

ESMD Life history data other species – Electronic Supplementary materials for chapter 8

Did the life history of Multicoloured Asian ladybeetle, *Harmonia axyridis*, change when it spread across the globe? A meta-analysis

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Literature data for immature development, longevity, fecundity, and pre-oviposition period of aphid-fed European populations of *A. bipunctata* (A2), *C. septempunctata* (C7), and *P. quatuordecimpunctata* (P14).

Data based on unsuitable prey, artificial diet, or *Ephesia* eggs are excluded. Data are also excluded when food availability was limited. All studies are performed in the laboratory

Data are grouped in four temperature classes: 14-16, 17-20, 21-24, 25 and higher.

Weighted averages are calculated. Values for development, female longevity, and fecundity of wild populations (unless otherwise specified) in classes 17-20 and 21-24 are shown in table 3 of the main text.

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Grey fields are identical to the field above.								
category	Type of information	Group	Columnhead	explanation	classes	calculation	note	type of value
reference	reference	Key	Tempgroup	temperature grouped in 4 classes	14-16			
			Tempgroup	temperature grouped in 4 classes	17-20			
			Tempgroup	temperature grouped in 4 classes	21-24			
			Tempgroup	temperature grouped in 4 classes	25+			
reference	reference	Key	Key	unique reference number				
reference	reference	Key	Ref	study that provided the data				
data	duration	Immature stages	ELP	both given and calculated values				both
data	duration	Immature stages	ELPexpl	gives data source	10	E + LP		explanation
data	duration	Immature stages	ELPexpl	gives data source	11	ELP		explanation
data	duration	Immature stages	ELPsd	sd/se given in paper				given
data	longevity	Longevity	Long	given in paper				both
data	longevity	Longevity	Longsd	sd/se given in paper				given
data	fecundity	Fecundity	TotalFec	total number of eggs during life time adult				given
data	fecundity	Fecundity	TotalFecsd	sd/se given in paper				given
data	fecundity	Fecundity	DailyFec	total number of eggs during life time adult				given
data	fecundity	Fecundity	DailyFecexpl	gives data source	1		daily fecundity determined over whole lifetime	explanation
data	fecundity	Fecundity	DailyFecexpl	gives data source	2		daily fecundity determined over a short limited time period	explanation
data	fecundity	Fecundity	DailyFecsd	sd/se given in paper				given
data	fecundity	Fecundity	PeriodforFec	gives length of period for calculating daily fecundity				given
data	fecundity	Fecundity	Periodstart	gives start of period for calculation daily fecundity				given
data	pre-oviposition	Pre-oviposition	PreOvi	given in paper				given
data	pre-oviposition	Pre-oviposition	PreOvisd	sd/se given in paper				given
setup	conditions	Replicates	N	number of replicates				both
setup	conditions	Replicates	Nexpl	gives data source	1		N given in paper	explanation
setup	conditions	Replicates	Nexpl	gives data source	2		N given in paper per stage	explanation
setup	conditions	Replicates	Nexpl	gives data source	5		N not explicitly given in paper, but estimated based on other information available	explanation
setup	conditions	Replicates	Nexpl	gives data source	6		N given in paper, transformed for analysis	explanation
setup	conditions	Replicates	Nexpl	gives data source	8		N is not specified: used: N=15	explanation

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setup	conditions	Temperature	Temp	temperature given in paper	°C	When temperature is not specified, the data is automatically excluded from the analysis	given
setup	conditions	Photoperiod	Photo	photoperiod given in paper	hour light		given
setup	conditions	Relative humidity	RH	relative humidity			given
setup	conditions	Note	Note	remark about data			
setup	population	population	Strain	strain type of beetles	1	wild collected	given
setup	population	population	Strain	strain type of beetles	2	collected and subsequently reared for max 4 generations	given
setup	population	population	Strain	strain type of beetles	3	laboratory reared	given
setup	population	population	Sex	sex of beetles used	1	female	given
setup	population	population	Sex	sex of beetles used	2	male	given
setup	population	population	Sex	sex of beetles used	3	not specified	given
setup	population	origin	Country	country of origin beetles		given in paper	both
setup	population	origin	Area	area/city of origin beetles		given in paper	both
setup	population	Year	Year	year experiment, given or estimated			both
setup	population	Year	Yearexpl	gives data source	1	year given in paper	explanation
setup	population	Year	Yearexpl	gives data source	2	year publication	explanation
setup	food	Food	Food	food used in experiment, when aphid, species name given			given
setup	food	Food	Host	hostplant of aphid species used			given
setup	food	Food	Foodtype	foodtype used in experiment	1	aphid	calculated
setup	food	Food	Foodtype	foodtype used in experiment	2	aphid and Ephestia eggs	calculated
setup	food	Food	Foodtype	foodtype used in experiment	3	Ephestia eggs	calculated
setup	food	Food	Foodtype	foodtype used in experiment	6	artificial diet	calculated
setup	food	Food	Foodtype	foodtype used in experiment	8	not specified	calculated
Bibliography	reference	Key	Ref	study that provided the data			
Bibliography	reference	Key	Authors	complete reference-authors			
Bibliography	reference	Key	Title	complete reference-title			
Bibliography	reference	Key	Journal	complete reference-journal			

