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MANAGEMENT OF INSECT PESTS FOR HIGHER YIELDS IN BLACK PEPPER

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Introduction

Black pepper, the dried mature berries of *Piper nigrum* L. (Piperaeceae) is of considerable economic importance earning more than 242 crore rupees annually in foreign exchange. Though India is a leading producer of black pepper in the world and the crop is grown in about 1,06,700 ha with a production of about 40,000 tonnes (Anonymous, 1987), its productivity is considerably low, the national average being about 375 kg per ha. Among the various factors responsible for the low productivity, infestation by insect pests is a major one. Control of these pests would be an effective short term strategy for increasing the productivity of black pepper. Though the crop is infested by about 20 insect pests in India (Pillai, 1978) only four of them are serious, namely, pollu' beetle, top shoot borer, leaf gall thrips and scale insects. The nature of damage caused by them and their control measures are discussed in this paper.

(1) 'Pollu' beetle—*Longitarsus nigripennis* Mots. (Coleoptera: Chrysomelidae)

The 'pollu' beetle is the most destructive pest and is a major constraint in the production of black pepper in many areas. In endemic areas 30—40 per cent of the yield may be lost due to the pest attack. The incidence of the pest is higher in the plains and at altitudes below 300 m; no damage is observed in areas above 900 m (Premkumar, 1980).

The adults are small measuring about 2.5 mm in length, the head and thorax being yellowish brown and the abdomen (elytra) black. The femur of the hind pair of legs are enlarged and adapted for jumping. During the flushing season (June-July) the adults feed on tender shoots, leaves and spikes by scraping the tissues leading to the formation of numerous holes on the leaves and black patches on the spikes. The damage caused by the grubs is more serious. The beetles lay eggs on the tender berries and the grubs bore into them, feed on the internal contents and make them hollow. The infested berries turn yellow and finally black and crumble when pressed. The term 'pollu' denotes the hollow nature of the infested berries. Sometimes the grubs damage the main spike axis resulting in the drying up of berries distal to the point of damage. The grubs are creamy white when fully grown and measure about 5 mm in length. Pupation occurs in the soil. The life cycle is completed in 40—50 days. The pest population is high in the field during July to January. During the 'off season' when berries are not available, the adults are present in low numbers and survive by feeding on mature leaves. The pest infestation is generally more severe in shaded areas.

For controlling the pest infestation, spraying of endosulfan or quinalphos (0.05% each) twice a year during June-July and September-October is to be undertaken. This recommendation is based on multilocation trials conducted at Kottayam and Calicut districts for three consecutive years with three insecticides viz., endosulfan, quinalphos and methyl parathion (Premkumar *et al*, 1986).

Since the first round of spraying coincides with the monsoon period, the operation has to be undertaken when there is sufficient break in the rains. The underside of leaves also have to be sprayed thoroughly since the adults are generally seen resting under the leaves.

(2) Top shoot borer—*Cydia hemidoxa* Meyr. (Lepidoptera: Eucosmidae)

The top shoot borer is a serious pest in younger plantations and up to 50 per cent of shoots have been reported to be damaged in certain areas. The adults are small moths with crimson and yellow forewings and grey hindwings. The eggs are laid on tender shoots and the larvae bore into them and feed on the internal tissues resulting in the drying up of the infested shoots. The growth of the vine is affected when successive new shoots are attacked. The caterpillars are greyish green and measure about 15 mm in length when fully grown. The pest completes its life cycle in about 30 days. The pest population is high in the field during July to November when succulent shoots are available on the vines.

Field trials conducted with various insecticides indicated that spraying of endosulfan 0.05% was the most effective in controlling the pest infestation. Since the incidence of pest coincides with that of 'pollu' beetle, the spray given for the latter would be sufficient to control the top shoot borer (Banerjee *et al*, 1981).

(3) Leaf gall thrips—*Liothrips karnyi* Bagnall (Thysanoptera: Phlaeothripidae)

The leaf gall thrips induce the formation of marginal leaf galls. The pest infestation is more severe at higher altitudes and also in the nurseries. In South Wynad which is a major black pepper area in Kerala,

leaf gall thrips are the most serious pest of the crop where up to 23 per cent of leaves were infested during certain seasons (Banerjee *et al*, 1981). Apart from the formation of marginal leaf galls, the feeding activity of the thrips results in reduction in size, crinkling and thickening of infested leaves. The adults are black and measure 2.5-3.0 mm in length; the larvae and pupae are creamy white. Both adults and juvenile stages live within the leaf galls induced by them. The life cycle is completed in 18-27 days.

Spraying of monocrotophos 0.05% is effective in controlling the pest infestation.

(4) Scale insects (Hemiptera : Coccidae; Diaspididae)

Scale insects sometimes cause severe damage to black pepper vines especially at higher altitudes. The pest infestation is also severe in the nursery in older cuttings. Scale insects suck the plant sap resulting in yellowing and withering of the infested shoots and in severe cases the vines dry up. Among the various species of scale insects recorded on the crop, the pepper scale *Lepidosaphes piperis* Gr. and the soft scale *Marsipococcus* (*Lecanium*) *marsupiale* Gr. are important. The females of scale insects are sedentary and appear as encrustations mainly on the stem and also on the leaves and berries.

Scale insects can be controlled by spraying dimethoate 0.05%. A second spray may be given after 15 days if the infestation persists. It is essential that the spraying is undertaken during the early stages of infestation. Severely infested plant parts can be clipped off and destroyed.

Erythrina indica which is generally used to trail black pepper vines are sometimes infested by grubs of *Remphan* sp. (Cerambycidae) which bore into the main root and stem near the ground level. The infested plants topple down ultimately resulting in breakage of the vines. The grubs can be controlled by application of 20-30 g of phorate 10G in the soil around the standards.

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