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Population of *Thrips tabaci* Lindeman, 1889 in Onion Crop from district Mansehra, Khyber Pakhtunkhwa, Pakistan

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Abstract

The present study was carried out during December 2016 to March 2017 to investigate the population of *Thrips tabaci*. In the results of present study, a total number of 204 insects were collected. The material was sorted out into single family Thripidae with single genus *Thrips* and a single species i-e: *Thrips tabaci* Lindeman, 1889. *T. tabaci* were observed regularly and the numbers of thrips on plants were documented on each selected field. Mean numbers of thrips were significantly maximum population in F1 with (15.68%) followed by F5 and F10 with (11.76%). While minimum population in F3 with (6.37) and F2 with (6.86%) respectively.

Keywords: Onion, Pest, *Thrips tabaci*, population, Thripidae

1. Introduction

Mansehra is situated at the eastern part of Khyber Pakhtunkhwa Province of Pakistan. District Mansehra is geologically located at an altitude of 975.36 meters (32feet) and at latitude (34.34N) and longitude (73.20N). it is considered as zone of multiple climates therefore mostly rainfalls with growing period of 180 days in its Northern parts while 240 days in its Central parts during the Moonsoon season. Nearly 72,640 acres (area) of District is under Cultivation, 12,407-acre area is Irrigated lands while 60,407 acres fall in rainfall. Temperature of this area is Coldest during Winter while fall to low in top Mountainous areas. Sometimes, Snowfalls occur commonly at lower levels. It is also famous for the good quality of production in Cash Crops in Pakistan. The Chief Crops are Cultivated in this area includes; wheat, maize tomato, onion, tobacco and other vegetables [1].

Onion (*Allium cepa* (L)) is commonly known as piaz belongs to Alliaceae family, a biennial cross pollinated and herbaceous vegetable. The name Onia was given by Onia in 1703 BC close to the bank of Suez [2]. The onions vary in taste, shape and coloration. Bulbs having white, yellow, red coloration and topedo, round or flattened in shape. Bulbs are very delicious and are widely spiced and used in large variety of dishes on daily basis [3]. It has been considered as supply of micro food, minerals, salts, vitamins and as well as other nutrients. Onion can be widely used in every type of food such as spicy garnish, Cooked food and as fresh Salads. In addition to this they can be used as in pickle, base for curries and used as alternate dish [4].

Onions diet play an important role in preventing from heart diseases and others [5]. Bulb of onion is rich with phosphorous, carbohydrates and calcium. It has been suggested that the wide use of extract of onion should be stopped. It becomes responsible for decline in glycation in human body in case of hyperglycemia and diabetes mellitus [6]. *Allium cepa* is rich in Carbohydrates, Phosphorous, Sodium, Potassium and Protein. Mostly used for the treatment of infections in intestine. It has been found as an antifungal, antibacterial, antiviral, antioxidant, anti-inflammatory and hypoglycemic [7]. Alliums are important vegetables worldwide including Pakistan [8]. It has been noted that onions are subjected to many diseases due to attack of insect pests that may cause reduction in the yield and quality of crop [9].

Thrips are considered as most damaging pests of onion and related allium crops worldwide. Thrips are slender like in shape and nearly 2mm long in their body size. They can be seen when onions are cultivated and can be found in warmer regions [10].

Seven species of thrips were listed as pests of *Allium* cops of which *Thrips tabaci* is found to

be severe pest of allium crops [11]. These pests have wide range; their population can move from one crop to other due to climatic change or when crop is harvested [12]. Therefore, spatial and temporal arrival of population of onion thrips in onion crop can be variable and mostly unpredictable [13]. The population of thrips in an onion crop can increase suddenly due to dry weather or after rainfall. It has been pointed out that thrips attack the crop at its seedling stage and might cause dramatic loss in cabbage, cotton or in onion crop [14]. Moreover, onion is also attacked by bacterial and fungal diseases in addition to the attack by pests [15, 16]. Several insect groups cause threat to the yield of onion. The loss is not only caused by nymphs but also by the adults, having sucking and rasping type of mouth parts [17]. Pests can cause severe damage at the time of flowering of crop and severely affect the yield and production of seed of Crop [18]. It was therefore present study was designed to investigate the population of thrips in onion crop.

2. Materials and Methods

2.1 Study sites

The study sites were selected based on being important producers of onions in District Mansehra. Surveys in the ten selected fields in Mansehra (latitude 34.34° N and longitude 73.20° E, with an altitude of 975.36 meter were conducted during December 2016 to March 2017.

2.2 Collection and identification

Hand picking method was adopted for collecting the insects (pests) from the onion plants and collection was done manually from the study area based on host preference of insect in the field (F1-F10) insects per field. The images were documented using cannon power shot camera, identification was done by available literature [16-18]. Identified samples are kept in Insect Systematic Laboratory Department of Zoology, Hazara University Mansehra No insecticides or pesticides were used for the protection of crop when collection was carried out.

2.3 Killing and preservation

Insects were killed in killing jar containing cotton soaked with ethyl acetate, the insects were pinned with entomological pins kept into insect boxes with information tag having name of collector, Host plant and name of locality.

2.4 Data analysis

Data was analyzed with the help of statistical software SPSS version 10.0.