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Adalia bipunctata

Immature development

Tempgroup	key	Ref	ELP	ELExpl	ELPsd	N	Nepl	Temp	Photo	RH	Note	Strain	Sex	Country	Area	Year	Yearexpl	Foodtype	Food	Host
Wild populations																				
17-20C																				
		Yasuda and Dixon 2002	19.93	11	0	27	1	20	18		1	1	UK	East Anglia		2002	2	Acyrtosiphon pisum		
		Yasuda and Dixon 2002	19.53	11	0	30	1	20	18		1	2	UK	East Anglia		2002	2	Acyrtosiphon pisum		
21-24C																				
2512		Kalushkov 1994	15.8	11	1	25	1	24	16	74	2	3	BG	Sofia		1994	2	1	Phorodon humuli	Humulus lupulus
25+C																				
		Yasuda and Dixon 2002	14.88	11	0	21	1	25	18		1	1	UK	East Anglia		2002	2	Acyrtosiphon pisum		
		Yasuda and Dixon 2002	14.84	11	0	19	1	25	18		1	2	UK	East Anglia		2002	2	Acyrtosiphon pisum		
Reared populations																				
14-16C																				
2463	Schuder, et al. 2004		41	11	0	31	2	15	16		3	3	DE	Braunschweig		2004	2	1	Sitobion avenae (F.)	
2357	Jalali, et al. 2010		47.73	11	0	30	2	15	16	64	3	3	BE	Ghent		2010	2	1	Myzus persicae	Vicia faba
17-20C																				
2424	Jalali, et al. 2009		28.94	11	0	45	1	19	16	64	3	3	BE	Ghent		2009	2	1	Acyrtosiphon pisum	
2367	Jalali, et al. 2009		33.48	11	0	38	1	19	16	64	3	3	BE	Ghent		2009	2	1	Myzus persicae	Vicia faba
230	Francis, et al. 2001		21.8	11	1	60	1	20	16		3	3	BE	Gembloux		2001	2	1	Myzus persicae	Sinapis alba
231	Francis, et al. 2001		22	11	1	60	1	20	16		3	3	BE	Gembloux		2001	2	1	Myzus persicae	Brassica napus
232	Francis, et al. 2001		23.4	11	1	60	1	20	16		3	3	BE	Gembloux		2001	2	1	Myzus persicae	Vicia faba
2464	Schuder, et al. 2004		24.9	11	0	29	2	20	16		3	3	DE	Braunschweig		2004	2	1	Sitobion avenae (F.)	
21-24C																				
2425	Jalali, et al. 2009		22.08	11	0	38	1	23	16	64	3	3	BE	Ghent		2009	2	1	Acyrtosiphon pisum	
2369	Jalali, et al. 2009		21.32	11	0	38	1	23	16	64	3	3	BE	Ghent		2009	2	1	Myzus persicae	Vicia faba
25+C																				
2465	Schuder, et al. 2004		15.6	11	0	33	2	25	16		3	3	DE	Braunschweig		2004	2	1	Sitobion avenae (F.)	
2426	Jalali, et al. 2009		15.12	11	0	41	1	27	16	64	3	3	BE	Ghent		2009	2	1	Acyrtosiphon pisum	
2371	Jalali, et al. 2009		15.01	11	0	40	1	27	16	64	3	3	BE	Ghent		2009	2	1	Myzus persicae	Vicia faba
2365	Jalali, et al. 2010		13.63	11	0	50	2	30	16	64	3	3	BE	Ghent		2010	2	1	Myzus persicae	Vicia faba

