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Assessment of relative abundance of black thrips, *Thrips parvispinus* (Karny) in major chilli growing areas of Karnataka

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Abstract

A survey was conducted across major chilli growing districts of Karnataka such as Kolar, Mysuru, Haveri, Bellary, Raichur, Belagavi and Bagalkot to assess the relative abundance of different thrips species occurring on chilli. The collected thrips specimens from these localities were submitted to the taxonomist for identification. Results revealed that, totally six thrips species such as *Thrips parvispinus* Karny, *Scirtothrips dorsalis* Hood, *Thrips palmi* Karny, *Frankliniella schultzei* Trybom, *Thrips florum* Schumtz and *Thrips hawaiiensis* Morgan were recorded from these surveyed districts. Among these species, *Thrips parvispinus* Karny found to be dominated, which accounts for over 93.87 per cent of the total thrips population recorded in all surveyed regions, followed by *Scirtothrips dorsalis* Hood (22.75%), *Thrips palmi* Karny (0.64%), *Frankliniella schultzei* Trybom (0.25%), *Thrips florum* Schumtz (0.31%) and *Thrips hawaiiensis* Morgan (0.27%). The high prevalence of *T. parvispinus* across surveyed districts may be due to its exceptional adaptability to different weather conditions prevailing in chilli growing areas, favorable host availability and also limited natural predation or parasitization. Hence, the present study underscores the need for targeted pest management strategies focused on the dominant species *T. parvispinus* to mitigate potential yield losses in chilli production, while monitoring the regional prevalence of secondary thrips species to ensure comprehensive pest control measures.

Keywords: Chilli, black thrips, pest prevalence, thrips taxonomy and species diversity

Introduction

Chilli (*Capsicum annuum* L.), a vital commercial crop, belongs to the Solanaceae family and is widely cultivated across the world for its economic and nutritional significance. India is the leading producer and exporter of chilli, contributing around 36% of global production. Major chilli producing states include Andhra Pradesh, Telangana, Karnataka, Madhya Pradesh and Maharashtra. The crop is highly valued for its rich content of vitamins A, C and E, along with antioxidants and capsaicin, which provides medicinal benefits such as pain relief and anti-inflammatory effects (Saleh *et al*., 2018) [5].

Despite its economic importance, chilli cultivation faces numerous challenges, particularly from biotic stresses such as insect pests. Among these, thrips are a significant concern, causing severe damage to leaves and fruits, leading to substantial yield losses. Nearly 25 insect pests have been reported attacking chilli crops in India, including thrips, mites, aphids, whiteflies, fruit borers and plant bugs. Among these, *Scirtothrips dorsalis* Hood (Thripidae: Thysanoptera) has been considered a major pest in chilli cultivation. However, in recent years, the emergence of the invasive thrips species *Thrips parvispinus* (Karny), commonly known as Black Thrips, has posed an even greater threat to chilli production.

First recorded in India on papaya (*Carica papaya* L.) in Bengaluru, *T. parvispinus* has been reported on various host plants, including beans, eggplant, potato and strawberry. It has a broad host range, affecting not only agricultural crops but also ornamental plants such as Anthurium, Chrysanthemum and Gardenia. The larvae and adults of *T. parvispinus* inflict damage through direct feeding on leaves and growing buds, leading to stunted growth and yield reduction (Patel *et al*., 2022) [3].

The polyphagous nature, cryptic feeding behaviour, rapid reproduction and increasing resistance to conventional insecticides make *T. parvispinus* a particularly difficult pest to manage. The recent outbreaks of this invasive thrips species in key chilli-growing regions, including Telangana and Karnataka, necessitate the development of effective pest management strategies. Understanding the distribution and prevalence of *T. parvispinus* is crucial for devising targeted control measures to mitigate crop losses and ensure sustainable chilli production.

This study aims to assess the relative abundance of *T. parvispinus* and other thrips species in major chilli-growing

regions of Karnataka. The findings will provide valuable insights into the pest population dynamics, contributing to the formulation of integrated pest management (IPM) strategies to enhance chilli productivity and safeguard farmer livelihoods.

Materials and Methods

A roving survey was conducted in eight major chilli growing districts of Karnataka (Mysuru, Kolar, Raichur, Bellary, Dharwad, Haveri, Belagavi and Bagalkot) from January to March 2024 to assess the species composition of thrips on chilli plants. In each district, eight fields were surveyed across two taluks and four villages. Thrips were collected by tapping the growing tips and flowers of chilli plants onto a white paper board and fallen thrips were collected using a fine camel hair brush into 2 ml vials containing 70% ethanol. Approximately 70-80 thrips were collected from each field. To ensure correct species identification, 20 specimens from each field were sent to Dr. Rachana R. R. at NBAIR, Bengaluru, for morphological identification.

