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Research Article

# Seasonal abundance of onion thrips, *Thrips tabaci* Lindeman and their natural enemies under dry land conditions.

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**Abstract**

Seasonal incidence studies indicated the prevalence of high population of thrips in the kharif season especially during August to October. Roving survey indicated that, maximum mean population of thrips was recorded in Muddebihal taluka while, it was minimum in Bijapur taluka. Generally, the population of thrips occurrence on onion crop was very low during seedling stage and it was gradually increased during vegetative stage of the crop and reached a peak occurrence during physiological maturity stage. Maximum population of spiders and coccinellid beetles were recorded in Basavana bagewadiand Bijapur talukas, respectively whereas, minimum number of spiders and coccinellid beetles were recorded in Muddebihal and Sindagi talukas, respectively.

**Key words:** Seasonal abundance, Thrips tabaci Lindeman.

## INTRODUCTION

Onion (*Allium cepa. L.*) is one of the important vegetable crops of Alliaceae family originated from Central Asia (Brewster, 1994) and it is growing mainly for its bulb, which is used almost daily in every home (Sani and Jaliya, 2009). It has been considered as rich source of carbohydrates, protein, vitamin C and minerals like phosphorus and calcium. Onion is grown in an area of 10.15 lakh ha with a production of 247.63 lakh mt and productivity of 24.39 t/ ha in India. Maharashtra, Karnataka, Andhra Pradesh, Gujarat, Bihar and Madhya Pradesh are the major onion growing states of the country. In Karnataka, four major districts viz., Dharwad, Chitradurga, Gadag and Bijapur contributes 59% of the total production and drill sowing is a common practice in these districts. In Bijapur, onion occupied an area of 11,383 ha with an annual the production of 2, 78,326 tonnes at a productivity of 24.45 tonnes / ha.

*Thrips tabaci* is considered an indirect pest of onion because, damage was seen on leaves rather than the marketable portion of the crop, the bulb. Thrips feeding on onion causes silvery leaf spots that turn into white blotches along the leaves due to removal of cellular content followed by the development of silvery patches, curling of leaves and finally reduced weight of onion bulb. This injury reduces the photosynthetic ability of the plant by destroying chlorophyll-rich leaf mesophyll and interferes with transportation of nutrients to the bulb causing up to 60% yield loss (Molenaar, 1984). Therefore to combat the insect pests, farmers are solely dependent on chemical pesticides. Onion grower typically applies insecticides regularly on weekly basis, resulting in 9-12 insecticides applications per crop season irrespective of knowing the time and incidence of this pest in right time and right manner. This was the reason arises from some farmers through personal contact during the present study. This might be due to varied stage wise (egg, larval. adult) incidence of thrips in a chronological order over period which seems to be holds good or congenial condition for incidence survivability of this pest. And also due to date of sowing the population of thrips will vary. Hence viewing to this point present study with regarding to seasonal incidence

and abundance of thrips seems to be highly effective in creating awareness in farmers community and also researchers for further need full works in present aspect.

## MATERIALS AND METHOD

In a present investigation a roving survey was undertaken in *kharif* season from seedling stage to till harvest of the crop in Bijapur district covering Bijapur, Sindagi, Indi and Basavana Bagewadi talukas during 2012. From each taluka, two villages were selected and from each village two fields were selected for the study. Observations were recorded at three different crop growth stages *viz.*, seedling (as whole plant), vegetative and physiological maturity stage by recording number of nymph/adult thrips per leaf after split opening of leaf sheath on five randomly selected plants, respectively in each field. Simultaneously observations on natural enemies were also recorded.

## RESULTS AND DISCUSSION

Though the occurrence of onion thrips has been reported from Bijapur district, the information on the level of incidence is lacking. In view of this, roving survey was conducted from June 2012 to October 2012 covering major onion growing talukas of Bijapur district.

