

**BIOLOGICAL CONTROL OF THE TWO SPOTTED SPIDER MITE  
*TETRANYCHUS URTICAE* KOCH USING THE PHYTOSEIID MITE,  
*NEOSEIULUS CUCUMERIS* (OUDEMAN) ON CUCUMBER (ACARI:  
TETRANYCHIDAE: PHYTOSEIIDAE)**

**IBRAHIM, G. A., N. M. ABD EL-WAHED AND A. M. HALAWA**

*Plant Protection Research Institute, ARC, Egypt*

(Manuscript received 20 August 2005)

**Abstract**

The predatory mite, *Neoseiulus cucumeris* (Oud.) was released to control the two-spotted spider mite, *Tetranychus urticae* Koch on cucumber field at Tock district, Qualubia Governorate. *N. cucumeris* was released at a rate 5 individuals/bit in the treated area.

The percent reduction of the mite pest reached 98.70% after two months of release with level of infestation of the mite pest averaged 0.72 mite/leaf compared with 50.92 individuals of mite pest/leaf in the control area.

These results indicated the possibility of this predator to be established under the Egyptian conditions and can be use as a biocontrol agent to control this mite pest on cucumber plant conditions. We would like to add that this predator mite, recently import from Koppert Center of producing natural enemies from Holland. We aim to produce product free of pesticides and adamizing this predator species in Egypt.

**INTRODUCTION**

Cucumber is considered one of the important vegetable crops in Egypt. Its cultivated area reached 30000 Feddans in summer and 10000 Feddans in winter. Cucumber cultivated in all Egypt Governorates for local market and exportation.

The two-spotted spider mite, *Tetranychus urticae* Koch, is one of important pest on cucumber, it causes sever damages to growth plant, resulting reduction in the quality and quantity of the production.

The predatory mite, *Neoseiulus cucumeris* (Oud.) successfully used in controlling lot of pests, it feeds on *T. urticae*, *Panonychus citri* and *Thrips tabaci* under laboratory, semi field and field conditions. Many trials have been done on this species such as Bordas *et al.*, (1985), Lindhagn and Nedstan (1988), Ramakers *et al.*, (1989), Marisa and Sauro (1990), Zhang *et al.*, (2000 & 2001), Blaeser *et al.*, (2002), Lin *et al.*, (2003) and Zhang *et al.*, (2003a and b).

This predator is using for the first time in Egypt on cucumber as a biocontrol agent against *T. urticae*. This predatory mite species imported from Holland and we aim to acimiz it under Egyptian conditions.

## MATERIALS AND METHODS

### Source of predator:

The culture of *N. cucumeris* was reared in the laboratory on bean plant leaves *Phaseolus vulgaris* L. as stuck culture on *Thrips tabaci* and *Tetranychus urticae* (Ravensberg and Altena 1987, Bieri *et al.* 1989 and Astagnoli 1989).

The predatory mite was reared on *T. urticae* on bean plant in small greenhouse (6 m wide x 9 m long). The small greenhouse was cultivated with host plant and after two weeks of plantation when the plant grows and became suitable to making infestation with prey (*T. urticae*). We make the infestation with prey and when the level of the prey reached about 20-30 individuals of prey on leaves, the predator transmit from the stuck culture of the predator which prepared before. We follow up the relation between the predator and the prey inside the greenhouse, when it need for prey we were supported it with more prey. After about four weeks when the rate of predator increased to reach 20 individuals/leaflet. The predatory mite was packed in small paper bags with few prey on bean leaves and transferred inside ice box to the experimental cucumber field.

### Design of the experiment:

The field experiment was about half Feddan planted with cucumber at Tock district, Qualubia Governorate and was left without pesticides treatments. This area was divided into two treatments including the control.

The release was carried out on 15<sup>th</sup> Feb. 2005. Releasing *N. cucumeris* was carried out by dusting the leaflet of bean with predator at rate of 5 predators/bit. Samples of 25 leaves were randomly taken from each treatment one just before releasing as pre-count and after release, weekly samples were taken. Leaves were examined in the field using handling lens (10-15 X) and motile stages of *T. urticae* and *N. cucumeris* were recorded.