After species identification, the remaining thrips specimens (50-60) from each field were sorted by species under a stereomicroscope. To assess the relative abundance of each species, thrips were randomly selected from each locality and the number of species was counted and segregated based on their morphological characters. This procedure was repeated for all collections and the relative abundance of each species was calculated by determining the proportion of each species relative to the total number of species in the sample in the laboratory. This method allowed for a comprehensive assessment of thrips distribution across the surveyed fields.

Results and Discussion

Among the six different species recorded on chilli in the major growing districts of Karnataka, namely Kolar, Mysuru, Haveri, Bellary, Raichur, Belagavi and Bagalkot, *T. parvispinus* was the most abundantly occurring species, representing 93.87% of the total thrips population across all localities. The second most prevalent species was *S. dorsalis* (22.75%), which was present in all surveyed areas except for Mysuru and Bagalkot, where the abundance was comparatively lower. In these regions, *T. parvispinus* was still the dominant species, but *S. dorsalis* was more frequently encountered. The next most commonly found species were *T. palmi* (0.64%), *F. schultzei* (0.25%), *T. florum* (0.31%) and *T. hawaiiensis* (0.27%), although these species were observed in much lower proportions compared to *T. parvispinus*. (Table 1,2 & Figure 1,2).

Previous studies showed that under field experiments which was carried out in Telangana, the findings documented the significant role of *Scirtothrips dorsalis* in certain environments, especially in areas where other thrips species, like *Frankliniella schultzei*, are less prevalent. *F. schultzei*, in fact, was found to dominate blossom thrips populations on chilli flowers, comprising 84.40% of the population in some areas. This indicates that *F. schultzei* may be a primary pest species on chilli flowers, causing substantial crop damage and yield loss, thus necessitating targeted pest control measures for this species.

Among the four different species occurring on tomato *viz*, *T. palmi, S. dorsalis, F. schultzei and T. tabaci, the T. palmi* was m o r e a b undantly occurred on tomato in all localities where the survey was conducted (45.50%). The next dominant species was *S. dorsalis* (22.00%) in all localities except Mysuru and Belagavi districts, whereas, in case of Mysuru, Bengaluru rural, Haveri and Bagalkot regions, *F. schultzei* was abundant as compared to other species. Interestingly, in Mandya, Haveri and Bagalkot district *T. tabaci* was recorded up to 12.00, 12.00 and 16.00 per cent, respectively as compared to other districts surveyed.

Table 1: Different species of thrips recorded during survey carried out in major chilli growing localities of Karnataka during 2024

Locality			No. of fields	Different species of Thrips
District	**Taluk**	**Village**		
Mysuru	Mysuru	Karaknalli	Field 1	*Thrips parvispinus* Karny, *Scirtothrips dorsalis* Hood and *Thrips palmi* Karny
			Field 2	*Thrips parvispinus* Karny and *Scirtothrips dorsalis* Hood
		Yelachahalli	Field 1	*Thrips parvispinus* Karny, *Thrips palmi* Karny and *Scirtothrips dorsalis* Hood
			Field 2	*Thrips parvispinus* Karny, *Thrips palmi* Karny and *Scirtothrips dorsalis* Hood
	Hunsur	Tenkanakoppalu	Field 1	*Thrips parvispinus* Karny and *Scirtothrips dorsalis* Hood
			Field 2	*Thrips parvispinus* Karny, *Frankliniella schultzei* Trybom and *Scirtothrips dorsalis* Hood
		Kommegowdan, Koppalu	Field 1	*Thrips parvispinus* Karny, *Thrips palmi* Karny and *Scirtothrips dorsalis* Hood
			Field 2	*Thrips parvispinus* Karny and *Scirtothrips dorsalis* Hood
Kolar	Srinivaspura	Mogilahalli	Field 1	*Thrips parvispinus* Karny, *Thrips palmi* Karny and *Scirtothrips dorsalis* Hood
			Field 2	*Thrips parvispinus* Karny, *Thrips palmi* Karny and *Scirtothrips dorsalis* Hood
		Chaldiganahalli	Field 1	*Thrips parvispinus* Karny, *Thrips hawaiiensis* Morgan
			Field 2	*Thrips parvispinus* Karny, *Thrips palmi* Karny and *Scirtothrips dorsalis* Hood
	Mulabagilu	Vaddahalli	Field 1	*Thrips parvispinus* Karny, *Scirtothrips dorsalis* Hood and *Thrips palmi* Karny
			Field 2	*Thrips parvispinus* Karny, *Scirtothrips dorsalis* Hood and *Thrips palmi* Karny
		Gudipalli	Field 1	*Thrips parvispinus* Karny and *Scirtothrips dorsalis* Hood
			Field 2	*Thrips parvispinus* Karny and *Scirtothrips dorsalis* Hood
Belagavi	Athani	Chamkeri	Field 1	*Thrips parvispinus* Karny *Thrips palmi* Karny *Scirtothrips dorsalis* Hood
			Field 2	*Thrips parvispinus* Karny *Scirtothrips dorsalis* Hood
		Yankanchi	Field 1	*Thrips parvispinus* Karny *Scirtothrips dorsalis* Hood and *Thrips palmi* Karny
			Field 2	*Thrips parvispinus* Karny *Scirtothrips dorsalis* Hood
	Gokak	Arabhavi	Field 1	*Thrips parvispinus* Karny *Frankliniella schultzei* Trybom *Scirtothrips dorsalis* Hood
			Field 2	*Thrips parvispinus* Karny *Scirtothrips dorsalis* Hood *Thrips palmi* Karny

