

Trichoderma harzianum
Parlatoria blanchardi Targ.

Ommatissus lybicus Berg
Chrysopa vulgaris Schn ,

(1

(1

()

()

()

48

14

:

%40

%70

450

2012

(Mashal and Abeidat,

)

50

2007)

(*Ommatissus lybicus*

(2012

Bergevin (Lybicus): Tropicuchidae Homoptera)

(2006

)

Hussain, 1963)

Parlatoria Targ (Homoptera: Diaspididae).

(El-

(1999

(2002

)

blanchardi

()

Haidari,1982

(1

(Blow, 2006)

.munammsm@yahoo.com . - (639) .

.2013/2/25

2012/9/6

(1997

)

500

400

(2000

)

Bitaw and Ben ,1990)

(Saad
2007 2005

2006 70

(2006)

(2011)

1990)
2006 1999

(Abdul Haq and Akmal, 1972
(Rincón and Antonio, 2004) (2007)

(2008)

(2012) (*Chrysopa vulgaris* Schn ,Chrysopidae:
(2004) Neuroptera)

(Hassan *et al.*, 1994 2004

(Hassan and Bogenschütz, 1994) (2007 1999

(Anon,1982)

(yellow dimiroll trap) *Beauveria bassiana* (Balsamo)
(2002)
() (Kubicek and Harman,1998)

()

(1)
 (2012/2/1 2011/11/29) (-)
 () 12 ()
 (Gharib, 1966)) ()
) 468 36 (2012
 .(1980 (Soderlund *et al.*, 2002)

: (1)

) (
/ 710 ×19	1000/ 2000 / 7000) 1000 (<i>Trichoderma</i> (-) <i>harzianum</i>	
	1000/ 2000	wp -	
	1000 7000		
%35 %40	1000/ 2000		
<u>C₂₂H₁₉Cl₂NO₃</u>	1000/ 500	EC-	

(10) 1000 (2012)
 (100 × 30)

(Hussain,1963)

14 48
%70 25

(Abdullah *et al.*, 1998)) 20× 20
(
48

(Abdullahand, 1998)

48

Abdul : 2012) 14 (Arnaldo, 2005)

(Haq and Akmal, 1972

(1956) Hendrson and Telton (Hassan and Bogenschütz.,1994)

5

15

. (Henderson and Tilton ,1955)

$$\text{Corrected \%} = \left(1 - \frac{\text{n in Co before treatment} * \text{n in T after treatment}}{\text{n in Co after treatment} * \text{n in T before treatment}} \right) * 100$$

Where : n = Insect population , T = treated , Co = control

M- LSD0.05 05.

(Arnaldo and Torres, 2005)

Stat

Dowson, 2004) %25

) (1936:
(1983 (3) (2)

%40 20

48 (1980)

%35

%75

%40

(3) (2)

1920

(Ascher *et al.*,1982)

(2009)

(2012)

Knock and down action)

(WHO, 2009 2010)

%20 10

Ascher *et al.*,)

48

(1982

Rincón and Antonio,)

(2004

(Wolfgang, 2006)

(Rincón *et al.*,2004)

14

(Environmental Health Criteria,1989)

(František and Jitka,

TD
2006)

48

48

48

%10 2

.2012/2/1

2012/2/1

%20

(2004)

(2010)

%98

(2010)

(2009) Mickler, 2012) *Beauveria* *Metarhizium bassiana* (Balsamo) *Paecilomyces anisopliae* (1992)

) (1999) (Anon,1982) (Mickler, 2012) (2009)

48

(1989)

Kubicek)

(and Harman, 1998

:(3)

2012/2/1						2011/11/29					
48						48					
%5.98	%96.21	%20.44	%10.79	%93.78	%10.35	%0	%97.66	%8.63	%5.77	%85.65	%5.15
c	a	a	d	a	c	c	a	b	c	b	c
%10.47	%97.66	%15.65	%15.47	%94.65	%10.47	%0	%95.58	%8.74	%5.45	%91.69	%4.98
b	a	b	c	a	c	c	a	b	c	ab	c
%5.86	%10.66	%10.46	%0	%10.32	%5.84	%0	%5.78	%4.63	%4.78	%15.97	%2.54
c	c	b	e	c	d	c	d	c	c	c	c
%10.66	%90.45	%20.35	%20.55	%95.74	%20.89	%5.87	%80.97	%10.41	%10.88	%96.47	%10.69
b	b	a	b	a	b	b	b	b	b	a	b
15.14%	%91.74	%10.55	%30.38	%98.11	%40.61	%10.36	%60.12	%20.32	%20.22	%97.76	%20.21
a	b	b	a	a	a	a	c	a	a	a	a

