



SPECIES COMPOSITION OF PREDACEOUS COCCINELLIDS IN PULSES AND GROUNDNUT CROPECOSYSTEMS OF CHITTOOR DISTRICT, ANDHRA PRADESH

T. VASISTA*, M. S. V. CHALAM, K. V. HARI PRASAD and G . MOHAN NAIDU

Department of Entomology, S. V. Agricultural College, Tirupati- 517 502, Chittoor Dt., A.P., India

Date of Receipt: 27.6.2019

ABSTRACT

Date of Acceptance: 24.9.2019

A survey was conducted in ten major pulse and groundnut growing mandals of Chittoor district of Andhra Pradesh. From each mandal five villages were selected for collecting Coccinellids, and the survey to know the species composition was conducted from August to January months. A total of twelve Coccinellid species were recorded from both pulse and groundnut crop ecosystems. Of these ten species of Coccinellids viz., *Cheilomenes sexmaculata* (Fabricius), *Coccinella transversalis* Fabricius, *Coccinella septumpunctata* Linnaeus, *Illeis cincta* (Fabricius), *Harmonia octomaculata* (Fabricius), *Brumoides suturalis* (Fabricius), *Micraspis discolor* (Fabricius), *Scymnus nubulis* Mulsant, *Jauravia dorsalis* (Weise) and *Pseudospidimerus trinotatus* Thunberg were reported from pulse crop ecosystems and Nine species of Coccinellids viz., *Cheilomenes sexmaculata*, *Coccinella transversalis*, *Illeis cincta*, *Harmonia octomaculata*, *Brumoides suturalis*, *Micraspis discolor*, *Scymnus nubulis*, *Chilocorus nigritus* (Fabricius), *Anegleis cardoni* (Weise) were reported from groundnut crop ecosystems.

KEYWORDS: Predaceous coccinellids, pulses, groundnut, survey

INTRODUCTION:

Coccinellids belong to family Coccinellidae of order Coleoptera and are commonly called as ladybird beetles. These are oval to hemispherical in shape with clavate antennae, securiform maxillary palpi, pseudotrimerous tarsi and are often brightly coloured with red, orange (or) yellow shades. Coccinellids belong to family Coccinellidae, superfamily Cucujoidea, suborder Polyphaga and order Coleoptera comprising about 490 genera and more than 6000 species worldwide (Slipnski, 2007).

Ladybird beetles have been known worldwide as predators on number of insects and were distributed in many Asiatic countries including India (Singh and Brar, 2004). Coccinellids are of high economic importance due to their predatory activity against soft bodied insects like aphids, leafhoppers, psyllids, whiteflies, scale insects and mealy bugs. They also prey upon small larvae, insect eggs and phytophagous mites which are injurious to agricultural and forest plantations. The predaceous Coccinellids have been successfully utilized in various bicontrol programs with spectacular success rates. Some

of the examples includes *Radolia cardinalis* Mulsant against *Iceria purchasi* Maskell, *Cryptolaemus montruzeri* Mulsant against *Maconellisoccus hirusutus* Green and *Planococcus citri* Risso etc. Less famous but just as important are the naturally occurring Coccinellids, for without these species in our crop ecosystems pest problems would have been far more intense. Composition of predatory Coccinellids varies widely among various crop ecosystems and so as their predatory potential on various hosts. Many workers recognized six subfamilies within the family Coccinellidae viz., Chilacorinae, Coccinellinae, Coccidulinae, Scymninae, Sticholotidinae and Epilachninae. Of these except subfamily Epilachninae all are predaceous. Survey is useful to determine the existence of any species on a given habitat. (Afshin *et al.*, 2013). Rani *et al.* (2013), conducted survey during rabi and summer seasons and reported that *Cheilomenes sexmaculata* was the predominant species in pulses ecosystem from Khamam district of Andhra Pradesh. Rekha *et al.* (2009) conducted survey on Coccinellid beetles in Madurai district of Tamilnadu and reported that *Coccinella transversalis* (Fabricius), *Menochilus sexmaculatus* (Fabricius) and *Brumoides suturalis* (Mulsant) were found in cereals, pulses and vegetable crop ecosystems.

