

**(Coleoptera: Coccinellidae) L. *Chilocorus bipustulatus***

\* \* \*

*Chilocorus*

( ) (Coleoptera: Coccinellidae) L. *bipustulatus*  
 (Homoptera: Diaspididae) Bouche *Aspidiotus nerii*  
 . (Homoptera: Diaspididae) Bouche *Aonidia lauri*

( 15.11)

(%56.54)

( 32.26)

( 562.4)

( 7.85)

.(%96.19)

( 540.97)

.. *Chilocorus bipustulatus*

:

Homoptera

(1997 )

L. *Chilocorus bipustulatus*

( ) (Coleoptera: Coccinellidae)

.(Lattin, 1998; Peronti et al., 2001 )

Scale insects

(Basheer, 1990) Armored scale insects

(1991) Hattingh and Samways

)

Coccoidea

(2006

*C. bipustulatus*

.2009/12/7

2009/5/14

\*

/

(1×1.5×1)

(1951) Bodenheimer

*C. bipustulatus*

(Homoptera: Diaspididae) Bouche

*Aspidiotus nerii*

(Homoptera, Bouche *Aonidia lauri*

Diaspididae)

(Yaghmaee, 2003) *C. bipustulatus*

Crawlers

(  
-24

Ponsonby and Copland. )& (2004 , )  
(Stathas, 2000; 2007)

48

(Ponsonby and Copland. 2000)

25±1

/ (8/16) %65±5

*C. bipustulatus*

)

(4)

(

2009 2008

(4)

-

-

25-20

*Hedera hilex*

(Araliales: Araliaceae)

(Laurales: Lauraceae) *Laurus nobilis*

(Nadel and Biron, 1964; )

48 Murali and Suresh, 2007; Ponsonby and (Copland. 2007

( )  
20-15

( 24 )

(1×5) )

.(2006

(4-3-2-1)

1  
(5 ) 2

1  
(6 ) 2

( )

3

8 7 4

P1  
F1

P2

F2

( 24 )

:

24 )

( + )

P2

(

(2.5×13.5)

(4×4)

3-2

(1×8.5)

)

34

.(

)

(

%5 %1

3.05

%1

3.32

)  
21

5 (1x5)

(

3.84

%1

4.95

%1

:  
× =

15.11

%1

(RCBD)  
SPSS-17  
T-test

%5

%1

.%5 %1

8.74

( - )

31.26

(1)

%1

%27.09

%5 %1

%1

7.32

*C. bipustulatus*

(1)

%1

T	(df)	Mean ± SE	Mean ± SE	
0.76	36	7.47 ± 0.177 a	7.32 ± 0.110 a	( )
0.2	36	3.05 ± 0.195 a	3.11 ± 0.169 a	( ) L1
3.77	36	4.05 ± 0.120 b	3.32 ± 0.154 a	( ) L2
4.88	36	4.63 ± 0.137 b	3.84 ± 0.086 a	( ) L3
3.17	36	5.58 ± 0.139 b	4.95 ± 0.143 a	( ) L4
5.47	36	17.32 ± 0.325 b	15.11 ± 0.241 a	( )
1.14	36	9.11 ± 0.215 a	8.74 ± 0.240 a	( )
4.24	36	33.89 ± 0.507 b	31.26 ± 0.357 a	( )
3.44	8	27.09 ± 5.31 a	56.54 ± 6.724 b	(%)

*Pseudaulacaspis pentagona* (Targioni-Tozzetti)

( )  
 ( - 8.8 - 6.6 - 4.4 - 3.3 - 3.5 - 7.6)  
 (2003) Specty (33.6)  
 29

. 26-25 C. (1951) Bodenheimer  
*bipustulatus*

( - 4.4 - 4.2 - 5.9) *C. bipustulatus* ( )  
 Stathas and (7.9) Uygun and Elekçioğlu  
 (2002) Eliopoulos *C. bipustulatus* (1998)

25

8/16 60 ± 5% 25 ± 1  
 ( / )

(2004) El-Serafi .  
*C. bipustulatus* *Aonidiella aurantii* (Maskell)