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Coccinella septempunctata

Immature development

Tempgroup	key	Ref	ELP	ELPexpl	ELPsd	N	Nexpl	Temp	Photo	RH	Note	Strain	Sex	Country	Area	Year	Yexpl	Foodtype	Food	Host
Wild populations																				
14-16C																				
2254	Katsarou, et al. 2005	70	11	2.7	7	1	14	16	50		2	3	GR	Karditsa		1999	1	1	Myzus persicae (Sulzer)	tabacco plant
2413	Sundby 1966	60			30	1	16	90			1	3	N	Vollebekk		1962	1	1	Myzus persicae	Brassica napus napobrassica
17-20C																				
2256	Katsarou, et al. 2005	46	11	0.5	13	1	17	16	50		2	3	GR	Karditsa		1999	1	1	Myzus persicae (Sulzer)	tabacco plant
2258	Katsarou, et al. 2005	33	11	0.4	20	1	20	16	50		2	3	GR	Karditsa		1999	1	1	Myzus persicae (Sulzer)	tabacco plant
21-24C																				
2412	Sundby 1966	29	11		67	1	21	90			1	3	N	Vollebekk		1962	1	1	Myzus persicae	Brassica napus napobrassica
2259	Katsarou, et al. 2005	22	11	0.2	22	1	23	16	50		2	3	GR	Karditsa		1999	1	1	Myzus persicae (Sulzer)	tabacco plant
2286	Zarpas, et al. 2007	23	11	0.3	68	1	23	16			2	3	GR	Velestino		1998	1	1	Aphis gossypii	cotton
2288	Zarpas, et al. 2007	24	11	0.3	40	1	23	16	50		2	3	GR	Larissa		1998	1	1	Aphis gossypii	cotton
25+C																				
2342	Phoofolo and Obrycki 1995	14	11	0.2	168	1	26	18			2	3	Ukr	Ukr		1995	2	1	Acyrthosiphon pisum	

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Propylea quatuordecimpunctata

Immature development

Tempgroup Key	Ref	ELP	ELExpl	ELPsd	N	Nexpl	Temp	Photo	RH	Note	Strain	Sex	Country	Area	Year	Yearch	Foodtype	Food	Host
Wild populations																			
14-16C																			
2492	Baumgärtner, et al. 1987	53.46	10		30	1	15.3	16		1	3		CH	Zurich	1987	2	1	Acyrthosiphon pisum	
17-20C																			
2297	Papanikolaou, et al. 2013	30.22	11	0.28	16	1	17	16	65	2	3		GR	Alta	2006	1	1	Aphis fabae Vicia faba	
2493	Baumgärtner, et al. 1987	24.76	10		30	1	19.8	16		1	3		CH	Zurich	1987	2	1	Acyrthosiphon pisum	
2299	Papanikolaou, et al. 2013	23.07	11	0.17	20	1	20	16	65	2	3		GR	Alta	2006	1	1	Aphis fabae Vicia faba	
2548	Michels and Flanders 1992	21.4	11		22	1	20	90		2	3		Ukr	Ukr	1989	1	1	Schizaphis graminum	
2549	Michels and Flanders 1992	24	11		22	1	20	90		2	3		Tu	Bepazari	1988	1	1	Schizaphis graminum	
2550	Michels and Flanders 1992	22.4	11		23	1	20	90		2	3		M	Moldavia	1989	1	1	Schizaphis graminum	
2551	Michels and Flanders 1992	25.9	11		19	1	20	90		2	3		Ukr	Ukr	1989	1	1	Diuraphis noxia (Mordvilko)	
2552	Michels and Flanders 1992	23.9	11		20	1	20	90		2	3		Tu	Bepazari	1988	1	1	Diuraphis noxia (Mordvilko)	
2553	Michels and Flanders 1992	21	11		20	1	20	90		2	3		M	Moldavia	1989	1	1	Diuraphis noxia (Mordvilko)	
25+C																			
2293	Papanikolaou, et al. 2013	15.16	11	0.19	25	2	25	16	65	2	3		GR	Alta	2006	1	1	Aphis fabae Vicia faba	
2494	Baumgärtner, et al. 1987	14.24	10		30	1	25.3	16		1	3		CH	Zurich	1987	2	1	Acyrthosiphon pisum	
2495	Baumgärtner, et al. 1987	10.71	10		30	1	30	16		1	3		CH	Zurich	1987	2	1	Acyrthosiphon pisum	
2294	Papanikolaou, et al. 2013	10.63	11	0.26	15	2	30	16	65	2	3		GR	Alta	2006	1	1	Aphis fabae Vicia faba	
2295	Papanikolaou, et al. 2013	9.86	11	0.21	14	2	32.5	16	65	2	3		GR	Alta	2006	1	1	Aphis fabae Vicia faba	
Reared populations																			
21-24C																			
2540	Hemptonne, et al. 1988	20.43	11	0.62	37	1	21	16		3	1		BE	Hinaut	1985	1	1		
25+C																			
2541	Hemptonne, et al. 1988	11.95	11	0.92	41	1	28	16		3	1		BE	Hinaut	1985	1	1		
2542	Hemptonne, et al. 1988	9.87	11	0.29	39	1	34	16		3	1		BE	Hinaut	1985	1	1		