		Sindikurbet	Field 1	*Thrips parvispinus* Karny *Thrips palmi* Karny *Scirtothrips dorsalis* Hood
			Field 2	*Thrips parvispinus* Karny *Scirtothrips dorsalis* Hood
Bagalkot	Bagalkot	Bevur	Field 1	*Thrips parvispinus* Karny and *Scirtothrips dorsalis* Hood
			Field 2	*Thrips parvispinus* Karny and *Scirtothrips dorsalis* Hood
		Tulsigeri	Field 1	*Thrips parvispinus* Karny, *Thrips florum* Schumtz and *Thrips palmi* Karny
			Field 2	*Thrips parvispinus* Karny and *Scirtothrips dorsalis* Hood
	Bilagi	Yedahalli	Field 1	*Thrips parvispinus* Karny, *Scirtothrips dorsalis* Hood and *Thrips palmi* Karny
			Field 2	*Thrips parvispinus* Karny and *Thrips florum* Schumtz
		Bavalatti	Field 1	*Thrips parvispinus* Karny and *Scirtothrips dorsalis* Hood
			Field 2	*Thrips parvispinus* Karny, *Scirtothrips dorsalis* Hood and *Thrips florum* Schumtz
Dharwad	Dharwad	Dharwad rural	Field 1	*Thrips parvispinus* Karny and *Scirtothrips dorsalis* Hood
			Field 2	*Thrips parvispinus* Karny and *Scirtothrips dorsalis* Hood
		Garag	Field 1	*Thrips parvispinus* Karny and *Frankliniella schultzei* Trybom
			Field 2	*Thrips parvispinus* Karny, *Scirtothrips dorsalis* Hood and *Thrips palmi* Karny
	Hubli	Hebsur	Field 1	*Thrips parvispinus* Karny and *Scirtothrips dorsalis* Hood
			Field 2	*Thrips parvispinus* Karny, *Scirtothrips dorsalis* Hood and *Thrips palmi* Karny
		Karadikoppa	Field 1	*Thrips parvispinus* Karny and *Thrips florum* Schumtz
			Field 2	*Thrips parvispinus* Karny and *Scirtothrips dorsalis* Hood
Haveri	Hangal	Mudur	Field 1	*Thrips parvispinus* Karny, *Scirtothrips dorsalis* Hood and *Thrips palmi* Karny
			Field 2	*Thrips parvispinus* Karny and *Scirtothrips dorsalis* Hood
		Allapur	Field 1	*Thrips parvispinus* Karny and *Scirtothrips dorsalis* Hood
			Field 2	*Thrips parvispinus* Karny, *Frankliniella schultzei* Trybom and *Thrips palmi* Karny
	Byadgi	Bisalhalli	Field 1	*Thrips parvispinus* Karny and *Scirtothrips dorsalis* Hood
			Field 2	*Thrips parvispinus* Karny, *Thrips palmi* Karny and *Scirtothrips dorsalis* Hood
		Belakeri	Field 1	*Thrips parvispinus* Karny, *Frankliniella schultzei* Trybom
			Field 2	*Thrips parvispinus* Karny, *Scirtothrips dorsalis* Hood and *Thrips florum* Schumtz
Bellary	Bellary	Kudathini	Field 1	*Thrips parvispinus* Karny and *Frankliniella schultzei* Trybom
			Field 2	*Thrips parvispinus* Karny and *Scirtothrips dorsalis* Hood
		Siddammanhalli	Field 1	*Thrips parvispinus* Karny, *Thrips hawaiiensis* Morgan and *Scirtothrips dorsalis* Hood
			Field 2	*Thrips parvispinus* Karny, *Frankliniella schultzei* Trybom and *Scirtothrips dorsalis* Hood
	Sandur	Talur	Field 1	*Thrips parvispinus* Karny and *Thrips florum* Schumtz
			Field 2	*Thrips parvispinus* Karny and *Scirtothrips dorsalis* Hood
		Kodal	Field 1	*Thrips parvispinus* Karny, *Thrips hawaiiensis* Morgan and *Thrips florum* Schumtz
			Field 2	*Thrips parvispinus* Karny and *Scirtothrips dorsalis* Hood
Raichur	Raichur	Ganmur	Field 1	*Thrips parvispinus* Karny and *Scirtothrips dorsalis* Hood
			Field 2	*Thrips parvispinus* Karny, *Scirtothrips dorsalis* Hood and *Thrips palmi* Karny
		Shakhavadi	Field 1	*Thrips parvispinus* Karny and *Scirtothrips dorsalis* Hood
			Field 2	*Thrips parvispinus* Karny, *Scirtothrips dorsalis* Hood and *Thrips palmi* Karny
	Devdurga	Gabbur	Field 1	*Thrips parvispinus* Karny and *Scirtothrips dorsalis* Hood
			Field 2	*Thrips parvispinus* Karny and *Scirtothrips dorsalis* Hood
		Shakapur	Field 1	*Thrips parvispinus* Karny, *Scirtothrips dorsalis* Hood and *Thrips palmi* Karny
			Field 2	*Thrips parvispinus* Karny and *Scirtothrips dorsalis* Hood

