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Towards Managing *Ganoderma* Induced Mortality in Indian Mesquite by Indigenous Bio-resources

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Abstract

Indian arid region in recent years witnessed large scale mortality in Indian mesquite [*Prosopis cineraria* (L) Druce] or *Khejri* due to root rot caused by *Ganoderma lucidum*. In addition a beetle *Acanthophorus*, which damages the roots made entry of the pathogen easy for infection. A series of studies were conducted to assess the bio-efficacy of bio control agents and in *in-vitro* and in field against *Ganoderma*. Three native bio agents isolated from rhizospheric soil of healthy and diseased tree of *Khejri* were purified to study their morphological characters. These were identified as *Trichoderma longibrachiatum*, *T. harzianum* and *Aspergillus nidulans*. Studies revealed that *T. longibrachiatum* and *T. harzianum* significantly inhibited the mycelial growth of *G. lucidum* compared to control. Maximum mycelial growth inhibition (47.6%) of *Ganoderma* was recorded in 96 hrs with *T. longibrachium*. Comparative efficacy of these bio agents was tested by amending soil with individual bio agents or with food substrates where *Ganoderma* infected cowpea bits were inoculated. All the treatments showed significant reduction in viable infected root bits of *Ganoderma* after 60 days over the control. However, there were significant differences in the reduction of viable propagules of *Ganoderma* among all the treatments having bio agents. Maximum reduction (85.0%) of viable infection of *Ganoderma* was achieved in a treatment combination having all the three bioagents, *Prosopis juliflora* and onion residue composts within 40 days. Laboratory experiments were also performed to ascertain compatibility of these bioagents at different concentrations of phorate and chloropyriphos in wet and dry soil conditions. Significant variations in the survival of all the three bioagents were estimated in both the conditions, time of incorporation and at different concentrations of insecticide. On the basis of aforesaid results, field experiments cum demonstrations were conducted at three problematic sites of arid districts of Rajasthan for the last one and half year. Maximum reduction in the *Ganoderma* induced root rot mortality and rejuvenation of affected *khejri* trees was recorded in the treatment where phorate (20g tree⁻¹) was combined with *T. longibrachiatum* + *T. harzainum* + *A. ninulans* + *P. juliflora* and onion residue composts (500g tree⁻¹) supplemented with one irrigation. These combinations were also successful in establishing bio agents in nutrient deficient sandy soils of the region. This technology has been found more effective in rejuvenating partially infected trees. Integration of naturally available bio-resources of the region has been found successful in achieving our endeavor to manage this strategic problem.

Key words: Biocontrol agents , chloropyriphos, onion residue, phorate, *Prosopis cineraria*

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Ganoderma lucidum (Leyss) Karst is a destructive root pathogen in various tree species and shrubs worldwide from xerophytic to tropicals and temperate regions (Kumari and Harsh 2004). It belongs to the group of pathogenic root inhabiting

fungi, which are characterized by their persistence in the left over roots and stumps, after clear felling in the forest. They do not have free spread in soil and may live for many years in the saprophytic phase, attacking young plantations raised over such

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