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Petrobian latens (Muller) (Arachnida: Tetranychidae): First record from Jammu and Kashmir, India

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Abstract

Petrobia latens (Muller) (Arachnida: Tetranychidae) was first time recorded in Kashmir, during a survey conducted in rabi 2016-17 to know the pest complex on wheat crop. The mites feed only on leaves, which results in leaf yellowing and mottling, in unhealthy grain formation and in wilting and dying of plants. An entire field can appear yellow-brown during heavy infestations. Most damage was seen during periods of dry and hot weather. Extensive mite injury is sporadic, usually occurring when winter rains are followed by a dry period and the plants are stressed. Thus Assessing environmental conditions, and early mite detection are important factors in determining the impact of this pest.

Keywords: Brown wheat mite, pest complex, wheat crop

Introduction

Wheat (*Triticum spp.*) is the most important cereal among the field crops, not because of its antiquity but due to being an excellent food for mankind. Wheat is accorded a premier place among cereals due to its vast acreage devoted to civilization, high nutritive value and association with some of the earliest and most important civilizations of the world. Wheat crop is grown over a wide range of latitudes covering a considerable diversity of conditions; the largest quantities of best wheats are produced in countries with cool, moist weather during a fairly long growing period followed by dry warm weather to enable the grain to ripe properly. The cultivation of wheat is so widely distributed geographically that the crop is being harvested in one country or the other all the year round (Tiwari and Shoran, 2011)^[9, 11]. Wheat is grown on 220.4 mha land area which is more than any other food crop (Anonymous, 2016)^[1]. World trade in wheat is greater than all other crops combined. In 2016, world production of wheat was recorded 749 million tons making it the second most-produced cereal after maize (Anonymous, 2016 a.)^[1]. Wheat is the most important staple food of about two billion people (36% of the world population), which provides nearly 55% of the carbohydrates and 20% of the food calories consumed globally (Breiman and Graur, 1995). It is the second most important cereal in India after rice and is grown on an area of 31.781 million hectares with total annual production of 96.64 million tons (Anonymous, 2016 c.)^[1]. India is today the second largest wheat producer in the whole world. Wheat cultivation has traditionally been dominated by the northern region of India and major wheat producing states are Uttar Pradesh, Punjab, Haryana, Madhya Pradesh, Rajasthan, Bihar, Maharashtra, Gujarat, Karnataka, West Bengal, Uttarakhand, Himachal Pradesh, and Jammu & Kashmir. Out of these states Punjab and Haryana have been prolific wheat producers.

Various arthropods causes' considerable damage to wheat (*Triticum aestivum* L.) plants throughout their life and no stage of the crop is free from damage. Pests of wheat are either polyphagous (damaging a wide range of plants) or oligophagous (feeding on only a few plant species) and it is very rare, any insect found to be monophagous to wheat crop. In India, wheat is ravaged by a number of insect pests viz., Termites, *Odontotermes obesus* (Ramb); shoot fly, *Atherigona naqvii* (Steyskal); Brown wheat mite, *Petrobia latens* (Muller); Armyworm, *Mythimna separata* Walker) and Aphid, *Sitobion avenae* (Fabricius) (Deol, 1982)^[4]. The brown wheat mite which is a non-insect pest of wheat was first time reported from Kashmir. The mite was feeding on wheat leaves and cause various symptoms resembling with

that of drought and wilting thus a farmer is not able to predict the early infestation and attribute it with the water stress.

Materials and methods

A survey was conducted in Rabi 2016-17 to know the pest complex on wheat crop. The adults as well as nymphs of brown wheat mite were collected from the wheat fields of wadura. The mite population was recorded following Khan *et al.* (1977) [5] one month after sowing at weekly interval till crop was harvested.

Hosts

The brown wheat mite was found attacking over hundreds of host plants of economic importance, including a variety of grains and onion, garlic, asparagus, strawberries, cucumber, spice crops, clover and other legumes.

Geographical distribution

Petrobia latens (Muller) (Tetranychidae: Acarina) is widely distributed mite species known from Europe, North Africa, Australia, Asia and North America. It has also been recognized as an important agricultural mite pest in South Western and Western United States of America with a wide range of hosts (Pritchard and Baker, 1955) [6] consisting chiefly of monocotyledonous plants. Its incidence has been recorded from Madhya Pradesh, Punjab, Rajasthan and Haryana (Sharma & Srinivasa, 2004) [7].

Results and Discussion

The population of Brown wheat mite was recorded randomly on tagged wheat plants between 12.00 and 14.00 hrs. These mites were visualized by magnifying glass and collected in vials by using a camel brush. The mite population on wheat plants was low in the beginning (Feb.) and it increased gradually reaching a peak on 20th of March 2018. Thereafter, the population slowly declined. No population was recorded after 7th April 2018.

Identification

Adult

Adults are light brown in colour, Individual mites are too small to be visible with naked eye without effort (Fig 1). Body is about 0.5 mm long, red-brown to black, legs long and yellow, forelegs distinctly longer than the other legs. Claws pad-like; empodium hooked and with two pairs of tenent hairs

Eggs

The female lays two types of eggs, bright-red non- diapause eggs and the white, capped diapause egg.

Biology

They live for about 3 weeks. In autumn they lay up to 30 diapause eggs, which may remain in this state for long periods, hatching when wetted, usually in the following spring. The non-diapause females lay about 50-90 eggs each; all eggs are placed on soil next to vegetation. Brown wheat mite spends the summer in the soil as a white egg resistant to hot, dry conditions. In the fall, as cooler, wetter conditions return, these eggs start to develop and hatch after a 10-day incubation. Female mites mature after feeding on wheat for about two weeks and then lay round, red eggs that give rise to further fall (one or two) and spring (two or

three) generations. As summer conditions return, white overwintering eggs are produced. Both red and white eggs are placed on soil particles adjacent to wheat plants. Brown wheat mites feed on plant sap during the day and spend the night in the soil. Their activity peaks at about mid-afternoon on warm, calm days. This mite is not affected by cold temperatures, but populations are quickly reduced by driving rains of 1/3 inch or more. Individual mites are too small to be visible with naked eye without effort. Adults are light brown in colour

Damage symptoms

Petrobia latens has gained importance in recent years. The extent of damage to the crop is dependent upon the severity of incidence. The adult mite of *P. latens* was responsible for most of the damage to the wheat crop by exclusively feeding on leaves sucking sap by inserting two needle-like stylets into the leaf thereby withdrawing nutrients from the plant. During high mite populations the leaves appeared bronze with some leaves even dying off as a result of intense feeding. The mite also have a tendency to feed on the tips of the leaves, causing them to dry out and die (Fig. 2). Heavily infested fields present a scorched withered appearance.



Fig 1: Adult of Brown wheat mite on wheat leaves.



Fig 2: Withering of leaves by Brown wheat mit

Conclusion

The Brown wheat mite (*Petrobia latens* Muller) was found to be only mite pest of wheat during pest complex study in Kashmir. The mite was found infesting the wheat crop and cause considerable damage to it. The mite was actively feeding during hot dry spell of summer in Kashmir region which depicts its strong relationship with high temperature. The life cycle shows positive affinity with change in

temperature. The mite is strictly a dry weather pest, and its damage appears to be similar to that caused by drought. Heavily infested fields appear to be dried out even though there may be sufficient moisture within easy reach of the roots of the plants.

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