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Adalia bipunctata

Longevity

Tempgroup Key	Ref	Long	Longsd	N	Nexpl	temp	photo	RH	Note	Strain	Sex	Country	Area	Year	Yearexpl	Foodtype	Food	Host
Wild populations Female																		
21-24C																		
2515	Kalushkov 1994	73.3	26.7	18	1	24	16	74	average temp of fluctuating temp	2	1	BG	Sofia	1994	2	1	Phorodon humuli	Humulus lupulus

Reared populations

17-20C

2431	Jalali, et al. 2009	69.6	3.68	11	1	19	16	64		3	1	BE	Ghent	2009	2	1	Acyrthosiphon pisum	
2432	Jalali, et al. 2009	78.3	7.4	11	1	19	16	64		3	1	BE	Ghent	2009	2	1	Myzus persicae	Vicia faba
2490	Blackman 1967	76.2	28	15	8	20	16			3	1	UK	Berks	1967	2	1	Myzus persicae	

21-24C

2434	Jalali, et al. 2009	44.5	3.87	11	1	23	16	64		3	1	BE	Ghent	2009	2	1	Acyrthosiphon pisum	
2435	Jalali, et al. 2009	53.2	5.33	11	1	23	16	64		3	1	BE	Ghent	2009	2	1	Myzus persicae	Vicia faba
2334	Bonte, et al. 2010	40.7	6.2	25	6	23	16	64		3	1	BE	Ghent	2010	2	1	Acyrthosiphon pisum	Vicia faba

25+C

2437	Jalali, et al. 2009	44	3.74	11	1	27	16	64		3	1	BE	Ghent	2009	2	1	Acyrthosiphon pisum	
2438	Jalali, et al. 2009	44.5	5.6	11	1	27	16	64		3	1	BE	Ghent	2009	2	1	Myzus persicae	Vicia faba

Male

Wild populations

21-24C

2518	Kalushkov 1994	55.2	17.9	18	1	24	16	74	average temp of fluctuating temp	2	2	BG	Sofia	1994	2	1	Phorodon humuli	Humulus lupulus
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Coccinella septempunctata

Longevity

Tempgroup	Key	Ref	Long	Longsd	N	Nexpl	Temp	Photo	RH	Note	Strain	Sex	Country	Area	Year	Yearexpl	Foodtype	Food	Host
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Wild populat Female

21-24C

2283	Zarpas, et al. 2007	51.1	6.5	21	1	23	16			2	1	GR	Velestino	1998	1	1	Aphis goss	cotton
2284	Zarpas, et al. 2007	63.5	5.2	21	1	23	16			2	2	GR	Velestino	1998	1	1	Aphis goss	cotton

25+C

482	Kalushkov and Hodek 2004	78	40	20	1	25	16	74		2	1	BG	Sofia	1999	1	1	Aphis faba	Vicia faba
483	Kalushkov and Hodek 2004	68	33	30	1	25	16	74		2	1	BG	Sofia	2000	1	1	Aphis crac	Vicia faba
484	Kalushkov and Hodek 2004	78	32	30	1	25	16	74		2	1	BG	Sofia	1999	1	1	Acyrthosiq	Vicia faba
485	Kalushkov and Hodek 2004	76	29	30	1	25	16	74		2	1	BG	Sofia	2000	1	1	Sitobion a'	Triticum vulgare
2289	Kontodimas, et al. 2008	94.9		25	1	25	16	65		2	1	GR	Copais	2006	1	1	Aphis faba	Vicia faba

