

**Population fluctuation of phytophagous mite, *Brevipalpus californicus* (Acari: Tenuipalpidae) and predatory mite, *Paraphytoseius orientalis* (Acari: Phytoseiidae) infesting holy basil, *Ocimum basilicum* (Lamiaceae) at Narendrapur, Kolkata (West Bengal)**

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**Abstract**

Seasonal fluctuation of phytophagous and predatory mite on *Ocimum basilicum* at Narendrapur campus of R.K. Mission Ashram is dealt with in this paper.

**Introduction**

*Brevipalpus californicus* (Bank) is an important pest of holy basil, *Ocimum basilicum* L. causing browning, drying and defoliation of leaves. It occurs more severely during January-August and thereafter its infestation subsides. Another mite, *Paraphytoseius orientalis* (Narayanan et al.) was also found associated as predator with *B. californicus* on that host. Since no study has been made earlier regarding population fluctuation of these two mites, it was thought desirable to carry out a preliminary study in this regard and the results thereof are presented in this paper.

**Material and Methods**

For sampling of mite infested leaves, 10 basil plants of same age and maturity were selected at random in the Medicinal Plant Garden of Narendrapur and from each of the plant 10 leaves were plucked. As such, altogether 100 leaves were plucked and mite population was counted by examining those leaves under Stereo binocular microscope. Along with population count, the abiotic factors like the monthly mean

temperature and RH for the entire study period were recorded to correlate the population with these factors. The study period covered January - July 2016, as thereafter the population disappeared.

**Results and Discussion**

The initial population of *B. californicus* during January 2016 was 3.50 per leaf and that of the predatory mite (*Paraphytoseius orientalis*) was 6.91 per leaf. The temperature and RH during that period were 18.32° C and 67.50%, respectively. The population of both in the following month was maintained more or less at the same level. Increase in population of both started in March becoming 4.21 and 7.38 per leaf in case of *B. californicus* and *P. orientalis*, respectively when the mean temperature and RH were 26.31° C and 65.29%, respectively. Almost same level of population was found during April also. However, with the further increase of temperature in May, the population of *B. californicus* increased considerably to become 9.51 per leaf when temperature and RH were 30.12° C and 72.12%, respectively. The peak population of *B. californicus* was attained in June when it was 9.70 per leaf and that of *P. orientalis* dropped down further to become 2.17 per leaf (Table 1). The mean temperature and RH during that month were 31.15° C and 75.62%,

**Table 1. Population fluctuation of *Brevipalpus californicus* and *Paraphytoseius orientalis* on *Ocimum basilicum* at Narendrapur campus of R.K. Mission, during January - July, 2016.**

Month/Year	Mean population <i>Brevipalpus californicus</i> per leaf	Mean population <i>Paraphytoseius orientalis</i> per leaf	Abiotic factors	
			Mean Temperature(°C)	Mean RH(%)
January 2016	3.50	6.91	18.32	67.50
February 2016	3.69	7.01	22.52	65.20
March 2016	4.21	7.38	26.31	65.29
April 2016	4.42	4.13	27.81	70.10
May 2016	9.51	3.20	30.12	71.12
June 2016	9.70	2.17	31.15	75.62
July 2016	2.91	4.12	30.15	70.64



Table 2. Correlation coefficient (r value) of phytophagous and predatory mites with abiotic factors.

Variables	Phytophagous mite ( <i>B. californicus</i> )	Predatory mite ( <i>P. orientalis</i> )	Mean Temperature	Mean RH
Phytophagous mite ( <i>B. californicus</i> )	-	0.048	0.018	(-)0.229
Predatory mite ( <i>P. orientalis</i> )	0.032	-	0.681	(-)0.630

respectively. However, in July, the population of *B. californicus* dropped down considerably to become minimum of 2.91 per leaf but the predatory mite population increased to 4.12 per leaf. The mean temperature and RH during that month were 30.15°C and 70.62%, respectively (Table 1).

From overall analysis of data to find out the correlation coefficient (r value) (Table 2), it appeared that population of *B. californicus* was positively correlated with predatory mite and temperature and negatively with RH while the popula-

tion of *P. orientalis* was positively correlated with temperature and negatively with RH. Since earlier studies are not available, the present result could not be compared with those of others.

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## Climate Change

### Increase in Temperature in Upper Himalayas Affecting 40 Species

SHIVANI AZAD

A study by scientists of the Dehradun-based Wildlife Institute of India (WII) in the Bhagirathi basin near Gaumukh has revealed that in the last two years, there has been a rise of at least 0.5 degree temperature accompanied by an almost 10% variation in humidity levels in upper Himalayas in Uttarakhand at an altitude between 3500-4500 meters. This alteration in temperature, will have direct impact on 40 species of animals and birds having their habitats in the region like Snow leopard, Musk deer, Himalayan snowcock and Snow partridge which are "under stress due to the escalated temperature." "Even a 0.5 degree rise in temperature in the past two years in the upper Himalayas affects the equilibrium of the sensitive species living in these regions. If this persists, we fear that the sensitive ones will phase out and only the tough ones would be able to survive the changed environment", said Dr S Satyakumar, Scientist (G), WII, that is being monitored by the National Action Plan on Climate Change.

The variation in temperature in these altitudes—the maximum temperature at 4500 metres touches 5 degree celsius while the minimum plunges to -14 whereas at 3500 metres, the maximum temperature is 10 degrees celsius while the minimum is around -2.5 degrees — is affecting not just animals but also the vegetation. "Flowering patterns are now happening in May instead of June."

Rains are happening in late September which is unusual since this is the autumn season. These variations are

going to have consequences," he added.

Elaborating, he said, "In response to the changed temperatures in alpine meadows which are the grazing and hunting sites for the species inhabiting the region, premature budding and flowering happens in plants. This leads to a change in the activities of insects. In response, birds will have to change their patterns.

Scientists have now begun monitoring the effects of the climate change on animals like Snow leopard, Musk deer, Kashmir stag, Himalayan mouse hare (among mammals) and Himalayan snowcock and Snow partridge among birds. In addition, aquatic species like Golden mahseer, Snow trout and Gangetic mystus are also being monitored. Further, flora like Himalayan birch, White lily, Tibetan sea buckthorn, Spotted heart orchid, Himalayan fir and Sikkim Rhubarb are under the scanner of WII too. In some species, notable changes have already begun to be observed.

"Our researchers have identified that Himalayan mouse hare, a kind of rodent unique to the alpine area is unable to adapt to the new environment. During snowbound months, it goes inside its burrows under partial hibernation.

A study by the dean of WII, GS Rawat sometime ago had found that the Golden mahseer which was earlier breeding at altitudes of 600 to 700 meters was now being found in heights of 1200 to 1300 meters, indicating its need for a cooler environment.