*Corresponding author, E-mail: starvasi19@gmail.com

Chanmamla (2009) conducted survey in and around Tirupathi and collected Coccinellid beetles from maize, field bean, cucumber, groundnut, brinjal, horse gram and sesamum fields and reported that *Coccinella transversalis* and *Cheilomenes sexmaculata* were the most abundant species. Rani et al. (2017) conducted survey in Guntur district and reported six Coccinellid species viz., *Cheilomenes sexmaculata* (Fabricius), *Coccinella transversalis* (Fabricius), *Harmonia octomaculata* (Fabricius), *Micraspis discolor* (Fabricius), *Scymnus coccivora* (Ayyar) and *Brumoides suturalis* (Fabricius).

MATERIALS AND METHODS:

A survey was conducted to collect Coccinellid beetles from ten mandals viz., Narayanavanam, Nagiri, Nindra, Nagalapuram, Pichatur, Kumara Venkata Bhupalapuram, Vadalamalapeta, Vijayapuram, Yerpedu, Ramachandrapuram of Chittoor district in Rayalseema region. From each mandal five villages will be selected for collection of Coccinellids as well as to study the species composition of Coccinellids. The ladybird beetles were collected by sweep net method from different habitats like greengram, blackgram, redgram, cowpea and groundnut crop ecosystems. The crop wise collected Coccinellid specimens were preserved in glass vials. These species were described based on morphological character and identifications were conducted at Department of Entomology, S. V. Agricultural College, Tirupathi.

RESULTS AND DISCUSSION:

Totally three thousand eight hundred and ninety three (3893) Coccinellids were collected from pulses and groundnut crop ecosystems. Of these 2234 beetles were collected from pulse crop ecosystem and one thousand six hundred and fifty nine (1659) beetles were collected from groundnut crop ecosystem. A total of twelve Coccinellid species were recorded from both pulse and groundnut crop ecosystems. These twelve species were viz., *Brumoides suturalis* (Fabricius), *Chilocorus nigritus* (Fabricius), *Coccinella septempunctata* Linnaeus, *Coccinella transversalis* Fabricius, *Harmonia octomaculata* (Fabricius), *Illeis cincta* (Fabricius), *Micraspis discolor* (Fabricius), *Cheilomenes sexmaculata* (Fabricius), *Anegleis cardoni* (Weise), *Pseudaspidimerus trinotatus* (Thunberg), *Scymnus (Scymnus) nubilus* Mulsant and *Jauravia dorsalis* (Weise) respectively. Among these ten species of -