### Number of thrips population per five plants

The occurrence of thrips was observed during seedling stage and it was gradually increased its population during vegetative stage and reached a peak during physiological maturity stage of the crop. Among the different talukas surveyed, higher population of thrips (39.3 /5 plants) was recorded in Muddebihal while, lower population of thrips (13.0/5 plants) was noticed in Bijapur taluka. The population of onion thrips per five plants ranged from 11.20 to 14.00, 13.60 to 18.40, 30.20 to 46.60, 14.00 to 17.80 and 13.20 to 16.80 in Bijapur, Basavana Bagewadi, Muddebihal, Sindagi and Indi talukas, respectively, during seedling stage of onion crop. During vegetative stage of the crop, the lowest population of thrips (30.45 / 5 plants) was recorded in Bijapur talukas while the highest population of thrips (49.15/5 plants) was recorded in Mudhebihal taluka. During physiological maturity stage, higher population of thrips was recorded in all the talukas of Bijapur district ranging from 34.35 to 111.70 thrips /5 plants except Indi taluka, which recorded the lowest population of thrips (16.20/5 plants) as compared to vegetative stage of the crop (35.50 / 5 plants) while higher population of thrips (111.7 / 5 plants) clearly indicating that occurance of more population of thrips in early sown crop due to less rainfall received during early stage in all the talukas of Bijapur district, while, late sown crop recorded low thrips population due to high rainfall received during july and august month in all the talukas of Bijapur district. The present investigation was closely related with earlier workers, Hammon (2002) reported that, thrips population appeared in onion in early June and peaked at about 600 thrips per plant in mid-July and less than ten per plant in early August. Similarly, the results of Lee and Wen (1982) who reported that, though the incidence of thrips was found in onion throughout the year, higher population was recorded during dry season. Similar findings were also made by Krantz *et al.* (1978) who reported that, the number of thrips on onion crop increased rapidly during dry weather and decreased rapidly after rain. During the present study, among the different talukas surveyed Mudhebihal taluka had recorded the highest pest load of thrips on drill sown onion crop. This was due to dry weather accomplished during that period which helped the buildup of thrips population.

### Number of natural enemies per five plants

The present investigation helped to record the natural enemies in onion growing areas of Bijapur district. Among the natural enemies *viz.*, majorly spiders and coccinellid beetles were found in numerical count when compare to other natural enemies in different talukas of Bijapur district during the survey. The populations of both the predators were low during seedling stage of the crop which ranged from 0.80 to 1.40 spiders /5 plants in Basavan bagewadi and Muhebihal talukas. While the population of coccinellid beetles ranged from 0.95 to 1.15/5 plants in Indi and Bijapur talukas, respectively. Slight increased populations of both the predators were recordedduring vegetative stage of the crop. The higher populations of coccinellid beetles were recorded during vegetative stage as compared to seedling stage of the crop. During physiological maturity stage, the population of spiders ranged from 0.78 to 0.99 in all the talukas of Bijapur and Mudhebihal. While the highest populations of coccinellid beetles (1.45 /5 plants) was recorded in Bijapur taluka, whereas, the lowest population of beetles (0.95 / 5 plants) recorded in Basavan Bagewadi taluka. Since this was the first attempt made in regard to study of natural enemies fauna in onion cultivated ecosystem, there was lack of much available reports in this regard. So on contrary the present investigation may be seems to be a pioneer in this field, hence comparative research results with present investigation was not possible in real situation.

**Table 1. Population of *Thrips tabaci* Lindeman, during different growth stages of onion in respective talukas of Bijapur district.**

