

# Role of systemic fungicide metalaxyl mancozeb in management of Koleroga (*Phytophthora meadii* Mc Rae) of arecanut (*Areca catechu* L.) in Central Western ghats of Karnataka

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Arecanut (*Areca catechu* L.) an economically important plantation crop in Central Western Ghats of Karnataka is severely affected by Koleroga/ Mahali (*Phytophthora meadii* Mc Rae). Under congenial environmental conditions during monsoon, the disease become severe and leads to dropping of young buttons, rotting of dropped nuts, affected trees left without management leads to rotting of crown and in due course end up in death of the tree. By regular practice of 1 per cent Bordeaux mixture application to the bunches after the appearance of the disease does not give satisfactory control. The present investigation revealed that arecanut bunches treated with systemic fungicides viz., metalaxyl mancozeb 72 WP @ 2 gl<sup>-1</sup> as spray for twice showed effective reduction of the disease and increase in the yield.

**Key words :** Koleroga/Mahali, Metalaxyl mancozeb 72 WP, Bordeaux mixture, Copper oxychloride

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Arecanut (*Areca catechu* L.) an important plantation crop in Central Western Ghats of Uttara Kannada district of Karnataka. The crop is cultivated in multistoried cropping system under valley situation where in arecanut is the main crop and is intercropped with number of crops viz., black pepper, banana, cardamom, cinnamon, cocoa, clove, nutmeg, betalvine, colocasia etc. The farmers of the region earn their lively hood by cultivation of arecanut and other intercrops. Arecanut is traditional and heritage crop of the region.

Among the important diseases of arecanut, Koleroga/ Mahali (*Phytophthora meadii*) is a devastating disease by causing loss in terms of dropping of immature nuts. The

disease starts with initial symptoms of sudden dropping of nuts from the bunches during monsoon. Freshly dropped nuts show the symptoms of water soaked lesions with dark green areas. Such affected nuts are called 'Neergole'. After a few days dropped nuts show the presence of white felt like mycelium with abundant production of mycelia, sporangiospores and zoospores. Such nuts are called 'Busergole'. The disease under congenial atmospheric condition with respect to high relative humidity (90 to 100 %) and low temperature (20°C to 22°C) results in rotting of the crown portion. Such trees left with out protection leads to death of the tree by rotting of the bud region. The farmers of

the region have practice to spray 1 per cent Bordeaux mixture particularly to the bunches during monsoon for 2-3 times depending on the monsoon and disease severity as management practice to combat the disease. Literature on use of systemic fungicide against the disease is meagre. Hence, the present investigation was made with respect to application of systemic fungicide *i.e.*, metalaxyl mancozeb 72 WP as spray to manage the disease and to compare its efficacy with non systemic copper fungicides to combat the disease.

An experiment was conducted at Horticulture Research Station (University of Horticultural Sciences, Bagalkot), Sirsi in Uttara Kannada district of Karnataka during 2009-10. The region is situated at 516 MSL. The variety used for the trail was Sirsi locals a popular variety of the region and it was highly susceptible to the disease. The soil was lateritic with 5.5 to 6.5 pH range. The average rain fall of the region is 2500 mm with 108 rainy days and major monsoon was observed during the months of June, July, August and September, which coincides with immature stage of the nut which is susceptible to the disease. The relative humidity during the rainy days ranged from 82 to 100 per cent with temperature around 20°C to 22°C. The climatic conditions were highly conducive for development and spread of the pathogen (*P. meadii*). The arecanut trees were planted at 2.7 × 2.7 m with age of 25-30 years old. Black pepper vines were trained on arecanut as standard. Banana was grown as intercrop. Koleroga starts usually 20 day after on set of monsoon. The severity (22 to 95 %) of the disease by dropping of immature nuts was seen during July to August. The disease extends up to October depending on the monsoon severity and its spread during the year.

