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First report of a new invasive thrips, *Thrips parvispinus* (Karny) (Thysanoptera: Thripidae) in cowpea (*Vigna unguiculata*) at Raipur, Chhattisgarh

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Abstract

Three species of thrips, namely *Thrips parvispinus* (Karny), *Megalurothrips distalis* (Karny) and *Megalurothrips usitatus* (Begnall) were recorded and identified from cowpea flowers at IGKV, Raipur during the study period Rabi 2020-2021 and 2021-2022. The invasive thrips, *Thrips parvispinus* (Karny) has been reported for the first time infesting cowpea (*Vigna unguiculata*) in IGKV, Raipur, Chhattisgarh. Population of thrips, *Megalurothrips distalis* (Karny), *Megalurothrips usitatus* (Begnall), *Thrips parvispinus* (Karny), initiated at the flowering stage with a mean population of (1.09, 1.05/5 flower) during 2nd week January and reached the peak (7.05, 8.06/5 flower) during 1st week February. Both nymphs and adults lacerate on flowers, flower buds and small pods. Probably, it may pose serious threat to other important crops also.

Keywords: *Thrips parvispinus*, *Megalurothrips distalis*, *Megalurothrips usitatus*, invasive, cowpea, incidence, SMW

Introduction

Cowpea, *Vigna unguiculata* (L.) Walp., belonging to family Fabaceae, is one of the important pulse crops, also known as black eyed bean or Southern pea in English, while chola or choli, chavli, lobia in various vernacular languages in India. Among legumes, cowpea is one of the important vegetable crops grown during the rainy, Rabi and summer seasons. Tender pods as well as green shelled seeds are used as vegetable and as a pulse when dried. It is also suitable for green manuring, fodder cover and catch crop. Cowpea grains are well known for their protein content (20-30%) and are source of cheap plant protein to people who can hardly afford animal protein derived from meat, fish, milk and eggs. Cowpea is also rich in minerals, fats, oils and vitamins. (Meena *et al.*, 2017) [2].

Several insect pests attack cowpea in the field and studies have indicated flower bud thrips (*Thrips parvispinus*, *Megalurothrips distalis* and *Megalurothrips usitatus*) to be the most damaging (Karungi *et al.*, 2000; Ngakou *et al.*, 2008; Muchero *et al.*, 2009) [1, 7, 5]. The yield reduction due to flower bud thrips ranges from 20 to 80 percent but under severe infestation, complete yield loss may also occur (Omo-Ikerodah *et al.*, 2009) [8].

T. parvispinus, which is designated as one of the notorious pest species from South East Asia, is a serious pest on numerous agricultural and horticultural crops. *T. parvispinus*, a member of "Thrips orientalis group" (Mound, 2005) [3], is a thrips of quarantine importance and has been reported from Thailand to Australia (Mound and Collins, 2000) [4] as a serious pest on innumerable unrelated plant families. It is reported on papaya in Hawaii, greenhouse Gardenia plants in Greece, vegetable crops like chili, green beans, potato, and eggplant from other countries (Murai *et al.* 2009) [6]. Occurrence of this species in India has been first reported by Tyagi *et al.* (2015) [12] on papaya from Bangalore. Later, Rachana *et al.* (2018) [10] reported the same on flowers of *Dahlia rosea* in Puttur, Karnataka. The presence of this invasive pest on an agriculturally important host plant raises serious concern and is an apprehension for quarantine officials. Earlier reports of this species on different economically important host plants in Karnataka and the current report on an agriculturally important host in Tamil Nadu hint that the pest may be slowly moving across states and measures need to be strengthened so as to prevent the spread of this invasive thrips to other parts of India. Regular monitoring of *T. parvispinus* in other parts of India is also essential as it may attain pest status especially within the territory of our country. Considering the polyphagous nature of this thrips species, the chances of spread on economically important crops cannot be ruled out.

Since *T. parvispinus* may attain major pest status on cowpea, the report demands regular monitoring and surveys for this thrips species on cowpea. Keeping the above facts in view, the present trial was organized to study the incidence of flower bud thrips *T. parvispinus*, *M. distalis* and *M. usitatus* on cowpea.

Material and Methods

The studies were conducted to record the incidence of thrips; *T. parvispinus* (Karny), *M. distalis* (Karny) and *M. usitatus* (Bagnall) in cowpea during *rabi* 2020-2021 and 2021-2022 at the Instructional Research farm of IGKV, Raipur (C.G.) The popular cowpea variety 'Kashi Kanchan' was sown during *rabi* 2020-2021 and 2021-2022 under natural conditions (Control plot) without spraying any insecticide to record the incidence of thrips. Observations were recorded at weekly intervals by counting the number of thrips/ five flower buds from ten randomly selected plants. Thrips were tapped on a piece of paper kept below. The number of thrips collected on the paper were counted. The thrips specimens were collected from flowers of cowpea plant separately and kept in the glass vials containing 70% ethyl alcohol. The specimens were sent to ICAR-National Bureau of Agricultural Insect Resources (NBAIR), Bengaluru for identification.

Result and Discussion

The identification results received from ICAR-NBAIR revealed the presence of new invasive thrips, *T. parvispinus* (Karny). The other species *viz.*, *Megalurothrips distalis* (Karny) and *Megalurothrips usitatus* (Bagnall) were also identified in the specimens indicating the complex of thrips population in cowpea flowers. The details of species

identified are presented in the Table 1. This is the first record of *T. parvispinus* on cowpea from Raipur, Chhattisgarh.