Male

Wild populations

486	Kalushkov and Hodek 2004	68	20	20	1	25	16	74		2	2	BG	Sofia	1999	1	1	Aphis faba	Vicia faba
487	Kalushkov and Hodek 2004	64	21	30	1	25	16	74		2	2	BG	Sofia	2000	1	1	Aphis crac	Vicia faba
488	Kalushkov and Hodek 2004	63	21	30	1	25	16	74		2	2	BG	Sofia	1999	1	1	Acyrthosiq	Vicia faba
489	Kalushkov and Hodek 2004	52	26	30	1	25	16	74		2	2	BG	Sofia	2000	1	1	Sitobion a'	Triticum vulgare

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Propylea quatuordecimpunctata

Longevity

Tempgroup Key	Ref	Long	Longsd N	Nexpl	Temp	Photo	RH	Note	Strain	Sex	Country	Area	Year	Yearexpl	Foodtype	Food	Host		
Wild popula Female																			
17-20C																			
2307 Papanikolaou, et al. 2013																			
2308 Papanikolaou, et al. 2013																			
21-24C																			
2318 Kalushkov and Hodek 2005		69	32	20	1	24	16	64	on BT-potatoes		2	1	BG	Sofia	2003	1	1	Myzus persicae	Solanum tuberosum BT
2319 Kalushkov and Hodek 2005		76	29	20	1	24	16	64			2	1	BG	Sofia	2003	1	1	Aphis fabae	Vicia faba
2320 Kalushkov and Hodek 2005		59	28	21	1	24	16	64			2	1	BG	Sofia	2003	1	1	Aphis craccivora	Vicia faba
2321 Kalushkov and Hodek 2005		68	33	20	1	24	16	64	on BT-potatoes		2	1	BG	Sofia	2003	1	1	Myzus persicae; Aphis craccivora	Solanum tuberosum BT; vicia faba
25+C																			
2309 Papanikolaou, et al. 2013		69.04	3.1	25	1	25	16	65			2	1	GR	Alta	2006	1	1	Aphis fabae	Vicia faba
2290 Kontodimas, et al. 2008		68.9		25	1	25	16	65			2	1	GR	Alta	2006	1	1	Aphis fabae	Vicia faba
2310 Papanikolaou, et al. 2013		33.53	1.9	15	1	30	16	65			2	1	GR	Alta	2006	1	1	Aphis fabae	Vicia faba
Male																			
21-24C																			
2322 Kalushkov and Hodek 2005		63	21	20	1	24	16	64	on BT-potatoes		2	2	BG	Sofia	2003	1	1	Myzus persicae	Solanum tuberosum BT
2323 Kalushkov and Hodek 2005		62	26	20	1	24	16	64			2	2	BG	Sofia	2003	1	1	Aphis fabae	Vicia faba
2324 Kalushkov and Hodek 2005		54	20	21	1	24	16	64			2	2	BG	Sofia	2003	1	1	Aphis craccivora	Vicia faba
2325 Kalushkov and Hodek 2005		64	21	20	1	24	16	64	on BT-potatoes		2	2	BG	Sofia	2003	1	1	Myzus persicae; Aphis craccivora	Solanum tuberosum BT; vicia faba

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Adalia bipunctata

Total fecundity

Tempgroup	Key	Ref	TotalFec	TotalFecsd	N	Nexpl	Temp	Photo	RH	Note	Strain	Country	Countryexpl	Area	Year	Foodtype	Food	Host
Wild populations																		
21-24C																		
2515	Kalushkov 1994		1011	466.1	18	1	24	16	74		2	BG	1	Sofia	1994	1	Phorodon hui	Humulus lupulus
25+C																		
671	Lanzoni, et al. 2004		537	76.9	20	1	25	16	70	Epehestia for larvae, aphid for adult	2	IT	1	Bologn	2004	2	Epehestia kueř	Pisum sativum
Reared populations																		
17-20C																		
2431	Jalali, et al. 2009		1144.43	79.75	11	1	19	16	64		3	BE	1	Ghent	2009	1	Acyrthosiphon pisum	
2432	Jalali, et al. 2009		1187.82	120	11	1	19	16	64		3	BE	1	Ghent	2009	1	Myzus persicæ	Vicia faba
2490	Blackman 1967		676.2		15	8	20	16			3	UK	1	Berks	1967	1	Myzus persicae	
21-24C																		
2334	Bonte, et al. 2010		796.1	101.1	25	6	23	16	64		3	BE	1	Ghent	2010	1	Acyrthosiphon Vicia faba	
2434	Jalali, et al. 2009		824.69	92.21	11	1	23	16	64		3	BE	1	Ghent	2009	1	Acyrthosiphon pisum	
2435	Jalali, et al. 2009		1081.54	108.35	11	1	23	16	64		3	BE	1	Ghent	2009	1	Myzus persicæ	Vicia faba
25+C																		
2437	Jalali, et al. 2009		1008.82	125.46	11	1	27	16	64		3	BE	1	Ghent	2009	1	Acyrthosiphon pisum	
2438	Jalali, et al. 2009		966.18	140.34	11	1	27	16	64		3	BE	1	Ghent	2009	1	Myzus persicæ	Vicia faba