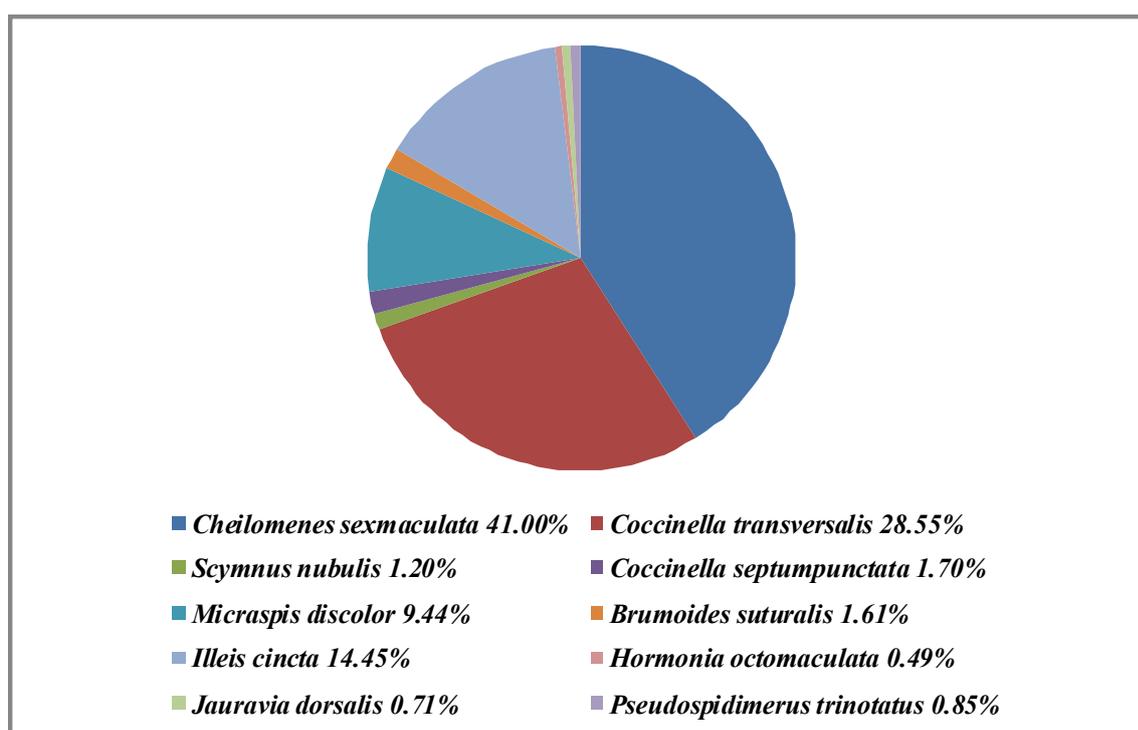
Coccinellids viz., *M. sexmaculata*, *C. transversalis*, *C. septempunctata*, *I. cincta*, *H. octomaculata*, *B. suturalis*, *M. discolor*, *S. nubilus*, *J. dorsalis* and *P. trinotatus* (Table 1) were collected from various pulse crop ecosystems viz., redgram, greengram, blackgram and cowpea (predominant pulses in Chittoor of Rayalseema region). Among the predatory Coccinellid species recorded *M. sexmaculata* (41.00% of total Coccinellids) ranked first in abundance followed by *C. transversalis* (28.55 % of total Coccinellids), while *H. octomaculata* ranked last in abundance (0.49% of total Coccinellids). The observations are presented in pie chart (Figure 1).

Species composition of predaceous coccinellids in pulses and groundnut crop ecosystems of chittoor district, Andhra Pradesh

Table 1: Species composition of Coccinellids in pulse crop ecosystem

S. No	Name of the species	Number of beetles collected	Percentage (%)
1	<i>Cheilomenes sexmaculata</i> (Fabricius)	916	41.00
2	<i>Coccinella transversalis</i> Fabricius	638	28.55
3	<i>Scymnus nubulis</i> Mulsant	27	1.20
4	<i>Coccinella septumpunctata</i> Linnaeus	38	1.70
5	<i>Micraspis discolor</i> (Fabricius)	211	9.44
6	<i>Brumoides suturalis</i> (Fabricius)	36	1.61
7	<i>Illeis cincta</i> (Fabricius)	323	14.45
8	<i>Hormonia octomaculata</i> (Fabricius)	11	0.49
9	<i>Jauravia dorsalis</i> (Weise)	15	0.71
10	<i>Pseudospidimerus trinotatus</i> (Thunberg)	19	0.85
	Total	2234	100%

Figure 1: Species composition of Coccinellids in pulse crop ecosystem



Nine species of Coccinellids viz., *Cheilomenes sexmaculata*, *Coccinella transversalis*, *Coccinella septumpunctata*, *Illeis cincta*, *Harmonis octomaculata*, *Brumoides suturalis*, *Micraspis discolor*, *Scymnus nubulis*, *Chilocorus nigritus* were reported from groundnut crop ecosystem, among these nine species of Coccinellids *Cheilomenes sexmaculata* Fabricius (45.75% of the total Coccinellids) and *Coccinella transversalis* (Fabricius) (27.42% of the total Coccinellids) were the two most abundant species and the least abundant species was *Aneglies cardoni* (Weise) (0.30% of the total Coccinellids). The two most abundant species from both pulse and groundnut crop ecosystems were found to be *C. sexmaculata* and *C. transversalis* (Table 2). The observations were presented in pie chart (Figure 2).

