounting duration =  $\exp(2.0143 + 0.1945\text{Fage})$ ,  $R^2 = 0.2253$ ,  $F_{1,135} = 39.27$ ,  $P < 0.0001$ ; (D) mating duration =  $\exp(3.5796 + 0.0343\text{Mage})$ ,  $R^2 = 0.0917$ ,  $F_{1,135} = 13.63$ ,  $P = 0.0003$  52
- Figure 4.12** Effect of food supply on mating success (A), premounting period (B), mounting period (C) and mating period (D) in *A. colemani*. Columns with the same letters are not significantly different ( $P > 0.05$ ) 54
- Figure 4.13** Effect of space on mating success (A), premounting duration (B), mounting duration (C) and mating duration (D) in *A. colemani*. For each space category, columns with the same letters are not significantly different ( $P > 0.05$ ) 55
- Figure 5.1** Survival and reproduction of parasitoids, parasitised aphids of different ages, and unparasitised aphid (healthy) adults. Bars (mean  $\pm$  SE) with the same letters are not significantly different ( $P > 0.05$ ) 65
- Figure 5.2** Reproduction of *A. colemani* females (A) and healthy *M. persicae* adults (B) in relation to their age after emergence. (A) Number of aphids parasitised =  $-8.51 + 70.09\exp(-0.17\text{age})$ ,  $R^2 = 0.7248$ ,  $F_{2,182} = 239.67$ ,  $P < 0.0001$ ; accumulative parasitism (%) =  $-13.10 + 114.50[1 - \exp(-0.38\text{age})]$ ,  $R^2 = 0.8231$ ,  $F_{2,182} = 423.50$ ,  $P < 0.0001$ . (B) Number of aphid offspring produced =  $5.26 / \{1 + [(age -$  66

$6.41)/6.12]^2\}$ ,  $R^2 = 0.4644$ ,  $F_{3,780} = 735.98$ ,  $P < 0.0001$ ;  
 accumulative number of aphid offspring produced (%) = -  
 $15.09+128.0[1-\exp(-0.11age)]$ ,  $R^2 = 0.9144$ ,  $F_{2,780} =$   
 $4163.69$ ,  $P < 0.0001$

- Figure 5.3** Parasitism rate of *A. colemani* in relation to host age. Bars 67  
 (mean  $\pm$  SE) with the same letters are not significantly  
 different ( $P > 0.05$ )
- Figure 6.1** Mean ( $\pm$  SE) number of aphids of different ages 76  
 encountered by *A. colemani* females. Columns with the  
 same letter are not significantly different ( $P > 0.05$ )
- Figure 6.2** Oviposition behaviours of *A. colemani* females after 77  
 encountering the hosts: **attack attempt** =  $1.05 +$   
 $2.19\text{encounter}$  ( $R^2 = 0.3499$ ,  $F_{1,166} = 89.34$ ,  $P < 0.0001$ );  
**ovipositor probing** =  $1.14 + 0.87\text{encounter}$  ( $R^2 = 0.2153$ ,  
 $F_{1,166} = 45.54$ ,  $P < 0.0001$ ), and **oviposition** =  $0.44 +$   
 $0.11\text{encounter}$  ( $R^2 = 0.1413$ ,  $F_{1,105} = 17.28$ ,  $P < 0.0001$ ).  
 Slopes of lines with the same letters do not differ  
 significantly (ANCOVA:  $P > 0.05$ )
- Figure 6.3** Defensive behaviours of aphids of different age and 78  
 handling time of *A. colemani* females for attacking aphids:  
 (A) aphid escaping, (B) aphid body shaking, and (C)  
 handling time of *A. colemani* females. Columns with the  
 same letters in each category are not significantly different  
 ( $P > 0.05$ )
- Figure 6.4** Fitness gain rate estimated from parasitism and handling 79  
 time in *A. colemani*. Columns with the same letters are not  
 significantly different ( $P > 0.05$ )

**Figure 6.5** Developmental duration (**A**) and body size (**B**) of *A. colemani* progeny developing from aphids parasitised at different ages. In each sex, columns with the same letters are not significantly different ( $P > 0.05$ ) 80

**Figure 6.6** Parasitism of *A. colemani* females produced from *M. persicae* when parasitised at 1 and 3 d old. Columns with the same letter are not significantly different ( $P > 0.05$ ) 80