p=.05

*

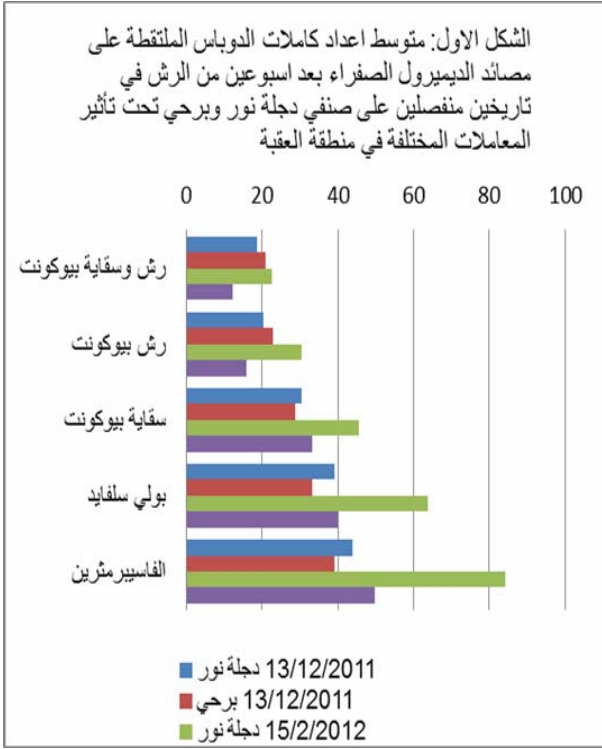
Henderson and Telton

**

(3) (2)

()

48



(Howard *et al.*, 2001)

(2007)

%30

Soderlund, *et* ()

(2000 *al.*, 2002)

(2008)

Soderlund,

(*et al.*, 2002)

48

(Kubicek and Harman, 1998)

(Arnaldo, 2005)

()

(Ascher *et al.*,1982).

14

(2009)
 48 %50.31 % 43.66
 %24 % 15.66
 %59.33
 %74.31

48

(Hanson *et al.* 2004)

(Shour and Crowder, 1980)

()

-
 48 7.85 5.67
 % 15.19 3.07
 % 23.04 %8.74

(Hussain, 2009)

(Ralph and 2009)

-25 %75

Berry,1998

%40
 (Soderlund, *et al.*, 2002)

(Ralph and Berry,1998 2007)
 - (4)

48 %10.76 %4.65
 %14.63 %10.01
 %25.39 %14.66

(WHO Specification and Evaluations
 for Public Health Pesticides, 2009)

:(4)

2012/2/1				2011/11/29				
2012/2/1		2011/11/29		2012/2/1		2011/11/29		
	48		48		48		48	
%14.69 b	%7.79 b	%14.56 a	%8.31 b	%15.91 b	%5.11 b	%12.22 B	%10.76 b	
%13.46 b	%4.65 bc	%11.46 b	%6.17 b	%14.63 b	%8.78 b	%10.01 B	%10.64 b	
%0.0 d	%0.0 d	%1.61 d	%0.0 c	%0.0 d	%0.14 c	%1.01 D	%0.0 c	
%3.61 c	%5.67 bc	%5.07 c	%7.85 b	%3.07 c	%5.74 b	%5.19 C	%7.35 b	
%20.45 a	%45.49 a	%15.66 a	%50.31 a	%24.00 a	%47.37 a	%20.20 A	%43.66 a	

LSD p=.05

Henderson and Tleton

*
**

(Extension Toxicology, 2012)

48

(1984)

)

(1996

, (Soderlund *et al.*, 2000)

14

(1990)

(5)

.(Mickler, 2012)

14

(5) :

2012/2/1		2011/11/29		2012/2/1		2011/11/29	
	48		48		48		48
%100.0 a	%97.90 a	%99.08 a	%90.12 a	%99.28 a	%95.55 a	%100.0 a	%90.36 a
100.0 a	%100.00 a	%98.64 a	%94.55 a	%100.00 a	%94.10 a	%99.52 a	%92.69 a
%8.22 c	%1.25 c	%5.14 c	%2.57 c	%9.11 c	%1.51 c	%8.22 d	%1.14 c
%38.28 b	%90.39 b	%28.25 b	%89.66 b	%45.86 b	%88.88 b	%31.55 c	%80.17 b
%40.10 b	%97.76 a	%37.44 b	%96.81 a	%54.54 b	%98.12 a	%48.61 b	%95.55 a

p=.05

*

Henderson and Telton

**LSD

(Mickler, 2012)

(1991)

(Elmer, 966)

(2012)

.35
.2006 .
Ommatissus lybicus de Berg

.1999 .
Basudin 60EW
.4-1:(1)
.2000 .

