植物保護學會會刊 35: 239～243, 1993

Scientific Notes

Notes on Predatory Natural Enemies of *Thrips palmi* Karny (Thysanoptera: Thripidae) on eggplant

N. T. Chang[1], C. T. Hung[1], T. Hua[1] and C. C. Ho[2]

1. Departmant of Plant Protection, National Pingtung Polytechnic Institute, No. 1 Hsueh Fu Rd., Nei Pu Hsiang, Pingtung, Taiwan, R.O.C.
2. Taiwan Agricultural Research Institute, 189 Chungcheng Rd., Wufeng, Taichung, Taiwan, R.O.C.

(Accepted for publication: November 11, 1993)

Chang N. T.[1], Hung C. T.[1], Hua T.[1], Hua T.[1], and Ho C. C.[2] 1993. Notes on Predatory Natural Enemies of *Thrips palmi* Karny (Thyanoptera: Thripidae) on eggplant. Plant Prot Bull. 35:239-243.

Thrips palmi Karny (Thysanoptera: Thripidae) was first collected on tobacco from Sumatra in 1921(8). It has, then, occurred throughout the most lands in Pacific and Indian Ocean, e.g. Philippines(14), India(1), Thailand(15), New Caledonia(4), Japan(17), Hawaii(13) and Australia(6).

Interestingly, this species had not been known in Taiwan until their serious damage on cucurbits in 1979 (in the report of Wen and Lee(16) this thrips was identified as *Thrips flavus* Schrank, which was later revised by Chen, L. S.). There were 58 plants listed as the host of *T. palmi*, recently(10). In these few years, *T. palmi* has not only become an increasingly important pest of several Cucurbitaceae and Solanaceae crops by feeding leaves or fruits(2), it also has been implicated as a vector of Tomato Spotted wilt-like Virus on watermelon in Taiwan(18).

In July 1992-June 1993, as part of the research program in integrated control of *T. palmi* on eggplant, investigations were made on collection and host-prey (-parasite) relationships of natural enemies involved. The following note summarizes the observations of predatory natural enemies found in field around southern area of Taiwan. The natural enemy collected from field was rearing individually in the petri dish (15 cm diam.) which placed one or two leaves of eggplant with *T. palmi* infesting on.

***Orius sauteri* Poppius (Anthocoridae: Hemiptera)**

Some species of anthocorid genus *Orius* are the more specific thrips predators[11]. *Orius sauteri*, however, was only recorded before as an predator of *T. palmi* in Japan[6,7]. Recently, Nagai[12] found that this predacious bug is an effective biological control agent and can be used in the integrated pest management of *T. palmi* in eggplant fields.

In Southern Taiwan, *O. sauteri* (Fig. 1A) was most often encountered in field during eggplant planting season. It sucks the body fluid of a variety of prey including *T. palmi*, mites and other Hemipterans.

There are five instars with average of 8.7 days needed during nymph stage under 28 ℃, when fed on the 2nd instar larvae of *T. palmi*. The longevity of adult is about 21.1 days under the same conditions. Food consumption of *O. sauteri* varied with the size and stage of the prey. The primary tests showed that nympy and adult of this bug can feed on approximately 15 larvae of *T. palmi* per day.

***Campylomma livida* Reuter (Miridae: Hemiptera)**

Though not many mirids are known to prey on thrips, *C. livida* (Fig. 1B) was frequently observed attacking *T. palmi* larvae on eggplant.

The mean nymph and adult duration of *C. livida* rearing under 28 ℃ within laboratory were 10.8 and 6.5 days, respectively. The efficiency of consumption on *T. palmi* larvae increased from the 1st nymph instar (8.6/day) to adult (24.1/day).

***Geocoris ochropterus* Fabr. (Lygaeidae: Hemiptera)**

Some big-eyed bugs, e. g. *G. bullatus*, *G. punctipes* and *G. uliginosus*, were found feeding on many small insects including the thrips[3]. *G. ochropterus* (Fig. 1C) was mainly predate on *Caliothrips indicus*, *Ayyaria chaetophora* and *Scirtothrips dorsalis* in India [9]. However, this is the first note that this lygaeid bug prey on *T. palmi* in eggplant field.

Feeding in laboratory, *G. ochropterus* was found to consume not only larvae but also adults of *T. palmi*. This may enhance the potential to utilize this species as a biological control agent. Because the least occurring frequency in field, the determination of life cycle and predatory efficiency of this species were deficient.

Phytoseiid mites (Phytoseiidae: Parasitiformes)

Kajita[7] noted that three species of *Amblyseius*, i.e. *A. longispinosus*, *A. okinawanus* Ehara and *A. mckenziei* Schuster et Pritchard, feeding *T. palmi* on cucumbers and eggplants in Japan.

Our collection in field eggplants have found and identified two species of predatory mites, *Amblyseius longispinosus* Evans and *Paraphytoseius multidentatus* Swirski and Shechter (Fig. 1D), preying on *T. palmi*. The studies of biology and predatory capabilities of these phytoseiid mites are in proceeding.