Coccinella septempunctata

Total fecundity

Tempgroup Key	Ref	TotalFec	TotalFecsd	Temp	N	Nexpl	Note	Strain	Country	Area	Year	Yearexpl	Foodtype	Food	Host
Wild populations															
25+C															
2283	Zarpas, et al. 2007	417	64.6	23	21	1		2	GR	Velestino	1998	1	1	Aphis gossypii	cotton
482	Kalushkov and Hodek 2004	626	417	25	20	1		2	BG	Sofia	1999	1	1	Aphis fabae	Vicia faba
483	Kalushkov and Hodek 2004	683	446	25	30	1		2	BG	Sofia	2000	1	1	Aphis craccivora	Vicia faba
484	Kalushkov and Hodek 2004	1428	585	25	30	1		2	BG	Sofia	1999	1	1	Acyrthosiphon pisum	Vicia faba
485	Kalushkov and Hodek 2004	1286	532	25	30	1		2	BG	Sofia	2000	1	1	Sitobion avenae	Triticum vulgare
2289	Kontodimas, et al. 2008	1996.8		25	25	1		2	GR	Copais	2006	1	1	Aphis fabae	Vicia faba

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Propylea quatuordecimpunctata

Total fecundity

Tempgroup	Key	Ref	TotalFec	TotalFecsd	N	Nexpl	Temp	photo	RH	Note	Strain	Country	Area	Year	Yearepl	Foodtype	Food	Host
Wild populations																		
17-20C																		
2307	Papanikolaou, et al. 2013	371.61	67.57	16	1	17	16	65	2	GR	Alta	2006	1	1	Aphis fabae	Vicia faba		
2308	Papanikolaou, et al. 2013	539	51.62	20	1	20	16	65	2	GR	Alta	2006	1	1	Aphis fabae	Vicia faba		
21-24C																		
2318	Kalushkov and Hodek 2005	386	140	20	1	24	16	64	2	BG	Sofia	2003	1	1	Myzus persicae	Solanum tuberosum BT		
2319	Kalushkov and Hodek 2005	345	213	20	1	24	16	64	2	BG	Sofia	2003	1	1	Aphis fabae	Vicia faba		
2320	Kalushkov and Hodek 2005	278	166	21	1	24	16	64	2	BG	Sofia	2003	1	1	Aphis craccivora	Vicia faba		
															Myzus persicae; Aphis craccivora	Solanum tuberosum BT; vicia faba		
2321	Kalushkov and Hodek 2005	431	275	20	1	24	16	64	2	BG	Sofia	2003	1	1	Aphis craccivora	Vicia faba		
25+C																		
2309	Papanikolaou, et al. 2013	724.61	47.33	25	1	25	16	65	2	GR	Alta	2006	1	1	Aphis fabae	Vicia faba		
2310	Papanikolaou, et al. 2013	402.3	49.19	15	1	30	16	65	2	GR	Alta	2006	1	1	Aphis fabae	Vicia faba		
Reared populations																		
25+C																		
2537	Hemptonne, et al. 1988	161.3	74.16	10	1	25	16		3	BE	Hinaut	1985	1	1	Myzus persicae	Brassica napus		
2538	Hemptonne, et al. 1988	8.3	7.5	9	1	34	16		3	BE	Hinaut	1985	1	1	Myzus persicae	Brassica napus		
Temp unknown																		
2522	Iablokoff-Khnzorian 1982	1308	15	8		90			3	UK	UK	1982	2	8				

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Adalia bipunctata

Daily fecundity

Tempgroup	Key	Ref	DailyFec	DailyFecexpl	DailyFecsd	PeriodforFec	Periodstart	N	Nexpl	Temp	Photo	Rh	Note	Strain	Country	Area	Year	Yearexpl	Foodtype	Food	Host
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Wild populations