17.33

*Coccus hesperidum*

% 70±2

27±1

17.32

( - - )

%56.54

Uygun and

(1998) Elekçioğlu

%26.2

. %27.09

.(Specty et al., 2003)

(2)

1.72

(1 )

%1 7.58

%1 562.4

82.02

%1 540.97

% 52.38

156.6



A                      B

(1)

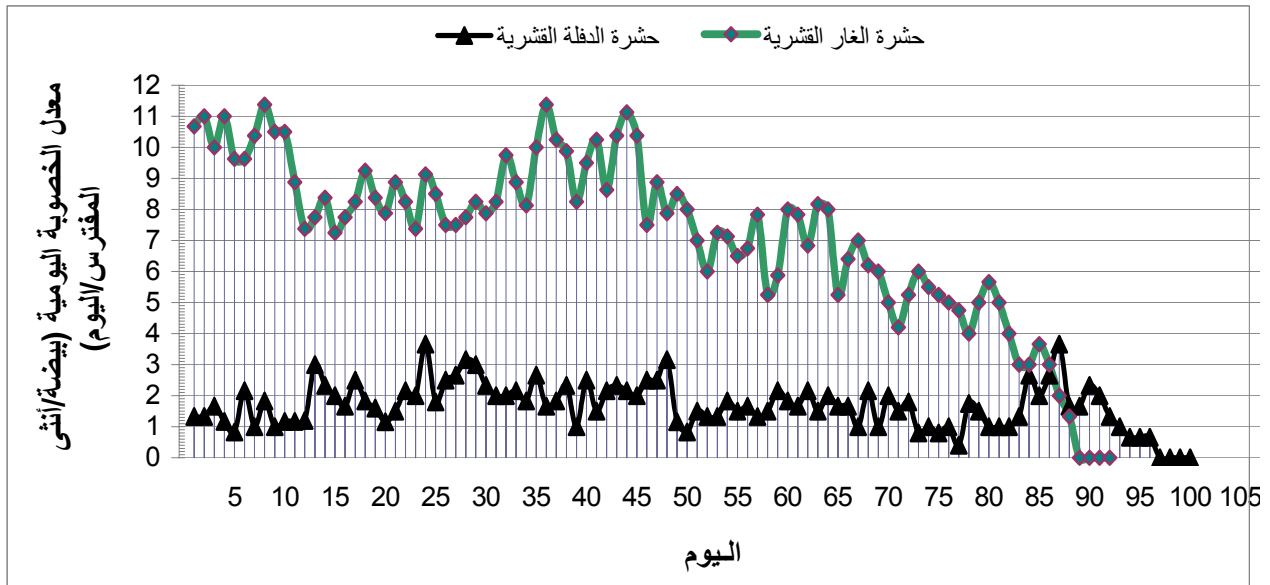
**A**  
**B**

*C. bipustulatus* (2)

%1

T

	(df)	Mean ± SE	Mean ± SE	
0.95	8	8.8 ± 0.374 a	9.4 ± 0.51 a	( )
1.29	8	71 ± 5.03 a	82.2 ± 7.067 a	( )
0.95	8	3.6 ± 0.51 a	4.2 ± 0.374 a	( )
1.45	8	84 ± 4.637 a	95.8 ± 6.674 a	
16.45	8	7.85 ± 0.326 a	1.72 ± 0.181 b	
6.4	8	562.4 ± 60.74 a	156.6 ± 18.12 b	
9.53	40	96.19 ± 2.234 a	52.38 ± 4.018 b	(%)
7.75	8	540.97 ± 65.8 a	82.02 ± 9.49 b	



*C. bipustulatus* (2)