The mean population/5 flower of cowpea thrips for the periods of *Rabi* 2020-2021 and 2021-2022 are shown in Table 2. Result revealed that the infestation of thrips started at flowering stage. In 2020-2021 mean population of thrips initiated was (1.09/5 flower) during 2nd SMW *i.e.*, 2nd week January and reached the peak (7.05/5 flower) during 6th SMW *i.e.*, 1st week February and in 2021-2022 infestation initiated (1.05/5 flower) during 2nd SMW *i.e.*, 2nd week of January and reached the peak (8.06/5 flower) during 6th SMW *i.e.*, 1st week of February. Average results of two years, resulted initial infestation of thrips (1.07/5 flower) during 2nd SMW *i.e.*, 2nd week of January and reached the peak (6.11/5 flower) during 6th SMW *i.e.*, 1st week of February. Thus, higher mean population of thrips was recorded during 6th SMW. The peak of thrips was observed during in the month of February in both the years *i.e.* 2020-2021 and 2021-2022.

According to Patel *et al.*, (2010) [9] population of thrips, *Megalurothrips* spp. was noticed on cowpea flowers in the month of March only, being maximum (3.91 thrips/flower) during fourth week of March which differs from the present findings.

Sharma *et al.*, (2019) [11] observed that the incidence of thrips *M. distalis* Karny commenced in the fourth week of August (35th SMW) with a mean population of 3.87 thrips/flower on cowpea. The population attained its peak during second week of September with a mean of 5.20 thrips/flower. Thereafter the pest population reduced gradually being lowest in the second week of October (41st SMW). These findings are also dissimilar to the present findings as the crop growing month is different.

Table 1: Thrips identified for the first time from Chhattisgarh

S.N.	Name of thrips species	Host plant	Identifier	Remarks
1.	<i>Megalurothrips distalis</i> (Karny)	Cowpea	Dr. Rachana R.R., Scientist (Germplasm Collection and Characterization), NBAIR, Bengaluru	First time identified from Chhattisgarh
2.	<i>Megalurothrips usitatus</i> (Bagnall)	Cowpea	Dr. Rachana R.R., Scientist (Germplasm Collection and Characterization), NBAIR, Bengaluru	First time identified from Chhattisgarh
3.	<i>Thrips parvispinus</i> (Karny)	Cowpea	Dr. Rachana R.R., Scientist (Germplasm Collection and Characterization), NBAIR, Bengaluru	Invasive reported on chilli First time reported from Chhattisgarh on cowpea

Table 2: Incidence of thrips (*Thrips parvispinus* (Karny), *Megalurothrips distalis* (Karny) and *Megalurothrips usitatus* (Bagnall) recorded in cowpea during *Rabi* 2020-2021 and 2021-2022

Month and week	SMW	Flower thrips/5 flower		
		2020-2021	2021-2022	Pooled mean
December III	51	0.00	0.00	0.00
December IV	52	0.00	0.00	0.00
January I	1	0.00	0.00	0.00
January II	2	1.09	1.05	1.07
January III	3	2.41	2.30	2.36
January IV	4	3.78	3.31	3.55
January V	5	4.19	4.13	4.16
February I	6	7.05	5.17	6.11
February II	7	3.15	8.06	5.61
February III	8	1.45	7.61	4.53
February IV	9	5.46	5.48	5.47
March I	10	4.11	4.11	4.11
March II	11	1.26	2.47	1.87
March III	12	0.63	1.45	1.04
March IV	13	0.00	0.00	0.00

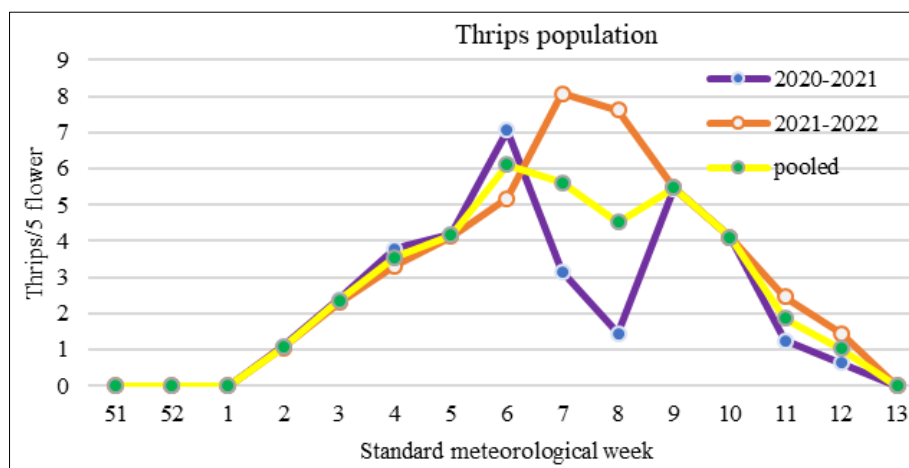


Fig 1: Mean thrips population

Conclusion

Thus, the present studies conducted on the incidence of thrips on cowpea at Raipur, Chhattisgarh revealed that three thrips species *Thrips parvispinus* (Karny), *Megalurothrips distalis* (Karny) and *Megalurothrips usitatus* (Begnall) were found and identified from cowpea flowers from IGKV, Raipur during the study period. Population of thrips, *Megalurothrips distalis* (Karny), *Megalurothrips usitatus* (Begnall), *Thrips parvispinus* (Karny), initiated at the flowering stage during 2nd week January and reached the peak during 1st week February.

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