The percent reduction of mite pest was calculated according to the equation of Henderson and Tilton (1955).

## RESULTS AND DISCUSSION

The release was started on 15<sup>th</sup> Feb. 2005. Results in Table (1) showed that the pre-count of population density of *T. urticae* was 347-318 moving stages/25 leaves in released and unreleased area with mean 13.88 and 12.72 motile stages/leaf, respectively.

The percent reduction in population density of *T. urticae* was 56% after one week of release the predatory mite, *N. cucumeris*, in the same time population density of *T. urticae* in control increased from 318 to 402 moving stages/25 leaves. After two

weeks from predatory release, the population of *T. urticae* decreased to 108 moving stages/25 leaves and the percent reduction was 80.12, on the opposite, pest population increased in the control reaching 498 moving stages/25 leaves. Then the percent reduction of the mite pest increased gradually reaching 98.70% after two months of release at that time the pest population reduced reaching to 0.72 mite/leaf compared with 50.92 mites/leaf in the control area.

The population density of the predator increased to 9.12 mites/leaf after two months of release according the natural development.

### CONCLUSION

The predatory mite, *Neoseiulus cucumeris* (Oud.) introduced good results in controlling the two-spotted spider mite, *Tetranychus urticae* Koch on cucumber plants in open field, thus this predator can be use as a biocontrol agent in controlling this dangerous mite pest on other plants.

Table 1. Population density and reduction percentage of *Tetranychus urticae* Koch after release of the predatory mite, *Neoseiulus cucumeris* (Oud.) on cucumber at Qualubia Governorate in open field.

Sampling date	Number and reduction % of motile stages of <i>T. urticae</i> /25 leaves			Untreated (chick)		<i>N. cucumeris</i>	
	Number		Reduction %	Number		Number	
	Total	$\bar{X}$ /leaf		Total	$\bar{X}$ /leaf	Total	$\bar{X}$ /leaf
15 Apr., 2005 Pre-count	347	13.88	-	318	12.72	-	-
22 Apr.	193	7.72	56.00	402	16.08	114	4.56
29 Apr.	108	4.32	80.12	498	19.92	123	4.92
6 May	92	3.68	86.44	622	24.88	141	5.64
13 May	74	2.96	90.91	746	29.84	111	4.44
20 May	81	3.24	91.55	879	35.16	165	6.60
27 May	53	2.12	95.22	1016	40.64	189	7.56
3 June	41	1.64	96.69	1135	45.40	215	8.60
10 June	29	1.16	97.78	1196	47.84	219	8.76
17 June	18	0.72	98.70	1273	50.92	228	9.12

