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A Report on the Occurrence, Abundance and Distribution of Cheese Mite, *Tyrolichus Casei Oudemans*, 1910 (Acari: Acaridae) from some Stored Food Products in Punjab

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ABSTRACT

Acarological analyses of 12 stored food products (Almond, Black gram, Cheese, Dalia, Maida, Maize flour, Moong Dal, Rice, Suji, Walnut, Wheat and White gram) collected from shops and storehouses from march 2014 to February 2017 in Punjab were conducted. Thirty samples (each of 25 grams) of each stored food were collected per season, i.e. Summer i.e. CCL1 (March-June), Rainy i.e. CCL2 (July-October) and Winter i.e. CCL3 (November- February). A total of 1220 (37.65 %) samples out of 3240 samples, were mite positive. A total of 30 mite species belonging to 3 orders, 12 families and 21 genera were reported. A total of 14812 mite specimens were obtained. During the present investigation, Tyrolichus casei has been observed in the samples of Cheese only. 14 out of 3240 total samples examined were infested with Tyrolichus casei that form 0.43% of total and 1.14% of mite-infested samples. A total of 202 specimens of this mite were obtained which is 1.36% of the total mite population (14812 specimens).

1. Introduction

Mites are most important pest of stored food products especially of grains, cereal products and stored food products. The mites can seriously reduce the quantity and also quality of stored products. In wheat, these mites damage the seeds and make them unsuitable for germination (Solomon, 1946)[1]. Some mite genera from family Acaridae are important source of allergens to the worker of farm and stores (Arlian, 1991[2]; Cuthbert *et al.*, 1979[3]; Hallas and Iverson, 1996[4]; Hughes, 1976[5]). This mite has been reported from wheat flour, hay, poultry feed (Nangia and Channabasavanna 1989)[6], stores and stored food products (Chmielewski, 1978)[7] and Voorhorst *et al*. (1969)[8] reported that *Tyrolichus casei* associated with cause of dermatitis and cause rashers with itching while handling stored food products.

2. Material 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, 1953[9], 1955[10], 1961[11]). The mites were kept in 70% alcohol. For further identification mites were mounted in Hoyer’s Medium (Fain *et. al.,* 1990)[12].

3. Results and Discussion

During the present investigation, *Tyrolichus casei* has been observed in the samples of Cheese. 14 out of 3240 total samples examined were infested with *Tyrolichus casei* that form 0.43% of total and 1.14% of mite-infested samples. A total of 202 specimens of this mite were obtained which is 1.36% of the total mite population (14812 specimens). Its presence in the samples of Cheese is the new report of commodity infested with *Tyrolichus casei* in Punjab.

4. Identification characters

Mite elongiated, chelicerae toothed, idiosoma elongated, supracoxal seta, Ps, boarder at base with lateral barbs, thence drawn into fine spine' idiosomal dorsal seta, d_1 three times shorter than d_2, lateral seta, La, five to six times longer than d_1, legs well developed, tarsi short, on tarsi 1, omega, cylindrical with slight middle expansion, famulus, e, short conspicuous spine like.

Table 1: Seasonal distribution of food samples infested with *Tyrolichus casei*

Name of mite species	Food type found infested with mite	No. of samples found infested	Seasonal distribution of mite infested		
			Summer	Rainy	Winter
Tyrolichus casei	Cheese	14	4	8	2
Total (No./%)	1	14 (100)	4 (28.57)	8 (57.14)	2 (14.29)

The seasonal distribution of number of food samples infested with this mite showed that 4 (28.57%) infested food samples with this mites *Tyrolichus casei* were obtained during summer seasons, 8 (57.14%) during rainy seasons and 2 (14.29%) during winter season (Table 1).

Table 2: Yearly distribution of food samples infested with *Tyrolichus casei*

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
Tyrolichus casei	Cheese	14	6	0	8
Total (No./%)	1	14 (100)	6 (42.86)	0	8 (57.14)

The yearly distribution of number of food samples infested with this mite showed that 6 (42.86%) infested food samples with this mite (*Tyrolichus casei*) were obtained during period from March 2014 to February 2015, and 8 (57.14%) from March 2016 to February 2017. No mite specimen of *Tyrolichus casei* was found from March 2015 to February 2016 (Table 2).

Table 3: Seasonal distribution of specimens of *Tyrolichus casei*

Name of mite species	Food type found infested with mite	No. of specimens found	Seasonal distribution of mite specimens		
			Summer	Rainy	Winter
Tyrolichus casei	Cheese	202	52	136	14
Total (No./%)	1	202 (100)	52 (25.74)	136 (67.33)	14 (6.93)

A total of 202 specimens of this mite were obtained which is 1.36% of the total mite population. Out of these 202 specimens of *Tyrolichus casei*, 52 (25.74%) specimens were obtained during the summer seasons, 136 (67.33%) specimens were obtained during the rainy seasons and 14 (6.93%) specimens were obtained during the winter seasons (Table 3).

Table 4: Yearly distribution of specimens of *Tyrolichus casei*

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
Tyrolichus casei	Cheese	202	80	0	122
Total (No./%)	1	202 (100)	80 (39.60)	0	122 (60.40)

Out of these 202 specimens of species *Tyrolichus casei*, 80 (39.60%) specimens were obtained during period from March 2014 to February 2015 and 122 (60.40%) from March 2016 to February 2017 (Table 4).

Table - 5 Showing the frequency (%) of occurrence of *Tyrolichus casei* within the total infestation and within the total examined samples

Total samples examined	Total samples infested	Total samples infested with *T. casei*	Frequency (%) within total infestation	Frequency (%) within total examined samples
3240	1220	14	1.14	0.43

Table - 6 Showing the frequency (%) of occurrence of *Tyrolichus casei* within the infestation with Acaridae family members

Total samples examined	Total samples infested	Total samples infested with *T. casei*	Total samples infested with Acaridae members	Frequency (%) within Acaridae family (14 infested samples)
3240	1220	14	563	2.48

Table - 7 Showing the frequency (%) of abundance of *Tyrolichus casei* within the total mite specimens (14812) and within the total Acaridae specimens (7825) obtained

Total samples examined	Total mite specimens obtained	Total *T. casei* specimens obtained	Frequency (%) within total specimens (14812)	Frequency (%) within Acaridae family (7825 specimens)
3240	14812	202	1.36	2.58

5. Conclusion

The results obtained in the present study are evidence that the species composition of acarofauna in cheese is numerous. They show that the continuation of Faunistic research on mites associated with cheese products appears to be well-founded. Results of these studies would have cognitive and practical aspects and would provide a good basis for further investigations on prophylaxis/control during storage for the protection of cheese.

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