Table 2: Relative abundance of different thrips species observed on chilli during survey carried out in major chilli growing localities of Karnataka during 2024

District	*Thrips parvispinus*		*Scirtothrips dorsalis*		*Thrips palmi*		*Frankliniella schultzei*		*Thrips florum*		*Thrips hawaiiensis*		Total
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	
Mysuru	387.00	93.93	20.00	5.03	4.00	0.83	1.00	0.21	-	-	-	-	412.00
Kolar	448.00	94.91	18.00	3.98	5.00	0.93	-	-	-	-	1.00	0.18	472.00
Belagavi	399.00	92.79	26.00	6.24	4.00	0.81	1.00	0.20	-	-	-	-	430.00
Bagalkot	453.00	92.82	29.00	6.08	3.00	0.55	-	-	3.00	0.55	-	-	488.00
Dharwad	412.00	93.84	23.00	5.39	2.00	0.39	1.00	0.19	1.00	0.19	-	-	439.00
Haveri	453.00	94.76	19.00	3.97	3.00	0.49	2.00	0.33	1.00	0.16	-	-	478.00
Bellary	425.00	93.20	25.00	5.71	-	-	2.00	0.35	2.00	0.37	2.00	0.37	456.00
Raichur	452.00	94.75	22.00	4.76	3.00	0.49	-	-	-	-	-	-	477.00
Mean	428.62	93.87	22.75	5.14	3.00	0.64	0.87	0.25	0.87	0.31	0.37	0.27	456.05

