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Thrips Population Diversity in Summer Groundnut

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Abstract A survey was conducted during *rabi*/of summer 2014 in selected summer groundnut growing places in North Karnataka (Bagalkot, Badami, Bilgi, Vijayapur, Gadag, Uttar Kannada, Kumta and Dharwad) to study the thrips population diversity. The observations such as taxonomic identification, population count, incidence of bud necrosis disease, response to recommended dosage of insecticide dimethoate 30EC@ 1.75ml/l were recorded. Thrips population of Badami, Bilgi, Vijayapur and Kumta were toxonomically identified as *Scirtothrips dorsalis* whereas, Gadag and Dharwad population consisted *S. dorsalis* and *Thrips palmi.* The observations on thrips population and incidence of groundnut bud necrosis disease in the field indicated highest numner of thrips and percent bud necrosis in Badami followed by Bilgi and it was least in Gadag. The response of thrips population from six locations to dimethoate 30 EC @ 1.75 ml/l revealed that thrips mortality was more than 90% in all the locations tested. Dimethoate 30 EC @ 2.00 ml/l was used by the farmers of Bilgi, Gadag and Dharwad for the management of thrips. However, monocrotophos 35 EC @ 1 ml/l, lambdacyhalothrin 5 EC@ 1 ml/l and imidacloprid 17.8 SL @ 0.5 ml/l were respectively used by farmers of Vijayapur, Kumta and Badami.

Keywords Thrips, Population, Diversity, Groundnut.

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Introduction

Groundnut or peanut *Arachis hypogaea* L. (Fabaceae) is a valuable cash crop for millions of small scale farmers in the semi-arid tropics and is the principal oilseed crop in India. Among insect pests, thrips are most destructive sucking insect causing damage to the crop, especially on crops in post rainy season. Among different species *Frankliniella hultzeri* Trybom, *Thrips palmi* Karny and *Scirtothrips dorsalis* Hood are considered as important. They are important sucking insect pests on groundnut crop known to cause yield loss and also responsible for spreading a viral disease called bud necrosis in groundnut. They feed by rasping the leaf surface and suck the released plant fluid which causes tiny scars on leaves and leads to stunted growth. Damaged leaves may become papery and distorted, infested terminals lose their color and curls upwards. They can be present at any time of the year but are most numerous in the post-rainy season. Groundnut bud necrosis disease (GBND) is an economically important disease of groundnut caused by groundnut bud necrosis virus (GBNV), vectored by *Thrips palmi*

Karny [1]. PBND incidence range from 5 to 80% in all major groundnut growing areas of India and it cause yield losses up to 50% [2]. The minute size and cryptic behavior of thrips makes them difficult to detect in the field and on plants. Many species have spread from their original natural habitat, reproduce rapidly and cause significant economic losses. Trearments against thrips are often specific, especially for thrips that have acquired insecticide resistant [3]. As a fundamental first step these treatments require the correct and unambiguous identification of species [4]. In this view taxonomic diversity, variation in population of thrips and percent bud necrosis in summer groundnut across the six geographical regions of Northern Karnataka are discussed and presented.

Table 1. Taxonomic identification results of thrips collected on *rabi*/summer groundnut.

Sl. No.	District/Location	Species Identified as	Order : Family
1	Bagalkot (Badami)	*Scirtothrips dorsalis*	
2	Bagalkot (Bilgi)	*Scirtothrips dorsalis*	
3	Vijayapur (Devapur)	*Scirtothrips dorsalis*	Thysanoptera: Thripidae
4	Gadag (Naregal)	*Scirtothrips dorsalis* and *Thrips palmi*	
5	Uttar kannada (Kumta)	*Scirtothrips dorsalis*	
6	Dharwad (Narendra)	*Scirtothrips dorsalis* and *Thrips palmi*	

Materials and Methods

The fields of six locations viz .Kerur (Bagalkot, Badami), Korti (Bagalkot, Bilgi), Devapur (Vijayapur), Naregal (Gadag), Handigona (Uttar Kannada, Kumta) and Narendra (Dharwad) in five districts (Bagalkot, Vijayapur, Dharwad, Gadag and Uttara Kannada) covering major summer groundnut growing areas of North Karnataka was selected for study with an aim to derive the information on taxonomic diversity of thrips, population count, incidence of bud necrosis and insecticide usage pattern on *rabi*/summer groundnut in North Karnataka. To study the taxonomic diversity, thrips samples were stored in 70% alcohol and later got identified by Dr Vikas Kumar, Scientist C, Center for DNA Taxonomy, Molecular Systematics Division, Zoological Survey of India M Block, New Alipore, Kolkata. Thrips population was counted on 10 terminal buds in each field and such of 3 fields in each village was selected for recording observations. Incidence of bud necrosis disease was also recorded by counting the number of bud necrosis affected plants and total number of groundnut plants in a meter row. Observations were made in five spots in each field. The name and dosage of insecticides sprayed, stage of the crop and variety grown were also recorded in all the fields, and also response of thrips to recommended dosage of dimethoate @ 1.75 ml/l was studied in all the visited places by conducting bioassay. Dimethoate 30 EC solution was prepared by dissolving 1.75 ml of insecticide in a liter of water. The groundnut leaves free from any insect incidence and damage was picked from the plant grown under controlled condition and dipped in the solution for 10 seconds and shade dried for 30 minutes to dry the insecticide solution present on the leaf surface. The cut end of the leaves was embedded in wet cotton so as to keep the leaves turgid. The entire leaf arena was placed in a small plastic box and 20 thrips of similar size were released by collecting from the groundnut field visited. After releasing the thrips lid of plastic box was closed for 24 h and later thrips mortality was recorded. Three replications were observed in each location and mortality of thrips in water dipped leaves was recorded after 24 h. Corrected percent mortality was worked out as per the formula given below [5].

$$\text{Corrected percent mortality} = \frac{T - C}{100 - C} \times 100$$

Where, T= Percent mortality in treatment, C = Percent mortality in control.