21-24C

2524 Ware, et al. 2008 20 2 30 mating 15 8 22 14 35 2 RU St Petersburg 2008 2 1 Acyrthosiphon pisum

25+C

671 Lanzoni, et al. 2004 16 1 0.9 20 1 25 16 70 Ephestia for larvae, aphid for adult 2 IT Bologna 2004 2 2 Ephesti Pisum sativum

Reared populations

17-20C

223	Ferrer, et al. 2008	22	1					58	1	18	16		3	FR	Castanet-tolosan Cedex	2008	2	1	Acyrtho Vicia faba		
233	Francis, et al. 2001	4.42	2	2.65	21	eclosion		42	1	20	16		3	BE	Gembloux	2001	2	1	Myzus † Sinapis alba		
234	Francis, et al. 2001	10.35	2	4.27	21	eclosion		42	1	20	16		3	BE	Gembloux	2001	2	1	Myzus † Brassica napus		
235	Francis, et al. 2001	6.82	2	2.78	21	eclosion		42	1	20	16		3	BE	Gembloux	2001	2	1	Myzus † Vicia faba		
2490	Blackman 1967	6.9	1					15	8	20	16		3	UK	Berks	1967	2	1	Myzus persicae		

21-24C

2334 Bonte, et al. 2010 28.1 1 2.2 25 6 23 16 64 3 BE Ghent 2010 2 1 Acyrtho Vicia faba
 2404 De Clercq, et al. 2005 11.6 2 1.4 30 11 1 23 16 65 3 BE Ghent 2005 2 1 Acyrthosiphon pisum

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Coccinella septempunctata

Daily fecundity

Tempgroup	Key	Ref	DailyFec	DailyFecexpl	DailyFecsd	PeriodforFec	Periodstart	N	Nexpl	Temp	Photo	RH	Note	Strain	Country	Area	Year	Yearexpl	Foodtype	Food	Host
Wild populations																					
17-20C																					
257 Hämäläinen, et al. 1975																					
24.9	1							10	1	20	18	85	hibernated beetles	1	FN	Tikkurila	1975	2	1	Myzus persicae	Chrysanthemum or sugar beet
21-24C																					
2526 Ghanim, et al. 1984		27.7	2					10	1	22	16	70		1	DE	Halle	1982	1	1	Macrosiphum avenae	
25+C																					
1216 Phoofolo and Obrycki 2000	19	2	18.9	60	start exper	40	1	26	18					2	FR	FR	2000	2	6	Acyrtosiphon pisum; Wheast; honey (1:1 mix)	
2338 Phoofolo and Obrycki 1995	15.8	2		74	start exper	25	1	26	18					2	Ukr	Ukr	1995	2	1	Acyrtosiphon pisum	
258 Hämäläinen, et al. 1975	23.3	1				10	1	30	18	85	hibernated beetles		1	FN	Tikkurila	1975	2	1	Myzus persicae	Chrysanthemum or sugar beet	
Reared populations																					
20C																					
2525 Dixon and Guo 1993	38.7	2		15	15 egg clusters laid	5	1	20	16					3	UK	Norwich	1993	2	1	Acyrtosiphon pisum	

Propylea quatuordecimpunctata

Daily fecundity

Tempgroup	Key	Ref	DailyFec	DailyFecexpl	DailyFecsd	PeriodforFec	Periodstart	N	Nexpl	Temperature	Photo	RH	Note	Strain	Country	Area	Year	Yearexpl	Foodtype	Food	Host
Wild populations																					
20C																					
2554 Michels and Flanders 1992																					
2556	Michels and Flanders 1992		4.0	2	90	start exper 7	1	20	90				2	M	Moldavia	1989	1	1	Schizaphis graminum		
2557	Michels and Flanders 1992		1.1	2	90	start exper 6	1	20	90				2	Ukr	Ukr	1989	1	1	Schizaphis graminum		
2559	Michels and Flanders 1992		0.1	2	90	start exper 8	1	20	90				2	M	Moldavia	1989	1	1	Diuraphis noxia (Mordvilko)		
			2.3	2	90	start exper 8	1	20	90				2	Ukr	Ukr	1989	1	1	Diuraphis noxia (Mordvilko)		
26C																					
2343	Phoofolo and Obrycki 2000		11.9	2	5.9	60	start exper 40	1	26	16			2	FR	Fr	2000	2	6	Acyrthosiphon pisum; Wheat; honey (1:1 mix)		
2462	Obrycki, et al. 1993		5.2	2	80	start exper 42	1	26	16				2	Fr	Drome	1989	1	1	Acyrthosiphon pisum	Vicia faba	
Temperature unknown																					
2522	Iablokoff-Khnzorian 1982		20	1				15	8				90		UK	UK	1982	2	8		