### REFERENCES

1. Bieri, M., F. Zwygart, G. Tognina and G. Stadler. 1989. The importance of soil water content for the biological control of *Thrips tabaci* Lind. on cucumber in the greenhouse. *Mitteilungen-der-Schweizerischen-Gesellschaft*, 62 : 1-2.
2. Blaeser, P., I. Lieonart, M. Sitjar and C. Sengonca. 2002. Laboratory studies on the development, longevity and reproduction of four *Amblyseius* predator mite fed with *Tetranychus urticae* and *Frankliniella occidentalis* (Pergande). *Nachrichtenblatt – des – Deutschen – Pflanzenschutzdienstes*, 54 (12): 307 - 311.
3. Bordas, E., R. Gabbara, O. Alomar and C. Castane. 1985. Integrated control in market-gardens in Catalonia: Present and future. *Bulletin-Srop*, 8 (1): 1 - 9.
4. Castagnoli, M. 1989. Biology and prospects for mass rearing of *Amblyseius cucumeris* (Oud.) (Acarina : Phytoseiidae) using *Dermatophagoides farinae* Hughes (Acarina : Pyroglyphidae) as prey. *Redia*, 72 (2) : 389 - 402.
5. Hendrson, C. F. and E. W. Tilton. 1955. Test with acaricides against the brown wheat mite. *J. Econ Entomol.*; 48 : 157 - 161.
6. Lindhagen, M. and B. Nedstam. 1988. Experiments on the biological control of *Frankliniella occidentalis* (Thysanoptera : Thripidae) with the aid of the predatory mite *Amblyseius cucumeris* i(Acari : Phytoseiidae). *Vaxtskyddsnotiser*, 52 : 1-2, 13 - 16.
7. Lin, B., J. Huang, B. S. Lin and J. S. Hung. 2003. Experiment of using mites to control the mites. *South China Fruits*, 32: 1, 11.
8. Marisa, C. and S. Sauro. 1990. Biological observations and life table parameters of *Amblyseius cucumeris* (Oud.) (Acarina : Phytoseiidae) reared on different diets. *Redia*, 73 (2): 259 - 583.
9. Ramakers, P. M. J., M. Dissevelt and K. Peeters. 1989. Large scale introductions of phytoseiid predators to control thrips on cucumber. *Mededelingen Van de Faculteit Landbouwwetenschappen, Rijksuniversiteit Gent.*, 54 : 3a, 923 - 929.
10. Ravensberg, W. J. and K. Altena. 1987. Recent developments in the control of thrips in sweet pepper and cucumber. *Bulletin-Srop*, 10 (2): 160 - 164.
11. Zhang, Y., Z. Zhang, J. Lin and J. Ji. 2000. Potential of *Amblyseius cucumeris* (Acari : Tetranychidae) in Fujian, China. *Biology and control of bamboo mites in Fujian. Special Publications Systematic and Applied Acarology*, No. 4, 109 - 124.
12. Zhang, Y. X., J. Z. Lin, J. Ji, A. Hou and Q. Zhang. 2003a. Study on using *Amblyseius cucumeris* for control of citrus mite for Navel orange. *South China Fruits*, 32: 1, 12 - 13.
13. Zhang, Y. X., J. Z. Lin, J. Ji, A. Hou and Q. Zhang. 2003b. Studies on the life history of *Amblyseius cucumeris* (Acari : Phytoseiidae) feeding on *Aponychus corpuzae*(Acari : Tetranychidae). *Systematic and Applied Acarology*, 8: 67 - 74.

## المكافحة البيولوجية للعنكبوت الأحمر العادي باستخدام المفترس الأكاروسي نيوسبولس كيوكوميرس علي الخيار

جمال الدين عبد المجيد إبراهيم ، نزيه محمد علي عبد الواحد ، علاء محمد عبد الفتحي حلاوة

معهد بحوث وقاية النباتات - مركز البحوث الزراعية - النقي - الجيزة

تم إطلاق المفترس الأكاروسي نيوسبولس كيوكوميرس لمكافحة العنكبوت الأحمر العادي علي نباتات الخيار في منطقة طوخ بمحافظة القليوبية وتم إطلاق المفترس بمعدل ٥ أفراد للجورة من الخيار علي مستوى إصابة للعنكبوت الأحمر العادي بمعدل ١٣,٨٨ فرد لكل ورقة وقد دلت النتائج المتحصل عليها بأن نسبة الخفض للعنكبوت الأحمر العادي بلغت ٩٨,٧٠ بعد شهرين من الإطلاق وكان عدد أفراد العنكبوت علي الورقة حوالي ٠,٧٢ فرد لكل ورقة من نباتات الخيار في منطقة الإطلاق أما علي العكس في منطقة المقارنة فكان عدد الأفراد ٥٠,٩٢ فرد لكل ورقة ، في حين وصل تعداد المفترس الأكاروسي ٩,١٢ فرد علي الورقة بعد شهرين في منطقة الإطلاق وذلك تزايد طبيعي نتيجة لتكاثر المفترس.

علي ضوء هذه النتائج فإنه يمكن استخدام المفترس الأكاروسي نيوسبولس كيوكوميرس تحت ظروف البيئة المصرية في مكافحة العنكبوت الأحمر العادي علي نباتات الخيار حيث أن هذا المفترس يستخدم لأول مرة في مصر في مكافحة العنكبوت الأحمر العادي وتم أستجلاب هذا المفترس من هولندا لتعظيم دور المفترسات الأكاروسية في مكافحة الحيوية ضد الآفات الأكاروسية المختلفة وجاري أقامة هذا النوع تحت الظروف البيئية المصرية وكذلك يمكن استخدامه ضد العنكبوت الأحمر العادي علي محاصيل أخرى.