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Editorial Open Access

Evaluation of New Chemistry Fungicides against Charcoal Rot of Sesame Caused by *Macrophomina phaseolina* in Pakistan

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Editorial

Sesame (*Sesamum indicum* L.) is the most significant oilseed crop of Pakistan. It is cultivated in tropical and subtropical areas of the world with slightly high temperature. The consumption of 100 gram seeds of sesame provides water (1.60ml), food energy (586 kcal), proteins (18.08 g), total lipids (50.87 g), carbohydrate (24.05 g), total dietary fiber (5.5 g), vitamin B6 (0.816 mg), vitamin A (3 µg), saturated fatty acids (1.252 g), monosaturated fatty acids (3.377 g) and polyunsaturated fatty acids (3.919 g). In the world, it is cultivated on an area of 9398 thousand hectares with total annual production of 4.78 million tons. In Pakistan, its area under cultivation is 88 thousand hectares with an average available production of 19.3 thousand tons.

There are numerous restrains for successful cultivation and production of Sesame crop. Among those constraints charcoal rot of sesame caused by *Macrophomina phaseolina* (Tassi.) Goid is the most imperative disease of this crop. The losses caused by this disease under field conditions are 57% with 40% disease incidence whereas yield losses of 5-100% has also observed in Egypt under favourable climatic conditions. Charcoal rot disease has diminished the production of sesame at about 27 million bushels per year in USA with an estimated value of $US 146 million.

Macrophomina phaseolina is necrotrophic and thermophillic phytopathogen in nature. Although a single specie *phaseolina* is recognized till now within the genus Macrophomina but a huge variability in morphology and pathogenicity has seen among various isolates from different hosts. The pathogen mainly reproduces either through microsclerotia or pycnidia. The fungus spreads promptly through soil as well as seed and enhances the disease severity as soil and air temperature increase from 28-35°C. The characteristic symptoms of this disease are appearance of spindle shaped lesions, light grey center of leaves with dark border, black secondary roots, sudden wilting and death of growing plants.

The sclerotia of pathogen survives in the soil, crop residues and on seed which cause characteristic symptoms such as sudden wilting, destruction of fibrous root, blackening of stem and roots. In the absence of resistant germplasm against virulent pathogen, the utilization of systemic fungicides is a potential approach to diminish the inoculum density of soil borne diseases.

Numerous disease management approaches are available such as resistant varieties, crop rotation, cultural practices, biological control method, soil solarization, systemic induce resistance and minimum supply of soil moisture to diminish the disease incidence of charcoal rot of sesame caused by *Macrophomina phasiolina* but these approaches require highly proficient accuracy in measurements as well as long time is required. In the meanwhile, adequate application of systemic fungicides against this disease is an appropriate and easy method to practice, prepare solutions, soil drenching and application with irrigation which is quick in action. Farmers judiciously apply fungicides to protect plants along with enhanced production, yield and economic return. The fungicide application possesses relatively low cost and more effectiveness on crops to hinder disease losses.

Plant protective measures for soil borne diseases depend upon an application of systemic fungicides. The effective management approaches are much imperative to diminish the disease incidence caused by soil born thermophillic plant pathogens which is the most pivotal part of the current research. Moreover, environmentally friendly systemic fungicide is the demand of the existing era.

Six fungicides viz. Nativo, Score, Topsin-M, Mancozib, Antracol and Topass are mostly used against Charcoal rot disease of sesame caused by *Macrophomina phasiolina* (Tassi) Goid. with different concentrations. Nativo expressed minimum fungal colony growth (1.26 cm at 150 ppm concentration by disrupting the metabolism as well as by hampering the growth and development of pathogen. It binds through covalent bond formation with sclerotia of pathogen and interrupts its ionic concentration. The above observations are also coincides with the studies of where it was assessed that Trifloxystrobin 25% + Tebuconazole 50% @ 5, 10, 15, and 25 ppm against *Macrophomina phasiolina* and Nativo expressed significant reduction in colony growth as compared to other fungicides.

Similarly, researches also evaluated six fungicides i.e. carbendazim, tebuconazole, propiconazole, hexaconazole, mancozeb and cheshunt with five concentrations of 50, 100, 250, 500 and 1000 ppm against charcoal rot disease pathogen namely *Macrophomina phasiolina* through poison food technique and diminished that carbendazim, Tebuconazole and propiconazole completely inhibited the mycelial growth of the pathogen even at 50 ppm as compared to all other concentrations.

Therefore, it is need of the hour to find out an appropriate concentration of systemic fungicides against charcoal rot of sesame to diminish disease losses and prevent sesame plants.