Adalia bipunctata

Pre-oviposition period

Tempgroup	Key	Ref	PreOvi	PreOvisd	N	Nexpl	Temperature	Photo	RH	Note	Strain	Country	Area	Year	Yearexpl	Foodtype	Food	Host
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Reared populations

17-20C

2431	Jalali, et al. 2009	9.07	0.25	11	1	19	16	64	3	BE	Ghent	2009	2	1	Acyrthosiphon pisum		
2432	Jalali, et al. 2009	8.45	0.25	11	1	19	16	64	3	BE	Ghent	2009	2	1	Myzus persicae	Vicia faba	
233	Francis, et al. 2001	3.5	0.7	42	1	20	16		3	BE	Gembloix	2001	2	1	Myzus persicae	Sinapis alba	
234	Francis, et al. 2001	5	0	42	1	20	16		3	BE	Gembloix	2001	2	1	Myzus persicae	Brassica napus	
235	Francis, et al. 2001	4.6	1.5	42	1	20	16		3	BE	Gembloix	2001	2	1	Myzus persicae	Vicia faba	

21-24C

2434	Jalali, et al. 2009	5.46	0.14	11	1	23	16	64	3	BE	Ghent	2009	2	1	Acyrthosiphon pisum		
2435	Jalali, et al. 2009	6.09	0.28	11	1	23	16	64	3	BE	Ghent	2009	2	1	Myzus persicae	Vicia faba	
2334	Bonte, et al. 2010	5.6	0.3	25	6	23	16	64	3	BE	Ghent	2010	2	1	Acyrthosiphon pisum	Vicia faba	

25+C

2437	Jalali, et al. 2009	4.45	0.25	11	1	27	16	64	3	BE	Ghent	2009	2	1	Acyrthosiphon pisum		
2438	Jalali, et al. 2009	5.73	0.14	11	1	27	16	64	3	BE	Ghent	2009	2	1	Myzus persicae	Vicia faba	

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Coccinella septempunctata

Pre-oviposition period

Tempgroup	Key	Ref	PreOvi	PreOvisd	N	Nexpl	Temp	Photo	RH	Note	Strain	Country	Area	Year	Yearexpl	Foodtype	Food	Host
Wild populations																		
21-24C																		
2283	Zarpas, et al. 2007		10		21	1	23	16		2	GR	Velestino		1998	1	1	Aphis gossypii	cotton
25+C																		
2338	Phoofolo and Obrycki 1995		6.4	0.4	25	1	26	18		2	Ukr	Ukr		1995	2	1	Acyrthosiphon pisum	

Propylea quatuordecimpunctata

Pre-oviposition period

Tempgroup	Key	Ref	PreOvi	PreOvisd N	Nexpl	Temp	Photo	RH	Note	Strain	Country	Area	Year	Yearexpl	Foodtype	Food	Host
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Wild populations

21-24C

2455	Obrycki, et al. 1993	10.5	10	1	22	18		2	Tu	Beypazari	1989	1	1	Acyrtosiphon pisum	Vicia faba
2459	Obrycki, et al. 1993	7	4	1	22	16		2	Fr	Drome	1989	1	1	Acyrtosiphon pisum	Vicia faba
2456	Obrycki, et al. 1993	8.5	6	1	22	18		2	Fr	Drome	1989	1	1	Acyrtosiphon pisum	Vicia faba

25+C

2458	Obrycki, et al. 1993	7.5	10	1	26	16		2	Tu	Beypazari	1989	1	1	Acyrtosiphon pisum	Vicia faba
2461	Obrycki, et al. 1993	8.42	1.4	39	1	26	16		Tu	Beypazari	1989	1	1	Acyrtosiphon pisum	Vicia faba
2462	Obrycki, et al. 1993	7.2	1.7	42	1	26	16		Fr	Drome	1989	1	1	Acyrtosiphon pisum	Vicia faba

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Ref	Authors	Title	Journal
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Blackman 1967	Blackman RL (1967)	The effects of different aphid foods on <i>Adalia bipunctata</i> L. and <i>Coccinella 7-punctata</i> L.	Ann. Appl. Biol. 59:207-219
Bonte, et al. 2010	Bonte M, Samih MA and De Clercq P (2010)	Development and reproduction of <i>Adalia bipunctata</i> on factitious and artificial foods.	BioControl 55:485-491
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