Rekha, B.S., Kumar, J.R., Kandibane, K., Raguraman, S and Swamiappan, M. 2009. Diversity of coccinellids in cereals, pulses, vegetables and in weeded and partially weeded rice-cowpea ecosystems in Madurai district of Tamil Nadu. *Madras Agricultural Journal*. 96(1-6): 251-264.

Singh, J and Brar, K. S. 2004. Mass production and biological control potential of coccinellids in India. In: Sahayaraj, K. ed. *Indian Insect Predators in Biological Control*. Daya Publishing House, Delhi, India. 204-260.

LITERATURE CITED:

Afshin, M., Jafari, R and Karahrudi, Z.R. 2012. The faunistic survey of predatory ladybeetls (Coleoptera : Coccinellidae) in the Aleshtar region (Lorestan province), Iran. *International Journal of Agriculture and Crop Sciences*. 6(11): 723-728.

Chanmamla, G. 2009. Taxonomic studies on predacious coccinellidae, order : Coleoptera. *M.sc (Ag) Thesis*. Acharya N G Ranga Agricultural University, Tirupathi (Andhrapradesh) India.

Puttarudraiah, M and Channabasavanna, G. P. 1953. Beneficial Coccinellids of Mysore I. *Indian Journal of Entomology*. 15: 87-96.

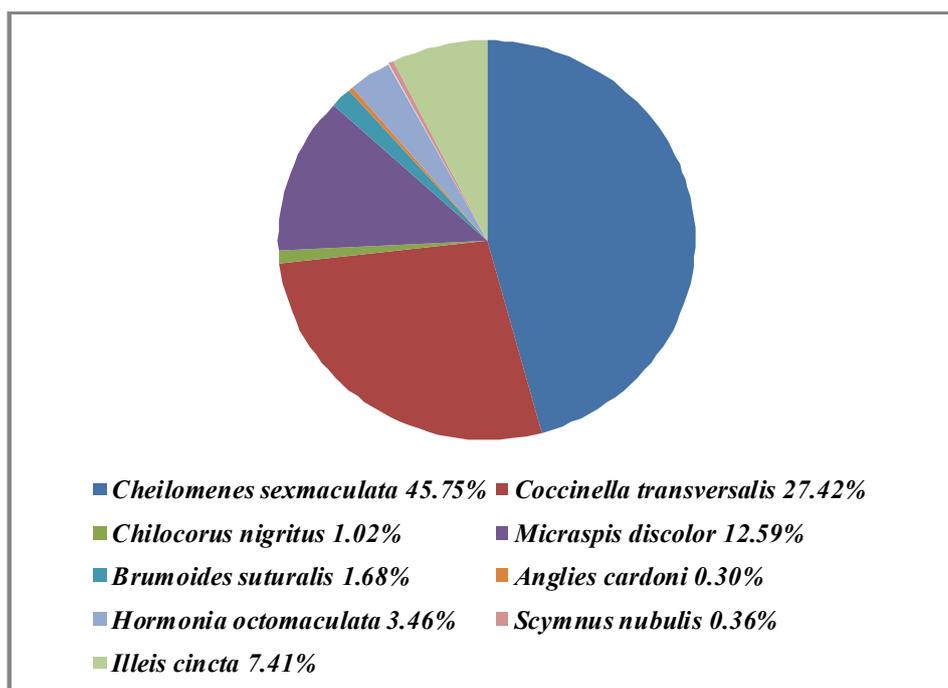
Rani, C. H., Rao, G. R., Chalam, M. S. V., Kumar, P. A and Rao, V. S. 2013. Summer season survey for incidence of *Maruca vitrata* (G.) (Pyralidae: Lepidoptera) and its natural enemies on green gram and other alternative hosts in main pulse growing tracts of Khammam district. *Journal of Research, ANGRAU*. 41(3): 16-20.