.78
.2002.
.518
-
. (1)

2004
. 1984.
.340
.2004 .
.14 -1
.2012

.13-12: (6)34
2002.
Beauveria
bassiana (Balsamo) Vuillemin
Jebusea
hammerschmidti Reich
. 2-1 : 2
2007 .

.451-446: (3) 11
.1980 .

1983
.488
1999
.350
.2009 .
Chrysoperla mutata MacL
Ommatissus lybicus
.213-27:210
2011
DeBerg

.62
1989 .
688
.2004.

.488
1992 .
.440
.1997 .
. 4-18
. 2008 .

. 6-1
. 1996
. 320
Tuta absoluta

Bergevin Berg.) : Tropiduchidae lybicus 1990 .
 Chrysopa Homoptera)
 vulgarisSchn, chrysopidae : Neuroptera. .150
 .(4)8 2009

1991

.38 " "

2012

(Ommatissus

- Abdul Haq, K.and Akmal, M.1972.,Insect pest of date palm and their control, The Punjab Fruit Journal,33:208-212 .
- Abdullah, F.,Al. Zidjali, T.and Al Khtri,S.1998. Biology of *Ommatissus lybicus* under field and laboratory condition spring1995. International Conference on Integrated Pest Management, Conference Proceedings, Sultan Qaboos University, Muscat, 23–25.
- Anon,I.1982. Pests and diseases of the date palm in date production and protection. Food and Agriculture Organization of the United Nations, Rome, Italy, 187-227.
- Arnaldo, P.and Torres, L.2005.Spatial distribution and sampling of *Thaumetopoea pityocampa* (Lep.: Thaumetopoeidae) populations of *Pinus pinaster* Ait. In Monntesinho, N. Portugal. Forest Ecology and Management, 210: 1-7.
- Ascher,K., Eliyahu, M., Nemny, N.and,Ishaaya, I.1982 .The toxicity of some novel pesticides - synthetic pyrethroids and benzoylphenylurea chitin synthesis inhibitors - for eggs of *Spodoptera littoralis* (Boisd). **Z. Angew Entomol.**, 94: 504-509.
- Awasthi, M.,Anand,L. 1983.Dissipation and persistence of synthetic pyrethroids on fruits of okra. **Jo. Entomol. Res.**,7(1): 55-59.
- Bitaw, A. and Ben Saad, A. 1990. Survey of date palm trees insect pests in Libya, **Arab Journal of Plant Protection**, 8: 72-76.
- Blow, J. 2006. Agricultural aerial spraying in a combat zone: Control the dubas bug (*Ommatissus lybicus*) in date palms in Iraq, (Trin.),13:180–181.
- Dowson,V.1936. A serious pest of date palms,*Ommatissus binotatus* Fieb. (Homoptera: Tropiduchidae).**Trop. Agric.**
- El- Haidari, H. 1982. New records of Dubas bug (*Ommatissus binotatus lybicus* de Bergevin) on date palms in Sudan.**Date Palm Jo.**,1:308.
- Environmental Health Criteria 82 Cypermethrin .1989.United Nations Environment Program, the International Labor Organization, and the World Health Organization EHC/2.
- Extension Toxicology Network, 2012., Least toxic organic pesticides for the Home gardener ,OSU: Extension Master Gardener™ Program ,University of California at Davis. funding by the USDA/Extension Service/National Agricultural Pesticide Impact Assessment Program.
- Gharib, A.,1966, *Ommatissus binotatus* Fieb. var *lybicus* Berg. **Applied Entomology & Phytopathology**, 24: 37-47.
- Hanson. J., Dismukes ,R., Chambers, W .Greene ,C. and Kremen, A .2004 .Risk and risk management in organic agriculture: Views of organic farmers, **Cambridge Journals Online**,19:4.
- Harman, G. and Kubicek, C.,1998,*Trichoderma* and *Gliocladium* , Enzymes, Biological Control and Commercial Applications, Taylor & Francis, London. 2: 393.
- Hassan, S.,Bigler, F.and H. Bogenschütz.,1994 ,Pesticides and Beneficial Organisms.**Entomophaga**,39(1): 107-119.