The trail was designed with five treatments and was replicated four times. Size of the treatment was 20 trees. The fungicides used against *P. meadii* were 1 per cent Bordeaux mixture, 0.2 per cent copper oxychloride, and 0.2 per cent metalaxyl mancozeb 72 WP, an age old practice of covering the bunches of arecanut with polyethylene cover of 200 μ thickness. Untreated bunches served as control. The fungicides were applied to the bunches with gutter sprayer before onset of monsoon. The treatments were repeated again at 25 days

interval after first round application. The efficacy of fungicides were assessed by counting the dropped nuts during before onset of the disease and after the onset of the disease. A scale from 0 to 5 was used for assessing the per cent disease incidence for counting the dropped nuts where in 0 grade- No nutfall, 1 grade -1-10 per cent nutfall, 2 grade -11-25 per cent nutfall, 3 grade -26-50 per cent nutfall, 4 grade- 51-75 per cent, 5 grade >75 per cent nutfall. Yield of arecanut as dry nut weight per tree was taken after the maturity of nuts. Standard statistical procedure was followed for analysis of data.

The results presented in the Table 1 revealed that, the fungicide metalaxyl mancozeb (@0.2%) showed least incidence of the Koleroga disease 4.75 per cent and 6.00 per cent after first and second round application with highest yield of 2.75kg dry nut per tree. This was followed by polyethylene cover 200μ gauge thickness to the bunches of nuts, where in the incidence of the disease was 7.25 per cent and 14.25 per cent after first and second round application with more yield of 1.79 kg dry nut per tree. Copper fungicides were at par with respect to reduction of the disease and yield. Among copper fungicides, 1 per cent Bordeaux mixture application was more effective in combating the disease (16.00 % and 49.00 % during first and second round application, respectively) with 1.25 kg of dry nut per tree. Whereas, the copper oxychloride (@ 0.2 %) showed 19.75 per cent and 51.75 per cent reduction of the disease with yield of 1.12kg per tree of dry nuts. Highest incidence of Koleroga was observed in the untreated bunches of arecanut (32.75 % and 93.50% after first and second round application, respectively) with dry nut of 0.20 kg per tree.

The results are in conformity with the findings of Sastry (1982), who reported that Bordeaux mixture (1%), copper oxychloride and metalaxyl were found effective in inhibiting the growth and sporulation of *Phytophthora capsici* and *P. meadii*. Similarly, Ramachandran and Sarma (1985) reported that metalaxyl was the most toxic to mycelial growth of the *P. capsici*. Metalaxyl at 200μg/ml concentration showed effective inhibition of *P. capsici*. (Ramachandran *et al.*, 1989). Further, Shashidhara *et al.* (2008), reported that metalaxyl mancozeb 72 WP at 0.1 per cent, 0.2 per cent and 0.3 per cent were highly

Treatments	Per cent disease incidence		Yield dry nut (kg/tree)
	Observation after first round application	Observation after second round application	
Bordeaux mixture @ 1%	16.00 (23.49)	49.00 (44.42)	1.25 (6.42)
Copper oxychloride @ 0.2%	19.75 (26.37)	51.75 (46.00)	1.12 (6.05)
Metalaxyl mancozeb 72 WP@ 0.2%	4.75 (12.54)	6.00 (14.10)	2.75 (9.54)
Polyethylene cover (200μ gauge) to the bunches of arecanut	7.25 (15.60)	14.25 (22.07)	1.79 (7.68)
Control	32.75 (34.86)	93.50 (75.71)	0.20 (2.49)
SEm ±	1.11	1.34	0.20
C.D. (P=0.05)	3.43	4.12	0.62

inhibitory to the pathogen *P. capsici*.

Present investigation showed that the application of metalaxyl mancozeb 72 WP at 0.2 per cent twice to the bunches of arecanut during pre monsoon and 25 days after first

application drastically reduce the incidence of Koleroga/ Mahali with increase in the yield. This fungicide was significantly superior over copper based fungicides.

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