

Some observations on *Perillus bioculatus* (F.) (Heteroptera: Pentatomidae), a new record for the entomofauna of Turkey

Müjgan KIVAN*

Summary

Perillus bioculatus (F.) (Heteroptera: Pentatomidae) is a predator native to North America and its primary prey is the Colorado potato beetle, *Leptinotarsa decemlineata* (Say) (Coleoptera: Chrysomelidae). The eggs, nymphs and adults of *P. bioculatus* were collected from potato and egg plants in Tekirdag, Turkey in 2003. This is the first record of this insect for the Turkish fauna. The presence of *P. bioculatus* in Turkey may have resulted from an accidental introduction. In addition, a scelionid egg parasitoid, *Trissolcus grandis* Thom. (Hymenoptera, Scelionidae) was observed parasitizing the pentatomid in the field.

Key words: *Leptinotarsa decemlineata*, *Perillus bioculatus*, Pentatomidae, new record, Turkey

Anahtar sözcükler: *Leptinotarsa decemlineata*, *Perillus bioculatus*, Pentatomidae, yeni kayıt, Türkiye

Introduction

The Colorado potato beetle, *Leptinotarsa decemlineata* (Say) (Coleoptera: Chrysomelidae), is the most important and destructive insect pest on potato in North America and also Turkey. Adult *L. decemlineata* attack potato plants in early to mid-spring from overwintering sites. In the central Anatolia and Thrace region, there are two generations during the season, the first generation causing yield loss in potatoes whereas the second damages eggplants (Has, 1992).

* Department of Plant Protection, Faculty of Agriculture, Trakya University, 59030 Tekirdag, Turkey
e-mail: kivan@tu.tzf.edu.tr
Alınış (Received): 28 06 2004

Control of *L. decemlineata* has largely been based on the large-scale use of insecticides. As a result of these applications, *L. decemlineata* has rapidly become resistant to many pesticides (Wegorek, 2002); therefore research on alternative management approaches continues, such as the use of natural enemies for biological control (Cappaert et al., 1991; Hilbeck et al., 1997; Hough-Goldstein et al., 1993; 1996).

The two-spotted stink bug or double-eyed soldier bug, *Perillus bioculatus* (F.) (Heteroptera: Pentatomidae), is an important natural enemy of *L. decemlineata*, preying on both eggs and larvae. It is a predatory pentatomid native to North America and has primarily been found in association with the Colorado potato beetle (De Clercq, 2000). Female adults are 10 to 12 mm long and males 8 to 10 mm. Adults are whitish- or reddish-black with a distinct black "Y-shaped" marking on the scutellum and two black spots on the pronotum. Fifth-instars are about 8-9 mm long. Eggs are mostly blackish or fuscous, somewhat elongate and laid in a compact double row containing 10 to 25 eggs on the upper surface of potato leaves.

P. bioculatus is naturally distributed from Mexico into Canada (De Clercq, 2000). This species has been introduced into Europe to control *L. decemlineata* in Slovakia, France, Germany, Poland, Russia, Italy and Hungary, but the species was never reported to have become established in the area (Jermy, 1980). Its failure to establish may be related in part to heavy parasitization of eggs by native scelionid wasps and has also been attributed to high tendency of the released adults to disperse, which limits the probability of mating and survival of small inoculative populations (Jermy, 1980). In Turkey, no record exists about *P. bioculatus*, although there are faunistic studies on Turkish Pentatomoidea (Öncüer, 1991; Lodos et al., 1978, 1998; Lodos & Önder, 1983). The current paper reports on the first record of this non-indigenous pentatomid in Turkey.

Material and Methods

The specimens were first collected from litter in 1997 in Tekirdag. During field studies in June-July 2003, adults, nymphs, and eggs were collected from potato and egg plants, associated with *L. decemlineata*, in Tekirdag, Turkey. Collected specimens were identified by Donald B. Thomas (USDA-ARS KDLG Subtropical Agricultural Research Center, USA) and Patrick De Clercq (Ghent University, Belgium) as *Perillus bioculatus*. The insects were cultured in the laboratory and their feeding on natural and unnatural prey larvae and eggs was observed. Collected eggs were cultured in the laboratory in July 2003 and scelionid egg parasitoids were reared from some of them. The scelionid egg parasitoid was identified by Erhan KOCAK (Zirai Mücadele Merkez Arastirma Enstitüsü, Yenimahalle, Ankara, Turkey).

Results and Discussion

When the specimens were first collected from litter in October 1997 in Tekirdag, Turkey, the insect could not be placed, because its host was not found. Some specimens were found in a building in March 2003. After this, it was observed in the fields. During June and July 2003, adults, eggs, and newly hatched nymphs were collected from potatoes and eggplants. It was seen that they were feeding on *L. decemlineata* larvae in the field. They were cultured with *L. decemlineata* larvae on potato leaves in the laboratory. It was observed that they feed on larvae and eggs of *L. decemlineata* and also on *Henosepilachna elaterii* Rossi. (Coleoptera: Coccinellidae) larvae and eggs and caterpillars of *Papilio machaon* L. (Lepidoptera: Papilionidae). An egg parasitoid species, *Trissolcus grandis* Thom. (Hymenoptera: Scelionidae) was also reared from egg masses of *P. bioculatus* collected in potato fields.

