

RESEARCHES REGARDING EVOLUTION OF SPECIAE *Chrysoperla carnea* - *Neuroptera* FAUNA IN CORN AGRO ECOSYSTEM

Diana COMAN, Ioan ROȘCA

University of Agronomic Science and Veterinary Medicine of Bucharest, 59 Mărăști Blvd,
District 1, 11464, Bucharest, Romania

Corresponding author email: cmn_diana@yahoo.com

Abstract

Corn agricultural agroecosystems is considered unstable ecosystems, with specific interdependencies between different food chains that natural factors play a role. A large number of insects are living in the maize agroecosystem, being a species community and each species has a particular place in the food chains. If a lot of studies were done, in Romania about biology, ecology and control of corn insect pest, there are little knowledge about beneficial fauna especially on the correlation between presences of *Chrysoperla carnea* species during different phases of corn vegetation. Evolution of *Chrysoperla carnea* population was assessed using yellow sticky traps, type Pherocone AM trap, which were installed, harvested and replaced, biweekly. Experiences from 2011-2012 had the main objective to observe the potential impact of GMO-maize on *Chrysoperla carnea* for Neuropteran fauna existing on 14 corn cultivars (7 conventional corn hybrids and 7 hybrids containing transformation events (glyphosate-tolerant, corn rootworm protected, resistant to Lepidopteran and with two of transformation events). Variants were in 4 replications, each corn plot had 4 rows and plot's area was 20.3 m². the flowering stage in corn, which involves pollen shed and silking, then this reduces their agroecosystem easy (their presence will continue to be significant) and their number gradually reduce towards the end of vegetation maize. There are no differences on the structure and quantity of wildlife Neuropterans between different hybrids.

Key words: Transgenic corn hybrids, yellow sticky traps, *Chrysoperla carnea*.

INTRODUCTION

In recent years concerns have been supported to identify animal species existing in different cultures (Baicu, 1990; Barbulescu et al., 1993; Muresan et al., 1973; Voicu et al., 1993). Corn agricultural agroecosystems is considered unstable ecosystems, with specific interdependencies between different food chains. If a lot of studies were done, in Romania about biology, ecology and control of corn insect pest (Barbulescu et al., 2000; Costea et al., 2011 a,b), Few data are known about, generally on useful fauna, especially on predatory fauna existing in corn fields in Romania (Perju et al., 1988; Rosca et al., 2007; Rosca and Istrate, 2008). *Chrysoperla carnea*, known as the common green lacewing, is an insect from the Chrysopidae family. The adults feed on nectar, pollen and aphid honeydew but the larvae are active predators and feed on aphids and other small insects. It has been used in the biological control of insect pests on crops (Henry et al., 2002). Polyphagous species *Chrysoperla carnea* is a common

representative of useful fauna in respect with their larval stage, taking into consideration that larvae are mobile, voracious searching all the plant for pray, generally small animals (adults, larvae and eggs) with soft bodies. Prey is mostly from the order Homopterous and is predominantly aphids on low growing vegetation (Bellows and Fisher, 1999). Of course there are adults of common green lacewing in corn fields especially when on corn plants are aphid colonies. On crops, the larvae have been reported as attacking several species of aphids, red spider mites, thrips, whitefly, the eggs of leafhoppers, leaf miners, psyllids, small moths and caterpillars, beetle larvae and the tobacco budworm. (Hoffmann and Frodsham, 1993). The present investigation was carried out to study the biology of common green lacewing, related with the presence of *C. carnea* (Figure 1) adults in corn field in correlation with corn flowering, in condition of Romania.



Figure 1. Adult *Chrysoperla carnea*



Figure 2. Yellow sticky trap (ICCN type)

MATERIALS AND METHODS

The experiment was done in centre for variety testing and registration Troian, where were 14 corn cultivars [7 conventional corn hybrids and 7 hybrids containing transformation events (glyphosate-tolerant, corn rootworm protected, resistant to Lepidopteran and with two of transformation events)]. Variants were in 4 replications, each corn plot had 4 rows and plot's area was 20.3 m². Sowing time was 16 May in 2011 and 22 May in 2012. Dynamic of *Chrysoperla carnea* adult flight in corn field was assessed using yellow sticky traps, type Pherocone AM trap, in 2011 and ICCN in 2012 (Figure 2), 6/replication (3 in area of conventional corn hybrids and 3 in area of corn hybrids containing transformation events). Yellow sticky traps were installed at the emergence of corn seedlings (middle of May), harvested and replaced, weekly (in 2011 on 31 May; 7, 14, 21, 28 June; 5, 12, 19, 26 July; 2, 9, 16, 23 and 30 August; 6 September, in 2012 on 22 and 29 May; 5, 12, 19, 26 June; 3, 10, 17, 24, 31 July; 7, 14, 21 and 28 August). Yellow sticky traps were maintained till transportation and analysing at +4⁰C, as soon was possible were analysed by taking out (with glue) and counting *Chrysoperla carnea* specimens. It was correlated the flowering stage in corn, which involves pollen shed and silking, (the most critical period in the development of a corn plant) with the presence of common green lacewing adults feeding with nectar, pollen and aphid honeydew, because in this period it seems that aphid population reached a peak in its development (Figure 3).