| Taluka | Village name | Site No | Population of thrips / 5 plants | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Seedling stage | | Vegetative stage | | Physiological maturity stage | |
| | | | Mean | S.D | Mean | S.D | Mean | S.D |
| Bijapur | Jumnal | 1 | 13.60 | 1.70 | 33.40 | 2.60 | 34.60 | 4.90 |
| | | 2 | 14.00 | 1.90 | 40.60 | 2.10 | 36.20 | 5.90 |
| | Savanalli | 1 | 11.20 | 1.50 | 24.00 | 6.40 | 51.60 | 4.90 |
| | | 2 | 13.20 | 1.80 | 23.80 | 4.10 | 55.00 | 5.70 |
| Mean | | | 13.00 | 1.70 | 30.40 | 3.80 | 44.40 | 5.40 |
| Bagewadi | Jayawadgi | 1 | 20.40 | 3.00 | 35.60 | 2.20 | 122.80 | 7.50 |
| | | 2 | 13.60 | 2.30 | 32.80 | 3.00 | 120.60 | 5.90 |
| | Ukkali | 1 | 18.40 | 2.30 | 31.80 | 3.30 | 76.40 | 1.70 |
| | | 2 | 16.00 | 2.90 | 31.20 | 6.10 | 72.40 | 2.40 |
| Mean | | | 17.10 | 2.60 | 32.80 | 3.80 | 98.10 | 4.40 |
| Muddhebihal | Gangnur | 1 | 46.60 | 3.50 | 54.60 | 6.60 | 101.40 | 8.40 |
| | | 2 | 40.00 | 5.50 | 52.80 | 9.30 | 117.00 | 8.10 |
| | Dannur | 1 | 30.20 | 3.30 | 44.80 | 2.80 | 94.60 | 1.90 |
| | | 2 | 40.40 | 6.20 | 44.40 | 5.50 | 88.20 | 6.60 |
| Mean | | | 39.30 | 4.60 | 49.20 | 6.10 | 100.30 | 6.30 |
| Sindgi | D. Hippargi | 1 | 16.40 | 3.10 | 34.40 | 1.10 | 95.60 | 5.000 |
| | | 2 | 14.00 | 2.70 | 32.80 | 4.10 | 110.40 | 13.70 |
| | Sindagi | 1 | 16.20 | 1.30 | 38.20 | 4.40 | 121.80 | 6.70 |
| | | 2 | 17.80 | 2.60 | 37.60 | 5.00 | 119.00 | 7.70 |
| Mean | | | 16.10 | 2.40 | 35.80 | 3.70 | 111.70 | 8.30 |
| Indi | Attarga | 1 | 13.20 | 1.9 | 39.60 | 5.50 | 17.80 | 1.30 |
| | | 2 | 16.20 | 2.60 | 32.20 | 6.50 | 18.40 | 4.60 |
| | Nagthan | 1 | 15.00 | 2.90 | 37.80 | 7.50 | 12.80 | 2.40 |
| | | 2 | 16.80 | 3.30 | 32.40 | 3.60 | 15.80 | 4.00 |
| Mean | | | 15.30 | 2.70 | 35.50 | 5.80 | 16.20 | 3.10 |

**Table 2. Population of natural enemies on onion thrips during different growth stage of onion in respective talukas of Bijapur district.**