Species composition of predaceous coccinellids in pulses and groundnut crop ecosystems of chittoor district, Andhra Pradesh

Table 2: Species composition of Coccinellids in groundnut crop ecosystem

S. No	Name of the species	Number of beetles collected	Percentage (%)
1	<i>Cheilomenes sexmaculata</i> (Fabricius)	759	45.75
2	<i>Coccinella transversalis</i> Fabricius	455	27.42
3	<i>Chilocorus nigritus</i> (Fabricius)	17	1.02
4	<i>Micraspis discolor</i> (Fabricius)	209	12.59
5	<i>Brumoides suturalis</i> (Fabricius)	28	1.68
6	<i>Aneglies cardoni</i> (Weise)	5	0.30
7	<i>Harmonia octomaculata</i> (Fabricius)	57	3.47
8	<i>Scymnus nubulis</i> Mulsant	6	0.36
9	<i>Illeis cincta</i> (Fabricius)	123	7.41
	Total	1659	100%

Figure 2: Species composition of groundnut crop ecosystem



Total 12 species of Coccinellids has been reported from pulse and groundnut crop ecosystems. Among these ten species were reported from pulse ecosystem and nine species were reported from groundnut crop ecosystem. *Cheolimenes sexmaculata* Fabricius and *Coccinella transversalis* (Fabricius) were the most abundant species in and around Tirupati in both pulse and groundnut crop ecosystems. *Illeis cincta* (Fabricius) (14.4% of the collected Coccinellids) is third most abundant Coccinellid in pulse crop ecosystem. *Micraspis discolor* (Fabricius) (12.59% of the collected Coccinellids) is the third most abundant species in groundnut crop ecosystem. Puttarudriah and Channabasavanna (1953, 1955, 1956) has reported five species of Coccinellids on groundnut crop viz., *Coccinella septempunctata* Linnaeus, *Coccinella transversalis* Fabricius, *Harmonia octomaculata* (Fabricius), *Micraspis discolor* (Fabricius) and *Cheilomenes sexmaculata* (Fabricius). Chanmamla (2009) reported five species viz., *Coccinella septempunctata* Linnaeus, *Coccinella transversalis* Fabricius, *Harmonia octomaculata* (Fabricius), *Micraspis discolor* (Fabricius) and *Cheilomenes sexmaculata* (Fabricius) from groundnut crop ecosystem feeding on aphids, *Aphis craccivora* and leafhoppers, *Empoasca* (*Empoasca*) *motti* Pruthi. Among these species, *Coccinella transversalis* Fabricius is abundant recording 52% of population followed by *Cheilomenes sexmaculata* (Fabricius) (29%). Rekha *et. al.* (2009) has reported three species of Coccinellids viz., *Coccinella transversalis*, *Menochilus sexmaculatus* and *Brumoides suturalis* from cereals, pulses and vegetable crop ecosystems. Rani *et. al.* (2013) has reported that *Cheilomenes sexmaculata* as predominant Coccinellid species in Khammam district of Andhra Pradesh. Rani *et. al.* (2017) has reported six species of Coccinellids viz., *Cheilomenes sexmaculata*, *Coccinella transversalis*, *Harmonia octomaculata*, *Micraspis discolor*, *Scymnus coccivora* and *Brumoides suturalis* from pulse crop ecosystems of Guntur district of Andhra Pradesh. She also reported that *Cheilomenes sexmaculata* was the predominant Coccinellid species in Guntur district. In the present studies also two Coccinellids viz., *Cheilomenes sexmaculata* and *Coccinella transversalis* were found to be the most abundant Coccinellids and the results are in close agreement to the works of Chanmamla (2009), Rani *et. al.* (2017) and Rekha *et. al.* (2009).

CONCLUSION:

The present study revealed that *C. sexmaculata* and *C. transversalis* were the most abundant Coccinellids in pulse and groundnut ecosystems of Chittoor district of Andhra Pradesh. *Harmonia octomaculata* and *Aneglies cardoni* were the least abundant Coccinellid species on pulses and groundnut crop ecosystems respectively.