**Figure 7.1** Reproductive fitness of *A. colemani* of different age ( $P_a$ ) in response to host density ( $N_o$ ). (**A**) Number of hosts parasitised ( $N_a$ ):  $N_a = \exp(1.2917 + 0.2344P_a - 0.0366P_a^2 + 0.0643N_o - 0.0006N_o^2)$  ( $F_{4,222} = 116.35$ ,  $P < 0.0001$ ,  $R^2 = 0.6772$ ); (**B**) Parasitism rate ( $N_a/N_o$ ):  $N_a/N_o = \exp(-0.4065 + 0.2317P_a - 0.0333P_a^2 - 0.0081N_o)$  ( $F_{3,223} = 16.39$ ,  $P < 0.0001$ ,  $R^2 = 0.1806$ ); (**C**) Number of female offspring ( $N_f$ ):  $N_f = \exp(1.4881 + 0.1048P_a - 0.0011P_a^2 + 0.0072N_o - 0.0006P_aN_o)$  ( $F_{4,222} = 90.75$ ,  $P < 0.0001$ ,  $R^2 = 0.3048$ ); (**D**) Proportion of female offspring [ $N_f(\%)$ ]:  $N_f(\%) = \exp(4.1833 - 0.0060P_a - 0.0031N_o)$  ( $F_{2,218} = 1.66$ ,  $P = 0.1930$ ,  $R^2 = 0.0150$ ) 97

**Figure 7.2** Reproductive fitness of *A. colemani* of different density ( $P_t$ ) in response to host density ( $N_o$ ). (**A**) Number of hosts parasitised ( $N_a$ ):  $N_a = \exp(1.2399 + 0.2328P_t - 0.0340P_t^2 + 0.0667N_o - 0.0006N_o^2 + 0.0018P_tN_o)$  ( $F_{5,234} = 224.66$ ,  $P < 0.0001$ ,  $R^2 = 0.8276$ ); (**B**) Parasitism rate ( $N_a/N_o$ ):  $N_a/N_o = \exp(-0.3950 + 0.2304P_t - 0.0335P_t^2 - 0.0102N_o + 0.0018P_tN_o)$  ( $F_{4,225} = 28.24$ ,  $P < 0.0001$ ,  $R^2 = 0.3248$ ); (**C**) Number of female offspring ( $N_f$ ):  $N_f = \exp(0.5612 + 0.4291P_a - 0.0585P_a^2 + 0.0618N_o - 0.0005N_o^2)$  ( $F_{4,223} = 94.65$ ,  $P < 0.0001$ ,  $R^2 = 0.6294$ ); (**D**) Proportion of female offspring [ $N_f(\%)$ ]:  $N_f(\%) = \exp(4.1370 + 0.1381P_a -$  99

$$0.0245Pt^2 - 0.0138N_o + 0.0002N_o^2) (F_{4,233} = 29.10, P < 0.0001, R^2 = 0.3331)$$

**Figure 7.3** Superparasitism rate of *A. colemani* of different age ( $P_a$ ) and 100  
different density ( $P_t$ ) in response to host density ( $N_o$ ). **(A)** Effect of different age ( $P_a$ ): Superparasitism rate =  $\exp(-0.8005 + 0.1684P_a - 0.0216P_a^2 - 0.0582N_o + 0.0005N_o^2)$  ( $F_{4,175} = 63.56, P < 0.0001, R^2 = 0.5924$ ); **(B)** Effect of different density ( $P_t$ ): Superparasitism rate =  $\exp(-1.3337 + 0.7965P_a - 0.1004P_a^2 - 0.0660N_o + 0.0005N_o^2 + 0.0066PtN_o)$  ( $F_{5,220} = 154.76, P < 0.0001, R^2 = 0.7786$ )

**Figure 7.4** Demographic response of *A. colemani* to parasitoid ( $P_t$ ) and 101  
host densities ( $N_o$ ). **(A)** The number of female progeny:  $P_{t+1} = SN_o[1-\exp(-aP_t)]$  ( $F_{1,229} = 5656.33, P < 0.0001, R^2 = 0.8412$ ), where the constant  $a = 0.6405 \pm 0.0252$ ; **(B)** proportion of female progeny:  $S = P_{t+1}/\{N_o[1-\exp(-aP_t)]\}$  ( $F_{1,229} = 4268.90, P < 0.0001, R^2 = 0.4350$ ), where the constant  $a = 1.0941 \pm 0.0562$

**Figure 7.5** The mutual interference in *A. colemani*:  $a = QP_t^{-m}$  ( $F_{1,238} = 102$   
101.35,  $P < 0.0001, R^2 = 0.2987$ ), where the constant  $Q = 0.2576$  and mutual interference constant  $m = 0.4983$