| S no. | Taluka name | Village name | SITE | Seedling stage | | | | Vegetative stage | | | | Physiological maturity stage | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Spiders/ 5 plants | | CB / 5 plants | | Spiders/ 5 plants | | CB / 5 plants | | Spiders/ 5 plants | | CB / 5 plants | |
| | | | | M | S.D | M | S.D | M | S.D | M | S.D | M | S.D | M | S.D |
| 1 | Bijapur | Jumnal | 1 | 1.00 | 0.70 | 1.20 | 0.84 | 1.20 | 0.84 | 1.40 | 0.89 | 0.71 | 1.00 | 1.20 | 0.80 |
| | | | 2 | 1.20 | 0.80 | 1.00 | 1.00 | 1.00 | 1.00 | 1.20 | 0.84 | 0.71 | 1.00 | 1.40 | 0.90 |
| | | Savanalli | 1 | 1.20 | 0.80 | 1.40 | 0.89 | 1.20 | 1.30 | 1.20 | 0.84 | 0.84 | 0.80 | 1.40 | 1.30 |
| | | | 2 | 1.40 | 0.50 | 1.00 | 0.71 | 1.20 | 0.84 | 1.20 | 0.84 | 0.89 | 1.40 | 1.60 | 0.90 |
| | Mean | | | 0.95 | 0.70 | 1.15 | 0.86 | 1.15 | 0.99 | 1.25 | 0.85 | 0.78 | 1.05 | 1.40 | 0.90 |
| 2 | Basavan Bagewadi | Jayawadgi | 1 | 1.00 | 1.00 | 1.00 | 0.71 | 1.00 | 0.71 | 1.00 | 0.71 | 0.89 | 1.60 | 1.00 | 0.70 |
| | | | 2 | 1.20 | 0.80 | 1.20 | 0.84 | 1.20 | 0.84 | 1.00 | 0.71 | 0.71 | 1.00 | 0.80 | 0.40 |
| | | Ukkali | 1 | 1.20 | 0.80 | 1.00 | 1.22 | 1.40 | 1.14 | 1.00 | 1.00 | 1.00 | 1.00 | 0.80 | 0.80 |
| | | | 2 | 0.80 | 0.80 | 1.20 | 0.84 | 1.20 | 0.84 | 1.00 | 0.71 | 0.84 | 1.20 | 1.20 | 0.80 |
| | Mean | | | 0.80 | 0.80 | 1.10 | 0.90 | 1.20 | 0.88 | 1.25 | 0.78 | 0.86 | 1.20 | 0.90 | 0.60 |
| 3 | Muddebihal | Gangnur | 1 | 1.40 | 0.90 | 1.00 | 1.00 | 0.80 | 0.84 | 1.00 | 1.00 | 1.00 | 1.00 | 1.40 | 1.10 |
| | | | 2 | 1.40 | 0.50 | 0.80 | 0.84 | 1.40 | 0.89 | 1.20 | 0.84 | 1.30 | 1.20 | 1.40 | 1.30 |
| | | Dannur | 1 | 1.40 | 1.10 | 1.00 | 0.71 | 0.80 | 0.84 | 1.00 | 1.00 | 0.84 | 1.20 | 1.00 | 0.70 |
| | | | 2 | 1.40 | 1.10 | 1.20 | 0.84 | 1.00 | 0.71 | 1.00 | 0.71 | 0.84 | 1.20 | 1.60 | 1.10 |
| Mean | | | | 1.40 | 0.90 | 1.00 | 0.84 | 1.00 | 0.82 | 1.05 | 0.88 | 0.99 | 1.15 | 1.35 | 1.05 |
| 4 | Sindagi | D. Hippargi | 1 | 1.20 | 0.80 | 1.20 | 1.30 | 1.00 | 0.71 | 1.00 | 1.00 | 1.10 | 1.20 | 1.00 | 1.00 |
| | | | 2 | 1.20 | 1.30 | 0.80 | 0.84 | 1.00 | 0.71 | 0.80 | 0.84 | 0.84 | 1.20 | 1.00 | 1.00 |
| | | Sindagi | 1 | 1.20 | 0.80 | 1.40 | 1.14 | 1.00 | 1.22 | 1.00 | 0.71 | 1.00 | 1.00 | 1.60 | 1.10 |
| | | | 2 | 1.20 | 1.30 | 1.00 | 1.00 | 1.00 | 1.00 | 1.40 | 0.89 | 0.71 | 1.00 | 1.20 | 0.80 |
| | Mean | | | 1.20 | 1.00 | 1.10 | 1.07 | 1.0 | 0.91 | 1.05 | 0.86 | 0.91 | 1.10 | 1.20 | 0.90 |
| 5 | Indi | Atharga | 1 | 1.60 | 1.10 | 1.00 | 0.71 | 0.80 | 0.84 | 1.40 | 0.55 | 0.71 | 1.00 | 1.40 | 0.90 |
| | | | 2 | 1.00 | 0.70 | 1.00 | 1.00 | 1.00 | 0.71 | 1.00 | 0.71 | 0.84 | 1.20 | 1.80 | 1.10 |
| | | Nagthan | 1 | 1.40 | 0.50 | 1.00 | 0.71 | 1.00 | 0.71 | 0.80 | 0.84 | 0.84 | 1.20 | 1.20 | 1.30 |
| | | | 2 | 1.20 | 0.80 | 0.80 | 0.84 | 1.20 | 1.10 | 1.00 | 0.71 | 0.84 | 1.20 | 1.20 | 0.80 |
| | Mean | | | 1.05 | 0.70 | 0.95 | 0.81 | 1.00 | 0.84 | 1.05 | 0.70 | 0.80 | 1.15 | 1.40 | 1.00 |

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