

Major Mite Pests of Tea and Their Management

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Introduction

Tea, *Camellia sinensis* (L.) Kuntze is the most widely consumed beverage in the world tracing back to water and one of the valuable crops in India, China, Japan, Kenya, and other countries and is also the most consumed beverage (Wan and Xia 2015). Over three million tonnes are grown annually for tea consumers worldwide. Tea is a species of evergreen shrubs in the flowering plant family Theaceae. Its leaves and leaf buds are used to produce tea. Common names include "tea plant", "tea shrub", and "tea tree". White, yellow tea, green tea, dark tea and black tea are all harvested from one of two major varieties grown today, *C. sinensis* var. *sinensis* and *C. s.* var. *assamica*. Tropical and subtropical regions with temperatures ranging from - 12°C to 40°C, annual rainfall from 938 to 6000 mm and relative humidity from 30 to 90% favours its cultivation. In India, tea is grown in Darjeeling, Assam and The Nilgiris (Tamil Nadu), Himachal Pradesh, Kerala, Karnataka, Uttaranchal, Sikkim, Orissa, Bihar, Arunachal Pradesh, Tripura, Manipur, Nagaland, Mizoram, Meghalaya and in the adjacent plain areas of Dooars and Terai of West Bengal. Both insects and mites are recorded as arthropod pests in tea plantations across the world (Ahmed *et al.* 2020; Prasad *et al.* 2020; Roy *et al.* 2021). Mites are the most serious pests of tea in almost all tea producing countries.

Important mite pests

Oligonychus coffeae (Nietner 1861), *Tetranychus kanzawai* Kishida 1927 (Acari: Tetranychidae), *Brevipalpus phoenicis* (Geijskes), *B. californicus* (Acari: Tenuipalpidae), *Acaphyllathea* (Watt) (Acari: Eriophyidae) and *Calacariscarinatus* (Green) (Acari: Eriophyidae) are major mites associated with tea plants, widely distributed in Asia, Africa, and other continents (Takafuji *et al.* 2000; Gotoh and Nagata 2001; Hazarika *et al.* 2009).

1. **Red spider mite, *Oligonychus coffeae*** (Nietner 1861) (Acari: Tetranychidae)

First reported in Assam (India) in 1868. This mite is widely distributed in India, Bangladesh, Sri Lanka, Taiwan, Burundi, Kenya, Malawai, Uganda, and Zimbabwe). This mite prefers the middle zone of the bush (30 cm below the plucking surface). Leaf temperature and light penetration within tea bushes influence mite distribution. Nymphs and adult's lacerate cells, producing minute characteristic reddish brown marks on the upper surface of mature leaves, which turn red in severe cases, resulting in crop losses from 17 to 46% (Hazarika *et al.* 2009). High temperature, dry conditions, and absence of shade are conducive to outbreak of this pest. The optimal temperature for growth and development is 30°C; the lower threshold for development is 10°C, and 232.6-degree days are required to complete the life cycle (Gotoh and Nagata 2001). *O. coffeae* normally attack the upper surface of the mature leaves in which the sap is not flowing freely. In a severe infestation, particularly under conditions of dry weather, the lower surface and the young leaves are almost equally attacked. The affected leaves turn brown, then bronze, and may eventually dry up and fall off.



Red spider mite, *Oligonychus coffeae*

2. False spider mite / Scarlet mite *Brevipalpus phoenicis* (Geijskes) and *Brevipalpus californicus* (Banks) (Acari: Tenuipalpidae)

Adult is scarlet red in colour and ovate in shape. It occurs in almost all the tea growing Asian and African countries, causing crop losses of 13% in Indonesia, 8 to 17% in South India, and 12% in Kenya (Wilson and Clifford 1992, Kumar *et al.* 2004, Hazarika *et al.* 2009). Eggs are bright red colour and elliptical in shape and laid on the leaf petiole, at the base of the leaf hair, or inside cracks and crevices of the stem. The life cycle is completed in 30 to 60 days. Mites congregate on the under surface of mature leaves. Both nymphs, and adults suck the cell contents from the under surface of leaves, mainly along the midribs and

base of the petiole. Infested leaves have brown scurf followed by splitting of petiole and defoliation.

3. **Pink mite (or) Orange mite *Acaphyllatheae* (Watt)** (Acari: Eriophyidae)

It is an important mite in India. Adult is very minute, orange coloured and carrot shaped. Adults and nymphs found on the under surface (abaxial) of young leaves. Damage is restricted to top 10-15 cm of tender leaves. Affected leaves turn pale and show upward curling. In severe infestation, leaves become leathery and brownish. Assam type of tea is susceptible to this mite.