***Arthrocnodax occidentalis* Eelt. (Cecidomyiidae: Diptera)**

A. occidentalis Eelt. mostly found

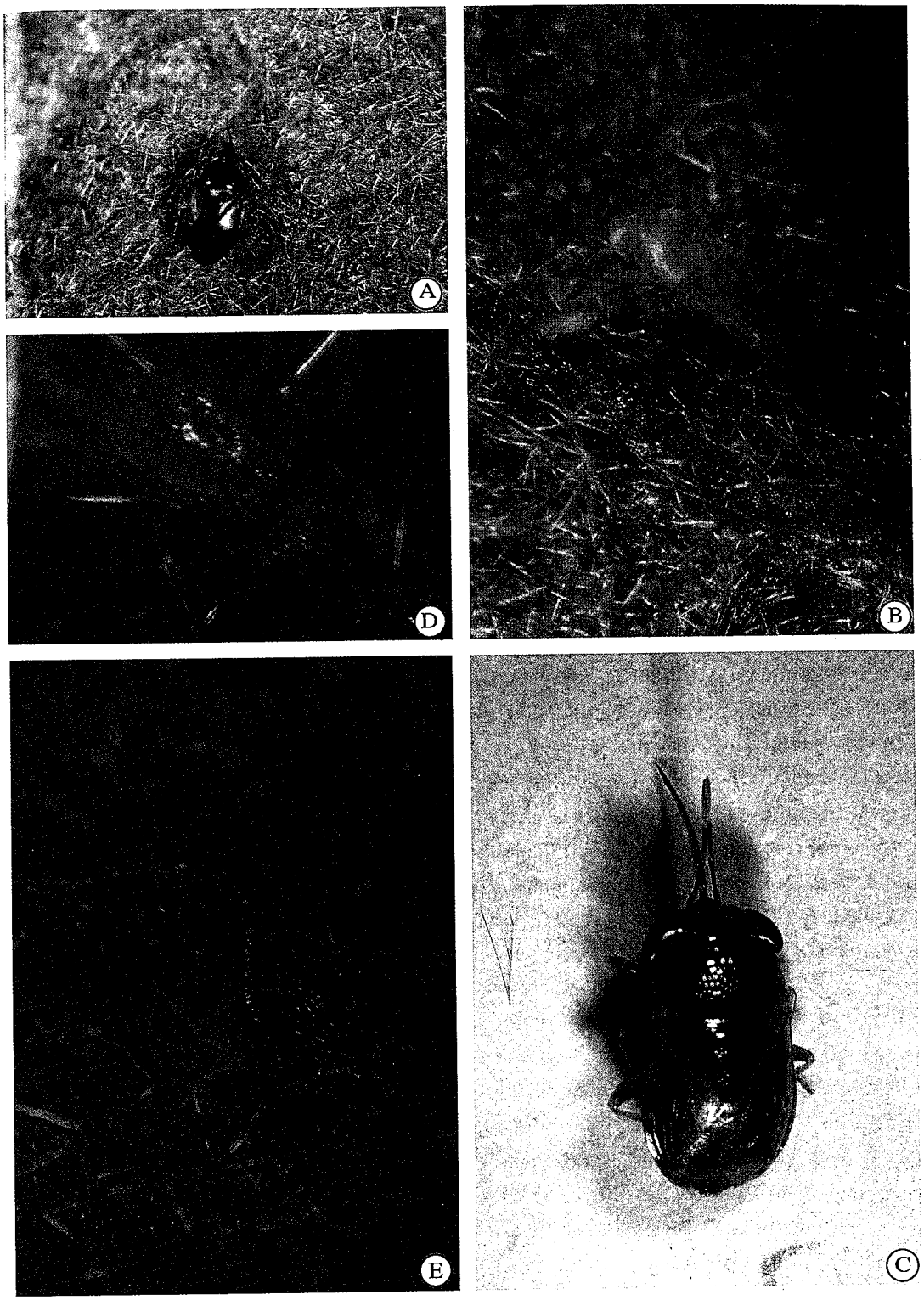

Fig. 1. Predatory natural enemies of *Thrips palmi* Karny on eggplant, *Orius sauter* (A), *Campylomma livida* (B), *Geocoris ochropterus* (C), *Paraphytoseius multidentatus* (D), and larva of *Arthrocnodax occidentalis* (E).

feeding on tetranychid mites. Larva of this fly (Fig. 1E), however, can occasionally be found to feed on *T. palmi*.

Those predatory natural enamies described above were all collected during the winter growing season from eggplant field without the chemical application. Moreover, the observation in field showed that the occurrence of those predatory bugs and the population dynamics of *T. palmi* are simultaneous. All the detail studies of bioecology of those natural enemies will be published elsewhere.

ACKNOWLEDGEMENTS

We would like to extend our sincere gratitude to Dr. Thomas J. Henry with the USDA, ARS, BA, PSI, Systematic Entomology Laboratory, U.S. National Museum, Washington, D.C., for his identifying the predatory bugs. We appreciate Dr. Yau-I Chu for his kindly suppling the reports. This study was supported by Grant "82-Sci. Tech.-2.3-Liang-11(14)" from the Council of Agriculture, Executive Yuan, R.O.C.