		%1		( )	
					9.4
		.(Specty et al., 2003)			
				(1998) Uygun and Elekçioğlu	
1.72				9.6	
	/ /	(156.6)	/ /		
El-			%52.38		
C.		(2004)	Serafi	(5.3) <i>Ryzobius lophanthae</i>	
	<i>P. psidii</i>	<i>C. hesperidum</i>	<i>bipustulatus</i>	Stathas ) 25	
125.74	178.54			(1995) Kasap and Ya,sar	.(et al., 2002
			/ /	<i>C. bipustulatus</i>	
					87.14
Uygun				<i>Quadrispidiotus perniciosus</i>	(Homoptera: Diaspididae)
		(1998) and Elekçioğlu			
	528.6		4.2	82.2	
			%91.4	84 95.8	
	)				
			(	(2001) Stathas and Eliopoulos	
				<i>C.</i>	
				65.1	<i>bipustulatus</i>
	(1994) Hattingh and Samways			25	
	3.8			El-Serafi	
	(1983) Peleg			60.01–59.21	(2004)
	<i>C. bipustulatus</i>			<i>Pulvinaria psidii</i>	<i>Coccus hesperidum</i>
%71.25		/ /	4.4	[ <i>Chloropulvinaria psidii</i> ]	
				.%70±2	27±1
C.				(1998) Uygun and Elekçioğlu	
			<i>bipustulatus</i>	(95.9 – 132.6 – 146.5)	<i>C. bipustulatus</i>
					<i>Pseudaulacaspis pentagona</i>
					. 25 ± 1



(% 96.19 – 540.97 – 562.4 – 7.85)

)  
- - -  
(

L. Coccinella .2006 .  
(Coleoptera: Coccinellidae) septempunctata

(114-93) : (2)22 .

.2006 .

(Colevee) (Homoptera: Diaspididae)

( ) *Parlatoria oleae*

.28-8 : 22 .

.2004 .

*Clitostethus* (Coleoptera: Coccinellidae)  
*arcuatus* (Rossi)

.117-113 :22 .

.1997 .

*Planococcus citri* (Rosso)

.48 .

Basheer, M. Abd-Alnabi. 1990. Researches over the entomophagous at the *quadraspidiotus peruciosus* (comst), (Homoptera: Diaspididae) in the agrobiocenosis of the plum tree and their role for limiting the populations in the district of plodiv. Plodiv – Bulgaria; A thesis submitted in partial fulfillment of the Requirements for the Degree of Doctorate of Agricultural Sciences : Pp. 166.

Bodenheimer, F.S. 1951. Citrus entomology in the Middle East with special references to Egypt, Iran, Irak, Palestine, Syria, Turkey. Dr. W. Junk Publ., The Hague. Pp 663.

El-Serafi, H.A.; A.A. Ghanim; A.H. El-Heneidy and M.K. El-Sherbenie. 2004. Biological characteristics of *Chilocorus bipustulatus* L. and *Chrysoperla carnea* (Steph.) reared on soft scale insects under laboratory

conditions. Egypt. J. Biol. P. Cont. 14(1): (77-86).

Hattingh, V. and M.J. Samways. 1991. Determination of the most effective method for field establishment of biocontrol agents of the genus *Chilocorus* (Coleoptera: Coccinellidae). Bulletin of Entomological Research. 81(2): 169-174.

Hattingh, V. and M.J. Samways. 1994. Evaluation of artificial diets and two species of natural prey as laboratory food for *Chilocorus* spp. Ent. Exp. Appl., 69: 13-20.

Kasap, I. and B. Yasar. 1995. Studies on the life table and resisting period to hungry of *Chilocorus bipustulatus* (L.) (Col., Coccinellidae) feeding on the eggs of *Chionaspis salicis* (L.) (Hom., Diaspididae) in laboratory conditions. Journal of the Faculty of Agriculture, University of Yüzüncü Yıl. 5(1): 1-13.