Results and Discussion

Taxonomic identification results of thrips from all the selected locations revealed that thrips population of Kerur (Bagalkot, Badami), Korti (Bagalkot, Bilgi), Devapur (Vijayapur) and Handigona (Uttar Kannada, Kumta) were identified as *Scirtothrips dorsalis*, whereas Narendra (Dharwad) and Naregal (Gadag) population consists of *S. doraslis* and *Thrips palmi* (Table 1). Fortyfive intraspecific populations of car-

Table 2. Thrips population, insecticide usage pattern and incidence of bud necrosis on *rabi*/summer groundnut.

Location	Thrips/ Terminal bud	% incidence of bud necrosis	Insecticides used with dosage	Variety of the crop	Stage of crop
Badami (Kerur)	15.10	16.50	Imidacloprid @ 0.5 ml/l- chlorpyriphos @ 2.5 ml/l	GPBD-4	40 days
Bilgi (Korti)	13.30	14.30	Dimethoate @ 2 ml/l-λ -cyhalothrin@ 2 ml/l	TMV-2	35 days
Vijayapur (Devapur)	12.90	10.20	Monocrotophos @ 2 ml-λ-cyhalothrin @ 1ml/l	TMV-2	45 days
Gadag (Naregal)	9.10	2.70	Dimethoate @ 2ml/l- profenophos @ 2.5 ml/l	TAG-24	45 days
Kumta (Handigona)	13.10	4.10	Monocrotophos @ 1 ml/l- parathion @ 2 ml/l	TMV-2	50 days
Dharwad (Narendra)	11.90	3.80	Dimethoate @ 2 ml/l-profenophos@ 2.5 ml/l-emamectin benzoate @ 2.0g/l	Dh-86	37 days

damom thrips *Scirtothrips cardamon,* from different geographical regions of India were morphologically identical [6]. Among the six visited locations, the highest number of thrips and percent bud necrosis were recorded in Badami (15.10 thrips/terminal bud and 16.50%). Similarly lowest number of thrips and percent bud necrosis were observed in Gadag (9.00 thrips/terminal bud and 2.70%). Variation in population of this pest between the localities may be due to variation in the microclimate, crop ecology and also cultivation practices followed by the farmers. As such there were no earlier published reports to corroborate the results of present study (Table 2).

Type of insecticide and dosage used varied from location to location. However, dimethoate 30 EC @ 2.00 ml/l was used by the farmers of Korti (Bilgi, Bagalkot), Naregal (Gadag) and Narendra (Dharwad) for the management of thrips. However, monocrotophos 50 EC @ 1 ml/l, lambdacyhalothrin 5 EC @ 1 ml/l and imidacloprid 17.8 SL @ 1 ml/l were respectively used by farmers of Devapur (Vijayapur), Handigona (Kumta, Uttara Kannada) and Kerur (Badami, Bagalkot) (Table 2). The insecticide usage pattern and dosage of insecticides used to manage insect pests on summer groundnut varied across the survey locations indicating there was no definite insecticide usage pattern followed by the farmers in places where survey was conducted. This might be due to the fact that most of the farmers had small holdings and were economically poor, illiterate and were using insecticides and other inputs supplied by agrochemical dealers on credit basis. Lack of good extension services to the nook and corner of our country side may be another reason. Further, farmers were using higher than the recommended dosage. This variation might be due to the fact that majority of the farmers purchase insecticides on the advice of pesticide dealers. Present findings are in line with the reports of Lingappa et al. [7] who reported that consumption pattern of different insecticides belonging to different groups varied across the geographic locations primarily based on the dealer recommendation, intensity of pest and diseases, knowledge level of farmers and availability of particular insecticide and socio-economic condition of the farmers.

Table 3. Response of thrips collected on *rabi*/summer groundnut to recommended dosage (@ 1.75 ml/l) of dimethoate 30 EC.

Location	Percent corrected mortality
Bagalkot (Badami)	93.30
Bagalkot (Bilgi)	95.14
Vijayapur (Devapur)	92.15
Gadag (Naregal)	91.53
Uttar kannada (Kumta)	94.71
Dharwad (Narendra)	93.88

The results of bioassay of thrips from six different locations revealed that, the per cent mortality of thrips varied from 91.53 to 95.14. Highest percent mortality was recorded in Bilgi (95.14%) followed by Kumta (94.71 %). However, lowest percent mortality (91.53%) was observed in Gadag population (Table 3). These investigations are in agreement with [8] who reported that dimethoate 30 EC found effective against thrips in groundnut by registering maximum reduction of pest population. Dimethoate 30 EC @ 300g a.i./ha was found most effective in reducing thrips

population at 3 and 7 days after spray of insecticide in cotton crop [9]. Dimethoate was the best one against thrips in okra by providing maximum reduction up to 92.3% after first day, 100% after third day and start losing its efficacy after seventh day by providing 87.7% reduction in thrips population [10].

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