



## Sucking Insect Pest Complex Associated With Black Pepper (*Piper nigrum* L.), Black Gold Of Uttara Kannada District, Karnataka

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### ABSTRACT

#### Key Words:

Black pepper, Mealy bugs, Scales, Sucking insect

Studies were carried out to know the sucking insect pest complex associated with black pepper, a profitable mixed crop of Uttara Kannada district of Karnataka. Studies carried through field survey indicated the presence of eight different species of sucking insects in major pepper growing areas. Amongst them, coconut scale, *Aspidiotus destructor* Signoret and mussel scale, *Lepidosaphes* sp. were found to cause serious damage. Leaf gall thrips, *Liothrips karnyi* (Bagnall) was most common in all the pepper grown areas and nurseries. Two species of mealy bugs viz., *Planococcus citri* (Risso) and *Ferrisia virgata* (Ckll.) were also recorded. Recently introduced insect pest, coconut rugose spiraling whitefly was also found infesting bush pepper grown in pots.

### INTRODUCTION

Black pepper (*Piper nigrum* L.; Family- Piperaceae), popularly called as the king of spices or black gold, is an important commodity of commerce since the time immemorial. The crop is valued for its aroma due to the essential oil, present in the berries and the pungency due to its alkaloid *piperine*. India was the leading pepper producing and exporting country up to 2002; however, currently, Vietnam is the world's largest producer and exporter of pepper. Kerala, Karnataka, Konkan and Tamil Nadu are top black pepper producing regions in India. This evergreen climbing

vine is grown as a profitable mixed crop with arecanut in Uttara Kannada district of Karnataka in an area of 774 ha with productivity of 4.2 q/ha (2015) whereas, the world productivity is around 7.9 q/ha (Ankegowda et al. 2012). Uttar Kannada district (13°55' to 15°32' N and 74°06' to 75°07' E) is situated in the North West parts of Karnataka adjoining the state of Goa. The major constraints for low productivity of pepper in this region are poor fertility status of the soil, use of local varieties, lack of quality planting material, poor drainage system, imbalance application of nutrients, severe incidence of phytophthora wilt disease and insect pests (Patil and Santhosha

2018). In India, pepper is known to be infested by at least 56 genera/species of insects causing damage to various parts of the vine *viz.*, roots, stems, shoots, leaves, spikes and berries (Devasahayam 2000). Of late, among insect pests infesting black pepper, sucking insect pest complex is causing serious threat to black pepper production. In this regard, studies were conducted to know the sucking insect pest complex associated with black pepper.

## MATERIALS AND METHODS

Uttara Kannada district comprises of hill and coastal zones covering 6 and 5 taluks, respectively. Periodical surveys were conducted during 2016 to 2018 in three taluks *viz.*, Sirsi, Siddapur and Yellapur to know the sucking insect pest complex associated with black pepper in Hill zone of Uttara Kannada district of Karnataka, situated at an altitude of 600 to 700 meters above MSL. In each garden about 20 vines were selected randomly. Observations were made on 10 feet height of the vine. The per cent infestation was calculated based on the number of vines infested among sampled vines. The sucking insect pest complex associated with black pepper were collected and preserved in 70 % alcohol. The scales and mealy bug specimens were sent for identification in ICAR- NBAIR, Bengaluru, Karnataka.

## RESULTS AND DISCUSSIONS

Data from the survey conducted in major black pepper growing regions of Uttara Kannada district (Hill zone) – Sirsi, Siddapur and Yellapur taluks which contributes almost 70 – 80 per cent of the pepper area of the district are presented. Panniyur -1 is the only improved genotype of pepper, which is predominantly cultivated in arecanut based cropping system along with some other local cultivars. Totally 104 pepper gardens were surveyed and the infestation of sucking insects, except leaf thrips, was highest in Yellapur taluk with 41.82 per cent, followed by Sirsi (32.00 %) and Siddapur (13.24 %; Table 1). Leaf gall thrips was noticed in all

gardens under survey. The sucking insect pest complex associated with black pepper is presented in Table 2 and Photo 1. The damage symptoms and other aspects are discussed hereunder.

### **Leaf gall thrips**

Thrips damage is noticed in all surveyed areas under survey and it is more serious in younger vines. Black coloured thrips feed on the tender leaves causing the leaf margin to curl downwards and inwards leading to formation of the marginal leaf galls. The infested leaves become thick, malformed and crinckles (Ravindran 2000). Also noticed severe infestation of thrips in nursery cuttings.