No releases of this bug have been done by scientists in Turkey lately. It was hypothesized that this predator was accidentally introduced into Turkey from the New World. There is a military airport in Tekirdag, Thrace and sometimes NATO military maneuvers occur in Thrace, so the bug may have come from America via the airport. Alternatively, since the Thrace region is in the European part of Turkey, it may originate from historical releases in Europe, although the literature suggests the bug failed to establish there. Our findings suggest that *P. bioculatus* is established in Tekirdag given its successful overwintering and that the native scelionid egg parasitoid *T. grandis* successfully parasitizes its eggs. The fact that this nonindigenous predator is present in Turkey should receive some attention. A substantial part of the generalist predators used in augmentative biocontrol are nonindigenous, and there is a justified concern that the use of exotic organisms may hold environmental risks (De Clercq, 2002). De Clercq (2002) pointed out that risk assessment procedures (either in place or under development) are largely based upon evaluations of host specificity and other elements to be considered are establishment potential of the exotic natural enemy, its overwintering ability, the presence of natural enemies in the area of introduction and the dispersal ability of the non-native agent.

In conclusion, considering these risks, it is warranted to further investigate the biology and natural enemies, distribution and population dynamics of *P. bioculatus* in Turkey and to evaluate its potential for control of *L. decemlineata*.

Özet

Türkiye böcek faunası için yeni bir kayıt, *Perillus bioculatus* (F.) (Heteroptera: Pentatomidae) üzerinde bazı gözlemler

Perillus bioculatus (F.) (Heteroptera: Pentatomidae) Kuzey Amerika'nın yerli predatör türlerinden olup, primer konukçusu Patates böceği, *Leptinotarsa decemlineata* (Say) (Coleoptera: Chrysomelidae)'dir. Türkiye faunası için ilk kayıt olduğu saptanan bu türün ergin, yumurta ve nimfleri Tekirdağ'da 2003 yılında patates ve patlıcandan toplanmış olup, bu türün Türkiye'ye kazara giriş yaptığı düşünülmektedir. Ayrıca, bir yumurta kümesinden parazitoid *Trissolcus grandis* Thom. (Hymenoptera: Scelionidae) türü de elde edilmiştir.

Acknowledgements

I thank Prof. Dr. De Clercq for ideas, information, for the identification of *P. bioculatus* and for helpful suggestions on the manuscript; Dr Donald Thomas for the identification of *P. bioculatus*, and Erhan Kocak for identification of the egg parasitoid, *T. grandis*.

References

- Cappaert, D. L., F. A. Drummond and P. A. Logan, 1991. Incidence of natural enemies of the Colorado potato beetle, *Leptinotarsa decemlineata* (Say) (Coleoptera: Chrysomelidae) on a native host in Mexico. **Entomophaga**, **36**: 110-117.
- De Clercq, P., 2000. Predaceous stinkbugs (Pentatomidae: Asopinae). In: C. W. Schaefer and A. R. Panizzi (eds), Heteroptera of Economic Importance, CRC Press, U.S.A., pp. 737-789.
- De Clercq, P., 2002. Dark clouds and their silver linings: Exotic generalist predators in augmentative biological control. **Neotropical Entomology**, **31** (2): 169-176.
- Has, A., 1992. Orta Anadolu Bölgesi koşullarında Patates böceği (*Leptinotarsa decemlineata* Say) (Coleoptera-Chrysomelidae)'nin biyo ökojisi ve özellikle konukçu bitki ilişkileri üzerinde arařtırmalar. Grafik Tasarım Basımevi Ltd. Şti., İstanbul, 194 s.
- Hilbeck, A., C. Eckel and G.G. Kennedy, 1997. Predation of Colorado potato beetle eggs by generalist predators in research and commercial potato plantings. **Biol. Control**, **8**: 191-196.
- Hough-Goldstein, J., J. A. Janis and C. D. Ellers, 1996. Release methods for *Perillus bioculatus* (F.), a predator of the Colorado potato beetle. **Biol. Control**, **6**: 114-122.
- Hough-Goldstein, J., G. E. Heimpel, H. E. Bechmann and C. E. Mason, 1993. Arthropod natural enemies of the Colorado potato beetle. **Crop Prot.**, **6**: 114-122.
- Jermey, T., 1980. The introduction of *Perillus bioculatus* into Europe to control the Colorado beetle. **Bull. OEPP/EPPO Bul.**, **10**: 475-479.
- Lodos, N. and F. Önder, 1983. Contribution to the study on the Turkish Pentatomoidea (Heteroptera) VI. Asopinae (Amyot and Serville) 1843. **Türk. Bit. Kor. Derg.**, **7** (4): 221-230.
- Lodos, N., F. Önder, E. Pehlivan ve R. Atalay, 1978. Ege ve Marmara Bölgesinin zararlı böcek faunasının tespiti üzerinde çalışmalar [Curculionidae, Scarabaeidae (Coleoptera); Pentatomidae, Lygaeidae, Miridae (Heteroptera)]. T.C. Gıda-Tarım ve Hayvancılık Bakanlığı, Zirai Mücadele ve Zirai Karantina Genel Müdürlüğü, Ankara, 301 s.
- Lodos, N., F. Önder, E. Pehlivan, R. Atalay, E. Erkin, Y. Karsavuran, S. Tezcan and S. Aksoy, 1998. Faunistic Studies on Pentatomoidea (Plataspidae, Acanthosomatidae, Cydnidae, Scutelleridae, Pentatomidae) of Western Black Sea, Central Anatolia and Mediterranean Regions of Turkey. Ege Üniv. Basımevi, Bornova, İzmir, 75 pp.
- Öncüer, C., 1991. A Catalogue of the Parasites and Predators of Insect Pests of Turkey. Ege Üniv. Zir. Fak. Yayınları, No: 505, 974 pp.
- Wegorek, P., 2002. Insecticide resistance management strategy for Colorado Potato Beetle (*Leptinotarsa decemlineata* Say) in Poland. **The Resistant Pest Management Newsletter**, **11** (2): 22-30.