REFERENCES CITED

1. Bhatti, J. S. 1980. Species of the genus *Thrips* from India (Thysanoptera). Systematic Entomol. 5:109-166.
2. Chang, N. T. 1991. Important thrips species in Taiwan. pp. 40-56. in N. S. Talekar (ed.) Thrips in Southeast Asia. Proceedings of a regional consultation workshop, Bangkok, Thailand, 13 Mar. 1991. AVRDC, Taipei. 74 pp.
3. Crocker, R. L. and W. H. Whitcomb. 1980. Feeding niches of the big-eyed bugs Geocoris bullatus, *G. punctipes*, and *G. uliginosus* (Hemiptera: Lygaeidae: Geocorinae). Environ. Entomol. 9:508-513.
4. Firman, I. D. 1981. Plant protection news. Info. Circ. S. Pacific Commission 88:1-11.
5. Hirose, Y. 1990. Prospective use of natural enemies to control *Thrips palmi* (Thysanop., Thripidae). pp. 135-141 in FFTC Book Series No. 40, The use of Natural Enemies to Control Agricultural Pests.
6. Houston, K. J., L. A. Mound and J. M. Palmer. 1991. Two pest thrips (Thysanoptera) new to Australia, with notes on the distribution and structural variation of other species. J. Aust. ent. Soc. 30:231-232.
7. Kajita, H. 1985. The predatory natural enemies of *Thrips palmi* Karny. Pulex. 71:329-330 (in Japanese).
8. Karny, H. H. 1925. Die an Tabak auf Java und Sumatra angetroffenen Blasenfusser (Thysanoptera) (The Thysanoptera found on Tobacco in Java and Sumatra). Abstract in Review of Applied Entomol. 13(A):290.
9. Kumar, N. S. and T. N. Ananthakrishnan. 1985. *Geocoris ochropterus* Fabr. as a predator of some thrips. Proc. Indian natn. Sci. Acad. B51: 185-193.
10. Lu, F. M. 1993. A list of thrips and their host plants in Taiwan. Fengshan Trop. Hort. Expt. Stat., Taiwan. 121 pp (in Chinese).
11. Mills, N. J. 1991. Thrips biocontrol:

Opportunities for use of natural enemies against the pear thrips. pp. 373-391 *in* B. L. Parker *et al.* (eds.) Towards understanding Thysanoptera. General Tech. Rept. NE-147, USDA, For. Ser. NE For. Exp. Stn., Radnor, PA, USA. 464 pp.

12. Nagai, K. 1993. Integrated pest managemnt of *Thrips palmi* Karny in eggplant fields. pp 384-404 *in* Proceedings International symposium on the "Use of Biological Control Agents under Integrated Pest Management". Oct. 4-10, 1993, Fukuoka, Japan.
13. Nakahara, I. M., K. Sakimura, and R. A. Heu. 1984. New State record-Hawai Department of Agriculture, Hawaii. Pest Report 6:1-4.
14. Ruhendi and J. A. Litsinger. 1979. Insect suppressing effect of rice stubble height, tillage practices and straw mulching in wetland rice-cowpea cropping pattern. Intr. Rice Res. Newsletter 4:26-27.
15. Wangboonkong, S. 1981. Chemical control of cotton insect pests in Thailand. Trop. Pest Management 27:495-500.
16. Wen, H. C. and H. S. Lee. 1982. Field studies on cucurbit thrips (*Thrips flavus*) and its control. J. Agr. Res. china. 31:89-96 (in Chinese with English summary).
17. Yamamoto, E., K. Nagai, and K. Nonaka. 1981. Ecology and control of the thrips infesting fruit vegetables-*Thrips palmi* Karny, in Japan. 1. Flight. Proc. of the Assoc. for Plant Prot. of Kyushu. 27:98-99.
18. Yeh, S. D., Y. C. Lin, Y. H. Cheng, C. L. Jih, M. J. Chen amd C. C. Chen. 1992. Identification of tomato spotted wilt-like virus on watermelon in Taiwan. Plant Dis. 76:835-840.

摘　要

張念台、洪啓財、華眞、何琦琛　1993　茄園南黃薊馬 ***Thrips palmi* Karny** 捕食性天敵之調查　植保會刊　35:239-243. ([1].國立屏東技術學院植物保護技術系；[2].臺灣省農業試驗所應用動物系)

調查茄園中南黃薊馬 *Thrips palmi* Karny 之捕食性天敵，經鑑定計得六種，包括三種捕食性椿象，即小黑花椿 *Orius sauteri* Poppius，斑腿盲椿 *Campylomma livida* Reuter，大眼長椿 *Geocoris ochropterus* Fabr.，兩種捕植蟎：長毛捕植蟎 *Amblyseius longispinosus* (Evans) 與 *Paraphytoseius multidentatus* Swirski & Shechter，以及西方蠼螋 *Arthrocnodax occidentalis* Eelt. 特此爲記。