

An investigation studies on *Tyrophagus tropicus* Robertson, 1959 (Acari: Astigmata: Acaridae)

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Abstract: The mite fauna from 12 stored food products in Punjab investigated during three years period i.e. March 2014 - Feb. 2017. 3240 samples from 10 districts were taken. 1220 samples out of 3240, were positive for mites. The present surveyed work revealed the differential frequency of occurrence and abundance of a mite species *Tyrophagus tropicus* in response to season to season environmental conditions (i.e., temperature, Relative humidity etc.) variation, food type. Out of 12 stored food sample examined, *Tyrophagus tropicus* reported only in Walnut samples.

Keywords: Stored food products, Occurrence, *Tyrophagus tropicus*, Infestation

INTRODUCTION

The mite fauna of stored grain houses has been extensively studied as responsible for the quality problem of grains. Infestations taint the grain making it unpalatable to livestock (Wilkin and Thind, 1984), and can cause occupational health problems to workers in the grain and milling industry e.g. farmer's lung, rhinitis, asthma, dermatitis, etc. (Cuthbert *et al.*, 1979; Hansen *et al.*, 1996). However, very little information exists on stored food products. Such studies would be useful because they would contribute to a better understanding of how storage mites colonize homes. The aims of this study were to discover mite fauna infesting the stored food products.

This mite has been reported from house dust, stored food products and food store premises around the globe (Sinha, 1968; Nath *et al.*, 1974; Griffiths *et al.* 1976; Hughes, 1976; Jeffrey, 1976; Krantz, 1978; Modak *et al.*, 1991; Gill, 2014).

Identifying characters: Elongated mite, gnathosoma lightly tanned, well developed, cheliceral toothed, a distinct mandibular spine and a conical spur on each chelicera, brownish idiosoma well developed, vertical internal seta, Vi, long, slightly pectinate, suprocoxal seta, Ps, with stiff lateral projections on expanded base, thence drawn out like fine spine, lateral seta, la, twice as long as dorsal seta, d₁, legs well developed, on tarsi I and II, omega 1 slightly expanded at base.

MATERIALS AND METHODS

During the present study, stored food and their products samples from different fields/localities, homes, grocery shops and stores, from the 10 districts of Punjab viz. Barnala, Bathinda, Fatehgarh Sahib, Jalandhar, Ludhiana, Mansa, Muktsar, Patiala, Ropar and Sangrur were collected. From March 2014 to February 2017 research was carried out. Total of 3240 samples were collected. The samples were brought to laboratory in ziplocked polythene bags for further study. A complete record of date, time, locality temperature and relative humidity was also maintained. With "Modified Berlese Funnel" storage mites were extracted (Macfadyen, 1953¹¹, 1955¹², 1961¹³). The mites were kept in 70% alcohol. For further identification mites were mounted in Hoyer's Medium (Fain *et al.*, 1990)¹⁴.

RESULTS AND DISCUSSION

During the present investigation, *Tyrophagus tropicus* has been observed in the samples of Walnut. Only 7 out of 3240 total samples examined were infested with *Tyrophagus tropicus* that form 0.21% of total and 0.57% of mite infested samples. A total of 39 specimens of this mite were obtained which is 0.26% of the total mite population (14812 specimens). The present surveyed work revealed the differential frequency of occurrence and abundance of a mite species *Tyrophagus tropicus* in response to season to season environmental conditions (i.e., temperature, Relative humidity, etc.) variation, food type. Its presence in the samples of Walnut is the new report of commodity infested with *Tyrophagus tropicus* in India.

Table 1: Seasonal distribution of food samples infested with *Tyrophagus tropicus*

| Name of mite species | Food type found infested with mite | No. of samples found infested | Seasonal distribution of mite infested | | |
|----------------------------|------------------------------------|-------------------------------|--|-----------|-----------|
| | | | Summer | Rainy | Winter |
| <i>Tyrophagus tropicus</i> | Walnut | 7 | 2 | 3 | 2 |
| Total (No./%) | 1 | 7 (100) | 2 (28.57) | 3 (42.86) | 2 (28.57) |

The seasonal distribution of the number of food samples infested with this mite showed that 2 (28.57%) infested food samples with this mite *Tyrophagus tropicus* were obtained during summer seasons, 3 (42.86%) during rainy seasons and 2 (28.57%) during winter seasons (Table 1).

Table 2: Yearly distribution of food samples infested with *Tyrophagus tropicus*

| Name of mite species | Food type found infested with mite | No. of samples found infested | Yearly distribution of infested samples | | |
|----------------------------|------------------------------------|-------------------------------|---|-----------|-----------|
| | | | 2014-15 | 2015-16 | 2016-17 |
| <i>Tyrophagus tropicus</i> | Walnut | 7 | 2 | 2 | 3 |
| Total (No./%) | 1 | 7 (100) | 2 (28.57) | 2 (28.57) | 3 (42.86) |

The yearly distribution of number of food samples infested with this mite showed that 2 (28.57%) infested food samples with this mite (*Tyrophagus tropicus*) were obtained during period from the March 2014 to February 2015, 2 (28.57%) from March 2015 to February 2016 and 3 (42.86%) from March 2016 to February 2017 (Table 2).

Table 3: Seasonal distribution of specimens of *Tyrophagus tropicus*

| Name of mite species | Food type found infested with mite | No. of specimens found | Seasonal distribution of mite specimens | | |
|----------------------------|------------------------------------|------------------------|---|------------|-----------|
| | | | Summer | Rainy | Winter |
| <i>Tyrophagus tropicus</i> | Walnut | 39 | 10 | 21 | 8 |
| Total (No./%) | 1 | 39 (100) | 10 (25.64) | 21 (53.85) | 8 (20.51) |

A total of 39 specimens of this mite were obtained which is 0.26 % of the total mite population (14812 specimens) (Table 102). Out of these 39 specimens of *Tyrophagus tropicus*, 10 (25.64%) specimens were obtained during the summer seasons, 21 (53.85%) specimens were obtained during the rainy seasons and 8 (20.51%) specimens were obtained during the winter seasons (Table 3).

Table 4: Yearly distribution of specimens of *Tyrophagus tropicus*

| Name of mite species | Food type found infested with mite | No. of specimens found | Yearly distribution of mite specimens | | |
|----------------------------|------------------------------------|------------------------|---------------------------------------|------------|------------|
| | | | 2014-15 | 2015-16 | 2016-17 |
| <i>Tyrophagus tropicus</i> | Walnut | 39 | 9 | 11 | 19 |
| Total (No./%) | 1 | 39 (100) | 9 (23.08) | 11 (28.21) | 19 (48.71) |

Out of these 39 specimens of species *Tyrophagus tropicus*, 9 (23.08%) specimens were obtained during period from March 2014 to February 2015, 11 (28.21%) from March 2015 to February 2016 and 19 (48.71%) from March 2016 to February 2017 (Table 4).

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