- Henderson, C. and Tilton E. 1955. Tests with acaricides against the brow wheat mite. *Jo. Entomol*, 48: 157-161.
- Howard, F, Moore, D., Giblin- D. and Abad, R. 2001. Insects on palms. CABI Publishing, New York, 152-155.
- Hussain, A. 1963. Biology and control of the dubas bug, *Ommatissus binotatus lybicus* de Berg. (Homoptera: Tropicuchidae), infesting date palms in Iraq, *Bull. Ent. Res*, 53:737-745.
- Hussain, A. 1974. Date palms and dates with their pests in Iraq, Min. Higher Educ. Sci. Res., University of Baghdad, Baghdad, Iraq.
- Hussain, A. 2009. Biology and control of the Dubas bug, *Ommatissus binotatus lybicus* de Berg. (Homoptera, Tropicuchidae), infesting date palms in Iraq Division of Entomology, Abu Ghraib Experiment Station, Iraq.
- Kubicek, C. and Harman, G. 1998. *Trichoderma and Gliocladium*, Basic Biology, Taxonomy and Genetics, Taylor & Francis, London, 1:278.
- Mashal, M. and Abeidate, B., 2006, Survey on insect pests of date palm trees in Jordan, *Jordan journal of Agricultural Sciences*, Jordan, 2(1):94-104.
- Mashal, M. and Abeidate, B. 2007. Pest of date palm in Jordan, National Center for Agricultural Research and Extension, Ministry of Agriculture, Jordan. 112.
- Mickler, K., 2012, Soap oil and Bt products control most garden insects, College of Agricultural and Environmental Sciences (*County Agent - Floyd County*) Georgia Pest Management Handbook, online.
- Payandeh, A., Kamali, K. and Fathipour, Y. 2010. Population structure and seasonal activity of *Ommatissus lybicus* in Bam Region of Iran (Homoptera: Tropicuchidae). *Munis, Entomology & Zoology*, 5 (2): 726-733.
- Ralph, E., Berry. 1998. Insects and Mites of economic importance in the Northwest, Green lace wing Neuroptera: Chrysopidae *Chrysopa* spp., 2nd Ed. 22.
- Rincón, M., Antonio, C., 2004, Biocontrol mechanisms of *Trichoderma* strains- Uni. of Sevilla., Spain, *Int. Microbiol*; 7(4):249-260.
- Shour, M. and Crowder, L. 1980. Effects of pyrethroid insecticides on the common green lacewing. *Journal of Economic Entomology*, 73: 306-309.
- Soderlund, D., Clark, J., Sheets, L., Mullin, L., Piccirillo, V., Sargent, D., et al. 2002. Mechanisms of pyrethroid neurotoxicity: implications for cumulative risk assessment, *Toxicology* 171:3 – 59.
- Soderlund, D., Smith, T., and Lee, S. H. 2000. Differential sensitivity of sodium channel isoforms and sequence variants to pyrethroid insecticides, *Neurotoxicology*, 21:127-137.
- United States Army, Armed Force Pest Management Board, WRMAC, Forest Glen Annex, BLDG 172, 6900 Georgia Avenue NW, Washington, DC.
- WHO Specification and Evaluations for Public Health Pesticides, Alpha-cypermethrin. 2009. <http://www.who.int/whopes/quality/en/Alphacypermethrineval>, WHO, Sep, 2009, pdf, online.
- Wolfgang, N., 2006. "*Ullmann's Encyclopedia of Industrial Chemistry*". Wiley-VCH Verlag. doi:pub2. ISBN 3-527-30673-0. on line book.

Field Evaluation of *Trichoderma harzianum* on Dubas Date Palm *Ommatissus lybicus* Berg. Targ. Palm Scale *Parlatoria blanchardi* and Egg Lace Wings *Chrysopa vulgaris* Schn Comparing with Other Chemicals on Date Palm

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ABSTRACT

Trichoderma harzianum (Biocont-t; Biocide) were evaluated against the Dubas date palm, palm scale and egg lace wings (foliar and irrigated applications) compared with the foliar fertilizer Polysulfide, Alpha-cypermethrin and the control (water application). Yellow dimiroll sticky traps were wrapped around trunks of all treated trees directly after treatments. Results indicated that there is a significant effect of all treatments on eggs and adults of Dubas with preferably to Alpha-cypermethrin. On the contrary, all treatments showed a significant effect on Dubas nymphs' number compared with control and irrigated Biocont-t with preferable to Alpha-cypermethrin and Polysulfide after 48 hours and to Biocont-t after two weeks, while the lowest number of Dubas adults which captured by yellow dimiroll sticky traps was by the three Biocont-t treatments. On the other hand,, Alpha-cypermethrin had a significant effect on lace wings eggs. Also, it was found that palm scale insects were significantly high affected by all treatments with preferable to Biocont-t (spraying) after two weeks.

Keywords: Biocont-t ,Alpha-cypermethrin, Polysulfide, Dubas, Palm Scale, Lace Wings, Dimiroll Sticky Trap.

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