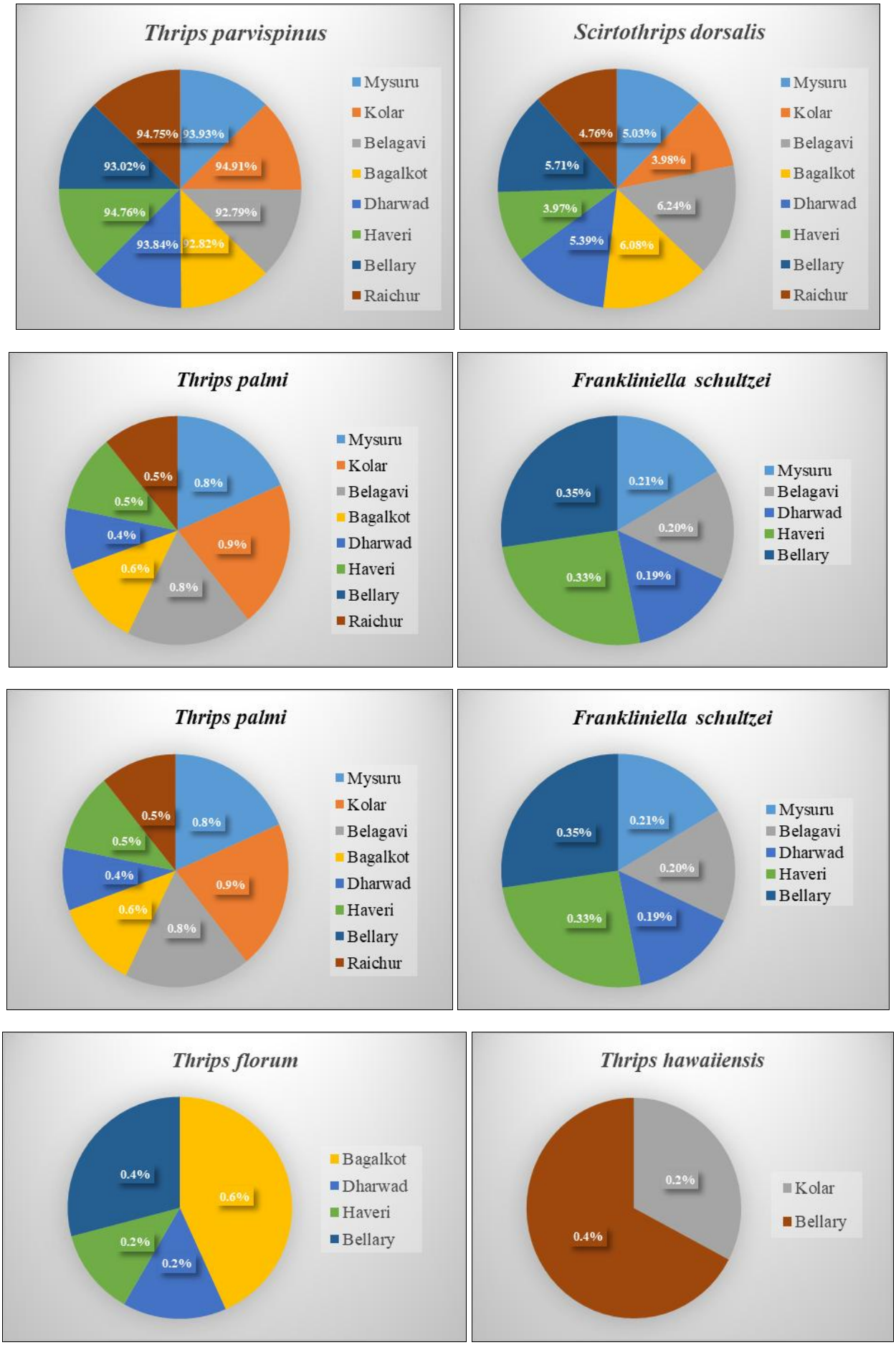

Fig 1: Relative abundance of thrips species found on chilli in major chilli growing districts of Karnataka

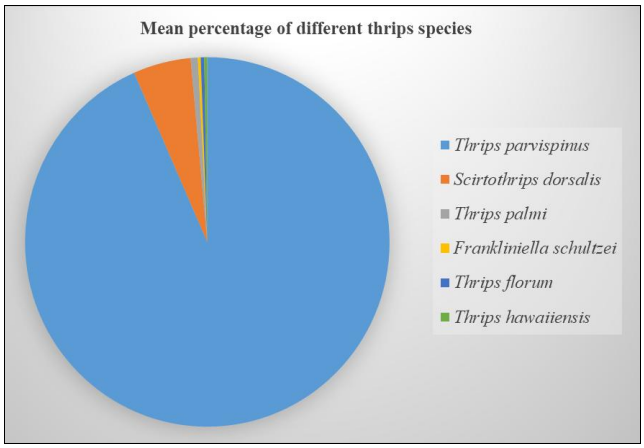

Fig 2: Mean percentage of different thrips species found on chilli in major chilli growing districts of Karnataka

Conclusion

Thrips parvispinus dominated the thrips population, comprising over 93.87%. The second most prevalent species was *Scirtothrips dorsalis* at 22.75%, while other species like *Thrips palmi* and *Frankliniella schultzei* were found in much lower numbers. The high dominance of *T. parvispinus* suggests its strong adaptability to local conditions, highlighting the need for targeted pest management strategies focused on this species to minimize yield losses. Monitoring secondary species, especially *S. dorsalis*, is also essential for effective pest control.

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