4. **Purple mite *Calacariscarinatus* (Green)** (Acari: Eriophyidae)

This is a major pest in South India. Adult is very small, spindle shaped and dark purple in colour with five longitudinal white waxy ridges on the dorsal side. Adults and nymphs suck the sap from under surface of mature leaves. Damaged leaves show coppery brown discolouration. Assam type of tea is more susceptible to purple mite.

5. **Broad/ Yellow mite *Polyphagotarsonemus latus* Banks** (Acari: Tarsonemidae)

It is polyphagous pest. Besides tea it is reported to attack tomato, cinchona, cotton, pulses, potato, chillies etc. In India and Sri Lanka, it is called the "yellow tea mite". Male mites are small and white to pale yellow in colour. Females are yellowish and bigger than the males. Yellow mites are active and fast-moving mite. Adults and nymphs of this mite are seen on younger leaves especially the top two to three leaves and the bud. Due to sucking affected leaves become rough and brittle. In severe infestation affected leaves curl downward. The damage resembles that caused by herbicides. The mites prefer areas of high humidity and low temperature.



False Spider Mite



Pink Mite



Yellow Mite

6. Kanzawa spider mite, *Tetranychus kanzawai* Kishida 1927 (Acari: Tetranychidae)

Both nymphs and adults suck the cell contents from tea leaves, producing tiny, pale spots or scars. A female lays 2 to 3 eggs per day on the leaves; lifetime fecundity ranges from 40 to 50 eggs. It completes its life cycle within 40 to 41 days and undergoes a seasonal change in habitat. It is a polyphagous pest. Within the tea ecosystem, it moves from one part of the tea plant to another and can migrate from the tea plant to another host, more particularly to weeds. Development of the mite is temperature-dependent within 12°C to 37°C; development ceases at 12°C (Ho 2000).

Management of mite pests

In order to keep the mite populations under check must practice good agricultural methods by altering or disrupting the favourable conditions that may aid in the establishment of mite pests. Identify and remove the alternate hosts if any present and mulching increases the humidity thus making it unsuitable for mite growth. Use of synthetic pesticides as the last resort may help in protecting the beneficial organisms (natural enemies i.e., predatory mite, *Phytoseiulus*, *Amblyseius* and *Typhlodromus*, tiny black lady beetle, *Stethorus* spp, spiders, *Chrysoperla* spp., predators and beneficial fungi). Practicing regular pruning greatly reduces the population of scarlet mites.

List of Pesticides recommended for control of mites in tea

S. No	Chemical	Dosage/ha			Waiting period (days)
		a.i. (g)	Formulation (g/ml)	Dilution in water (l)	
1.	Bifenthrin 0.8 % SC	40	500	400	11
2.	Cyflumetofen 20 % SC	125-150	625-750	400-500	05
3.	Dicofol 18.50 % EC	230	125	250	15-20
4.	Ethion 50 % EC	250	500	500-1000	03
5.	Etoxazole 10 % SC	40	400	400	05
6.	Fenazaquin 10 % EC (RSM, pink mite, purple mite)	100	1000	400-600	07
	Fenazaquin 10 % EC (Scarlet mite)	125	1250	400-600	07
7.	Fenpropathrin 30 % EC	50-60	165-200	400-500	07

8.	Fenpyroximate 5 % EC (RSM, pink mite, purple mite)	15-30	300-600	400-500	07
9.	Fenpyroximate 5 % SC (RSM, pink mite, purple mite)	30-60	600-1200	400	07
10.	Flumite 20 % SC/ Flufenzine 20 % SC (Pink mite, purple mite)	80-100	400-500	500-1000	07
11.	Hexythiazox 5.45 % w/w EC (Scarlet mite, RSM)	15-25	300-500	400	05
12.	Phosalone 35 % EC (Pink mite, purple mite)	360	1028	500-100	-
13.	Propargite 57 % EC (RSM, pink mite, purple mite, scarlet)	430-612	750-1250	400	07
14.	Pyridaben 20 % w/w WP	100	500	500	07
15.	Spiromesifen 22.9 % SC	96	400	400	07
16.	Propargite 42% + Hexythiazox 2% EC	525 + 25	1250	400-500	07

(as per Central Insecticide Board and Registration Committee, Faridabad)

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