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- Lattin, J.D. 1998. A review of the insects and mites found on *Taxus* spp with emphasis on western North America. Gen. Tech. Rep. PNW-GTR-433. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 12 p.
- Murali, B.R.K. and K. Suresh. 2007. Influence of semi-synthetic diets and non-living substrata on fecundity of Black beetle, *Chilocorus nigria* (Fabricius) (Coleoptera: Vovvinellidae). Journal of Entomological Research. 31(3): 243-246.
- Nadel, D.J. and S. Biron. 1964. Laboratory studies and controlled mass rearing of *Chilocorus bipustulatus* L., a citrus scale predator. Rivista Parassitol. 25: 195-206.
- Peleg, B.P. 1983. Effect of three insect growth regulators on larval development, fecundity and egg viability of the coccinellid *Chilocorus bipustulatus* (Coleoptera: Coccinellidae). Entomophaga. 28(2): 117-121.
- Peronti, A.L.B.G.; D.R. Miller and C.R. Sousa-Silva. 2001. Scale insects (Hemiptera: Coccoidea) of ornamental plants from Siio Carlos, Siio Paulo, Brazil. Insecta Mundi. 15(4): 247-255.
- Ponsonby, D.J. and M.J.W. Copland. 2000. Maximum feeding potential of larvae and adults of the scale insect predator *Chilocorus nigritus* with a new method of estimating food intake. BioControl. 45: 295-310.
- Ponsonby, D.J. and M.J.W. Copland. 2007. Aspects of prey relations in the coccidophagous ladybird *Chilocorus nigritus* relevant to its use as a biological control agent of scale insects in temperate glasshouses. BioControl. 52: 629-640.
- Samways, M.J. 1984. Biology and economic value of the scale insect predator *Chilocorus nigritus* (F.) (Coccinellidae). Biocontrol News and Information. 5: 91-105.
- Specty, O.; G. Febvay; S. Grenier; B. Delobel; Ch. Piotte; J.F. Pageaux; A. Ferran and J. Guillaud. 2003. Nutritional plasticity of the predatory ladybeetle *Harmonia axyridis* (Coleoptera: Coccinellidae): Comparison between natural and substitution prey. Archives of Insect Biochemistry and Physiology 52: 81-91.
- Stathas, G.J. 2000. The effect of temperature on the development of the predator *Rhyzobius lophanthae* and its phenology in Greece. BioControl. 45: 439-451
- Stathas, G.J.; P.A. Eliopoulos; D.C. Kontodimas and Th. Siamos. 2002. Adult morphology and life cycle under constant temperatures of the predator *Rhyzobius lophanthae*. J. Pest Science 75: 105-109.
- Stathas, G.J. and P.A. Eliopoulos. 2001. Prey consumption of the predator *Chilocorus bipustulatus* L. on *Aspidiotus nerii* Bouche. Annales de l'Institut phytopathologique Benaki. 19(2): 125-133.
- Uygun, N. and N.Z. Elekçioğlu. 1998. Effect of three Diaspididae prey species on development and fecundity of the ladybeetle *Chilocorus bipustulatus* in the laboratory. BioControl. 3(2): 153-162.
- Yaghmaee, F. 2003. Some coccinellid scale and aphid predators (Coleoptera: Chilicorinae) prevalent in North East Khorasan of Iraq. Arab J. Prot. 21: 60-62.

**Biology of The Predator *Chilocorus bipustulatus* (L.) (Coleoptera: Coccinellidae) By Feeding On Two Scale Prey Species under Laboratory Conditions**

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**ABSTRACT**

The purpose of this study was to determine the better suitable prey for the development and reproduction of the predatory coccinellid, *Chilocorus bipustulatus* (L.) (Coleoptera: Coccinellidae) on two diaspidid species; *Aspidiotus nerii* Bouche and *Aonidia lauri* Bouche (Homoptera: Diaspididae). Life tables were constructed at controlled conditions. The developmental time, longevity, fecundity, hatchability and fertility were determined. Individuals fed on *A. nerii* displayed significantly shorter larval and generation developmental time (15.11 and 32.26 days, respectively), but higher immature mortality rate (56.54%). The duration of egg and pupal stages and longevity of females showed no significant differences between the two tested preys. On the other hand, females fed on *A. lauri* displayed significantly higher daily fecundity (7.85 eggs/female), total fecundity (562.4 eggs/female), real fertility (540.97 fertile eggs/female) and hatchability (96.19%) compared with those fed on *A. nerii*. The results showed that under laboratory conditions, *C. bipustulatus* developed better on *A. nerii*, whereas the reproduction was better on *A. lauri*.

**Keywords:** *Aspidiotus nerii*, *Aonidia lauri*, *Chilocorus bipustulatus*, development, reproduction.

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