### **Scales**

Amongst the five species of scale insects recorded, mussel scales (*L. piperis*) and coconut scale (*A. destructor*) caused serious damage. They suck the sap from stem, leaf and petioles resulting in yellowing and wilting. Observed severe infestation of mussel scale on bush pepper, where berries as well as complete plants were affected. Other scale insects caused localized chlorotic spots or patches on leaves. Incidence of scale was not uniform in all gardens and no visible symptom of damage was observed in the field as reported by Koya et al. (1996).

### **Mealy bugs**

Mealy bugs were found in cluster on the terminal shoots, leaves, berries, roots and suck the sap resulting yellowing withering and drying of the plant and shedding of the berries too. Similar observations were made by Mani *et al.* (2016). The infested plants show slow growth due to direct sucking damage as well as development of black sooty mould. Prasad Kumar et al. (1998) also reported the damage by mealy bug (*F. virgate*) on black pepper cuttings at Sirsi, Uttara Kannada district, Karnataka.

### **Rugose spiraling whitefly**

The incidence was seen only in few bush pepper potted plants kept in coconut orchard which was infested with rugose spiraling whitefly. Both nymphs and adult suck the sap from lower surface of the leaves. Besides, whitefly excretes honeydew

on which sooty mould develops. This affects the growth of the pepper. In Tamil Nadu also incidence of rugose spiraling whitefly was observed on pepper by Srinivasan et al. (2016).

In general, black pepper growers are not taking any plant protection measures against sucking insects both under field conditions and also in their nurseries. The sucking insects especially scale and mealy bugs were higher during Rabi and Summer month. Since the hill ecosystem of Uttara Kannada district region receives heavy rainfall upto 3000 mm, sucking population

starts buildup during post monsoon season and become severe during summer months. These results are line with the works of Selvakumaran et al. (1996). In nursery, if suitable management measures are not taken against leaf gall thrips, then plant growth is adversely affected.

The area under black pepper is increasing due to its lucrative prices, along with diseases sucking insect pest complex need to studied in depth. Further studies are required on ecofriendly management measures especially management of scales and mealy bugs in black pepper.

**Table 1.** Survey studies in major pepper growing regions of Uttara Kannada district, Karnataka

Sl. No	Taluka/ Tehsil	No. of villages surveyed	No. of gardens surveyed	Sucking insects Infestation (%)
1	Sirsi	17	43	32.00
2.	Yellapur	15	41	41.82
3.	Siddapur	09	20	13.24

**Table 2.** Sucking insect pest complex associated with black pepper in hill zone of Uttara Kannada district, Karnataka

Sl. No.	Common Name	Scientific Name	Family	Order	Severity (%)
1.	Leaf gall thrips	<i>Liothrips karnyi</i> (Bagnall)	Phleothripidae	Thysanoptera	Severe
2.	Mussel Scale	<i>Lepidosaphes piperis</i> (Green ) and <i>Lepidosaphes beckii</i> (Newman)	Diaspididae	Hemiptera	Low to Moderate, But severe on bush pepper under polyhouse condition
3.	Scale	<i>Icerya</i> sp.	Monophlebidae	Hemiptera	Low
4.	Snow scale	<i>Unaspis</i> sp.	Diaspididae	Hemiptera	Low
5.	Coconut scale	<i>Aspidiotus destructor</i> Signoret	Diaspididae	Hemiptera	Low to Moderate
6.	Striped Mealy bug	<i>Ferrisia virgata</i> (Ckll.)	Pseudo coccidae	Hemiptera	Low to Moderate
7.	Mealy bug	<i>Planococcus citri</i> (Risso)	Pseudo coccidae	Hemiptera	Low
8.	Rugose spiraling whitefly	<i>Aleurodicus rugioperculatus</i> Martin	Aleyrodidae	Hemiptera	Severe on bush pepper

Note : Severity % is based on damage scale Very low ( $\leq 5\%$ ), Low(6 to 10%), Moderate (11 to 20%), severe (21 to 50%) and very severe ( $>50\%$ )



Infestation of mealy bug in pepper



Infestation of mussel scales on bush pepper



Infestation of pod with snow scale (*Unaspis* species)



Infestation of rugose spiralling whitefly in bush pepper



Pepper leaf and twig infested with mealy bug, *Ferrisia virgate*



Leaf gall thrips damage in black pepper

**Photo 1.** Photographs showing different kinds of infestation caused by sucking insect pests in black pepper

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