3. Results and Discussion

The current study was conducted to know the population of onion thrips in onion from district Mansehra Khyber Pakhtunkhwa, a survey was conducted in the different selected fields (Field-1 to Field-10) of the district Mansehra to discover the insect pests of onion during the year December 2016 to March 2017. In the results of this survey (excursion conducted daily), a total number of 204 insects were collected. This collection was taxonomically sorted out into family Thripidae with single genus *Thrips* and a single species i-e: *Thrips tabaci*. *T. tabaci* were observed regularly and the numbers of thrips plants were recorded on each selected field (Fig. 2 & 3). Mean numbers of thrips were significantly maximum population in F1 with (15.68%) followed by F5 and F10 with (11.76%). While minimum

population in F3 with (6.37) and F2 with (6.86%) respectively (Fig1). The seasonal abundance and distribution of thrips population on cotton crop was investigated from Central Greece. Additionally, it was observed that the increase in population of thrips may be economic loss to the agricultural crop [26].

Allium cepa is rich in Carbohydrates, Phosphorous, Sodium, Potassium and Protein. Mostly used for the treatment of infections in intestine. It has been found as an antifungal, antibacterial, antiviral, antioxidant, anti-inflammatory and hypoglycemic. Besides this, it was also noted that if the population of *Thrips tabaci* increases than it can cause loss in the onion crop [7]. Alliums are important vegetables worldwide including Pakistan [8]. It has been noted that onions are subjected to many diseases due to attack of insect pests that may cause reduction in the yield and quality of crop. Additionally, population of onion thrips can be voracious to the allium crop in addition to onion [9]. It has been reported that the damage cause by onion thrips in Onion crop. They further, stated that the onion crop is most preferred host thrips in addition to potato, sweet potato, and mustard crop [19]. The primary vegetables attacked by Onion thrips include Garlic, Cauliflower, bean, tomato, cucumber, small grains, cotton, potato, tobacco in addition to Onion crop. It was further, observed that the population of thrips may cause loss in these crops [20].

Population of thrips may have significant role in damaging allium crops. In addition to this, *Thrips tabaci* is an indirect pest of dried bulb onion because nymphs and adults feed upon fresh leaves as compared to other part of crop, causing silvery leaf spots and then leaves change into white blotches due to removing of cellular contents, sometimes causing leaves curling [21]. Beside damages to *Allium cepa* (Onion) its adult and larvae feed upon flower pedicels, buds and cause reduction in seed production in onion crop [22]. Onion thrips is a key insect pests of onion and other Allium species in many part of the world. Moreover, it has also been stated that population of thrips may be ravenous to alliums [23]. It has been reported that thrips cause severe damage to various crops cultivated in Africa, Europe, North and South America, Australia and Asia [24]. *Thrip tabaci* population are expressively higher in onion fields initiated front transplant in comparison with initial stages of seeds, apparently because the transplanted onions are larger and attractive for the thrips colonization and population [25]. Knowledge of population-level genetic differences can clarify variation among populations of insect vectors in their role in the epidemiology of specific viruses. Variation in competency to transmit *Tomato spotted wilt virus* (TSWV) that occurs among populations of *Thrips tabaci* related with the presence of cryptic species that revelation different modes of reproduction and host ranges. However, their findings suggested that vector competency of *T. tabaci* at any given location depends on the thrips and virus populations that are present [27]. *Thrips tabaci* drifts from the lower to the upper portion of the agricultural crops as the season progresses and plants increase in size. The population level of thrips on seedlings can be resolute by visual observations of leaf damage instead of scouting. The crop should be sprayed before the damage level is such that seedling leaflets have a cup-like appearance. Combined attack by thrips (14.6 per leaf) and jassid (4.6 per leaf) caused a 37.6% loss in the yield of seed cotton. Granule application at the seedling stage and foliar sprays at later stages is suggested as a control strategy.

Thrips and jassids appear to be mutually exclusive but the exact mechanism is not known [28]. The present study will be beneficial for pest control agencies related with Onion thrips control.

4. Conclusion

On the basis of our findings and compared with already available information about this pest it is concluded that proper monitoring of crop should be carried out at time. So, that the pest may not reach to the economic threshold level. Moreover, Onion is very important crop worldwide and have great medicinal importance so it should be protected from these severe pests.

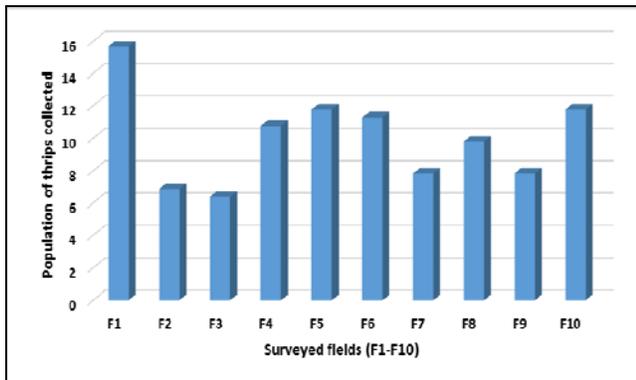


Fig 1: Showing the % population of onion thrips collected during the year 2016-2017



Fig 2: Onion crop at its initial growing stage



Fig 3: Observing Onion crop

5. Acknowledgement

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