Figure 3. Aphid colony on corn

RESULTS AND DISCUSSIONS

The order Neuroptera, or net-winged insects, include the *Chrysoperla carnea*, known as the common green lacewing between other predatory species (Brooks and Barnard, 1990; Grimaldi and Engel, 2005). The importance of Neuroptera for different agroecosystems was discussed previously (New, 1975; McEwen, et al., 2001; Paulian, 2001). A lot of insect groups were captured on yellow sticky traps and comparison of proportion, it is noted that the most numerous are in 2011 Coccinellidae, in 2012 the most numerous are in Syrphid. The most widespread neuropteran species is *Chrysopa carnea*. In Romanian' conditions there are 1-2 generations of common green lacewing (*Chrysopa carnea*), adults generally live from 1-3 months depending on temperature, humidity and quality of food sources. In Europe, in areas cultivated with corn, Neuropteran populations is developed numerous in late July, when numbers reach a peak of development, then this reduces their agroecosystem easy (their presence will continue to be significant) and their number

gradually reduce towards the end of vegetation maize. The biology' of various species of chrysopids has been studied on different hosts by several authors. Tassel emerges and pollen shed begins 2-3 days prior to silk emergence and in the next period continue to elongate until fertilized. In this period of time is necessary to scout for corn leaf aphids, corn rootworm adults and symptoms (goose neck) caused by rootworm larva. From figures 1 and 2 we can see that the common green lacewing (*Chrysoperla carnea*) total was 141 specimens, in 2011, of which 73 specimens were captured in the plots with conventional hybrids and 68 specimens were captured in the plots with hybrids containing transformation events and 148 specimens, in 2012, of which 71 specimens were captured in the plots with conventional hybrids and 77 specimens were captured in the plots with hybrids containing transformation events.

fields only for food, after panicle appearance at beginning fall corn pollen and silk emergence, because the adults feed on nectar, pollen and aphid honeydew but the larvae are active predators and feed on aphids and other small insects, which started, in this period, to develop aphid colony on corn. Thus from the total of 141 specimens captured throughout the period in which observations were made, 129 (91.5%) were captured during July 12 - 16 August, in 2011, and respectively 118 (79.7) during 10 July - 14 August, in 2012, when corn began to form pollen and silks and continue to remain on corn until the plants remain relatively green, allowing the development of colonies of aphids and larvae feeding predator default. There are no differences on the structure and quantity of wildlife Neuropterans between different types of corn hybrids.

CONCLUSIONS

Our data confirm generally supposition that this predator is coming in corn fields only for food, after panicle appearance at beginning fall corn pollen and silk emergence.

There are no differences on the structure and quantity of wildlife common green lacewing (*Chrysoperla carnea*) between different types of corn hybrids [conventional and those containing transformation events (glyphosate-tolerant, corn rootworm protected, resistant to Lepidopteran and with two of transformation events)].

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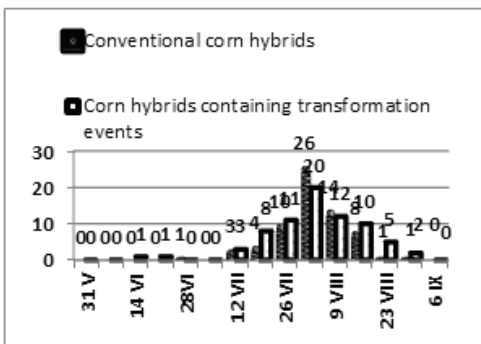


Figure 4. Evolution of specimens of *Chrysoperla carnea* captured on yellow sticky traps in 2011

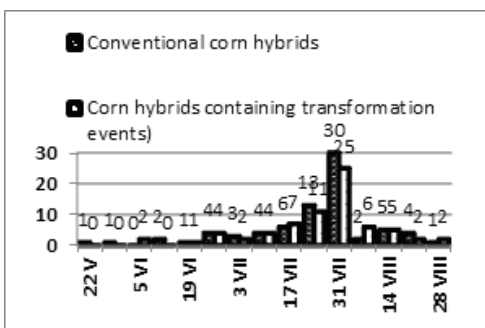


Figure 5. Evolution of specimens of *Chrysoperla carnea* captured on yellow sticky traps in 2012

In this respect our data confirm generally supposition that this predator is coming in corn

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