

Management of anthracnose disease (*Colletotrichum gloeosporioides* (Penz) Penz & Sac.) of black pepper (*Piper nigrum* L.) in the high ranges of Idukki District, Kerala

P Sainamole Kurian, G Sivakumar, A Josephraj Kumar, S Backiyarani, M Murugan & K N Shiva¹

Cardamom Research Station
Kerala Agricultural University
Pampadumpara–680 656, Idukki District, Kerala.
E-mail: spicessiva@yahoo.co.in

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Abstract

Evaluation of contact and systemic fungicides for the management of anthracnose disease (caused by *Colletotrichum gloeosporioides*) on black pepper (*Piper nigrum*) at Idukki District (Kerala) indicated that the incidence of the disease on leaves and spikes was significantly lower in vines treated with a combination fungicide containing carbendazim + mancozeb 0.1% followed by carbendazim 0.1%. The dry berry yield was also significantly highest (742.7 g vine⁻¹) in vines treated with carbendazim + mancozeb 0.1%.

Key words: anthracnose, black pepper, *Colletotrichum gloeosporioides*, management *Piper nigrum*.

Black pepper (*Piper nigrum* L.) is affected by various diseases in Kerala among which anthracnose caused by *Colletotrichum gloeosporioides* (Penz) Penz & Sac. is gaining importance in recent years (Kurien *et al.* 2000). The fungus causes damage to the plant both in the nursery and field. On older vines in the field, leaves, spikes and berries are affected. Infection on spikes results in spike shedding, whereas, infection on immature berries leads to formation of brownish splits on the berries. Spike shedding is more severe at high altitudes. The disease is seen throughout the crop season in plantations and maximum damage is caused during August to September and

ranges from 28% to 34% (Nair *et al.* 1987). The damage on the berries due to *C. gloeosporioides* has also been reported to result in 100% yield loss (Santhakumari & Rajagopalan 2000). Successful management of the disease has been achieved through spraying of Bordeaux mixture 1% (Nair *et al.* 1986). The present study was undertaken to evaluate the efficacy of systemic and contact fungicides for the management of the disease.

The field experiment was conducted at a farmer's field located in a hot spot tract of Chakupallam Panchayat of Idukki District (Kerala) during 2003–05 in a randomized block design with seven treatments and three replications. The trial was conducted on

¹All India Coordinated Research Project on Spices, Indian Institute of Spices Research, Marikunnu P. O., Calicut–673 012, Kerala, India.

7-year old vines of var. Panniyur-1 and the level of anthracnose infection on the vines was nearly 45%. The treatments included: Bordeaux mixture 1% foliar spray, twice (before flowering (late June) and during berry formation (late August) stages); Bordeaux mixture 1% foliar spray, thrice (before flowering (late June), during flowering (early July to early August) and during berry formation (late August) stages); mancozeb 0.1% foliar spray, twice (before flowering (late June) and during berry formation (late August) stages); propiconazole 0.1% foliar spray, once (at the time of flowering); carbendazim 0.1% foliar spray, once (at the time of flowering); combination of carbendazim and mancozeb 0.1% foliar spray, once (at the time of flowering) and control. The disease incidence on leaves and spikes was observed based on 0–5 scale (0=no visible symptom; 1=<1% leaf area infected; 2=1%–10% leaf area infected; 3=11%–25% leaf area infected; 4=26%–50% leaf area infected; 5=>50% leaf area infected) and the percentage infection index was calculated. The observation on disease incidence was made randomly at four different places on the vine and the percentage infection index was calculated. The dry yield was also recorded in all the vines.

All the treatments were found to be effective in reducing the incidence of anthracnose disease on leaves and spikes compared to that of control. Among the various fungicides evaluated, the combination fungicide (carbendazim + mancozeb 0.1%) was significantly effective against the disease. Leaf infection index was lowest (10.3%) on vines treated with carbendazim + mancozeb 0.1% and highest (45.8%) in control. Vines treated with carbendazim + mancozeb 0.1% also registered the least infection index on spikes (3.5%) whereas the control vines recorded the highest (20.2%). Spraying of carbendazim 0.1% was the next best treatment and the leaf infection and spike infection indices were 13.6% and 5.9%, respectively (Table 1). The efficacy of Bordeaux mixture 0.1%, carbendazim 0.1% and benomyl 0.1% against anthracnose disease has been reported earlier (Sundaraman 1928; Nair *et al.* 1987; Nybe 2001). The yield of vines was significantly higher in all the treatments compared to control. Vines treated with the combination fungicide (carbendazim + mancozeb 0.1%) recorded the highest dry berry yield (742.7 g vine⁻¹) which was 55% higher than control. The study thus indicated that anthracnose disease of black pepper could be effectively managed by spraying a combination

Table 1. Effect of various fungicides on incidence of anthracnose disease incidence and yield of black pepper*

Treatment	Percentage leaf infection index	Percentage reduction in leaf infection	Percentage spike infection	Percentage reduction in spike infection	Dry berry yield (g plant ⁻¹)
Bordeaux mixture 1% (2 sprays)	25.1	45.4	12.5	38.1	450.3
Bordeaux mixture 1% (3 sprays)	19.6	57.2	9.9	50.8	495.0
Mancozeb 0.1% (2 sprays)	16.6	63.8	7.2	64.3	550.4
Propiconazole 0.1% (2 sprays)	20.4	55.4	10.9	46.0	480.0
Carbendazim 0.1% (1 spray)	13.6	70.3	5.9	70.8	616.3
Carbendazim + Mancozeb 0.1% (1 spray)	10.3	77.5	3.5	82.7	742.7
Control	45.8	0.0	20.2	0.0	350.4
CD (P=0.05)	2.2		0.6		20.2

*Pooled data of 2003–05

fungicide (carbendazim + mancozeb 0.1%) during flowering phase in the high ranges of Idukki District of Kerala.

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