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The Entomopathogenic fungi Talk show: Present status & Future challenges

Madhu Bai Meena[1], Manoj Kumar[2], S. K. Singh[3], Amit Kumar[*1], Bommidi Nandini[4]

Introduction:

Entomopathogenic fungi & its Importance in pest management

Entomopathogenic fungi used as a biological control agent in pest management programs worldwide. Due to their safe, effective, environmentally friendly, cost-effective, multiple modes of action and sustainable solution simultaneously help to reduce the environmental impact of chemical pesticides while providing long-term benefits for crop production. Entomopathogenic fungi are important in pest management because they offer a sustainable and eco-friendly alternative to chemical pesticides. They are effective against a wide range of pests, including insects that have developed resistance to chemical pesticides. Entomopathogenic fungi also have low toxicity to non-target organisms, making them safe for use in the environment. Additionally, entomopathogenic fungi can be easily produced and applied, making them accessible to farmers of all scales. They can be used in combination with other pest management strategies, such as biological control agents and cultural practices, to improve their efficacy. The importance of entomopathogenic fungi lies in their potential to provide a sustainable and effective solution to pest management while minimizing negative impacts on the environment and human health.

Entomopathogenic fungi: Mechanism in pest control

The mode of action of entomopathogenic fungi infect insects through their spores, which attach to the insect's cuticle and germinate, penetrating the insect's body. Once inside, the fungus grows and spreads throughout the insect, eventually killing it. The fungus then produces new spores that are released into the environment, where they can infect other insects. The mechanism of pest control in entomopathogenic fungi is multifaceted. The fungus can directly kill insects, reduce their reproductive capacity, and alter their behaviour, making them more susceptible to predation or parasitism by other natural enemies.

Madhu Bai Meena[1], Manoj Kumar[2], S. K. Singh[3], Amit Kumar[*1], Bommidi Nandini[4]

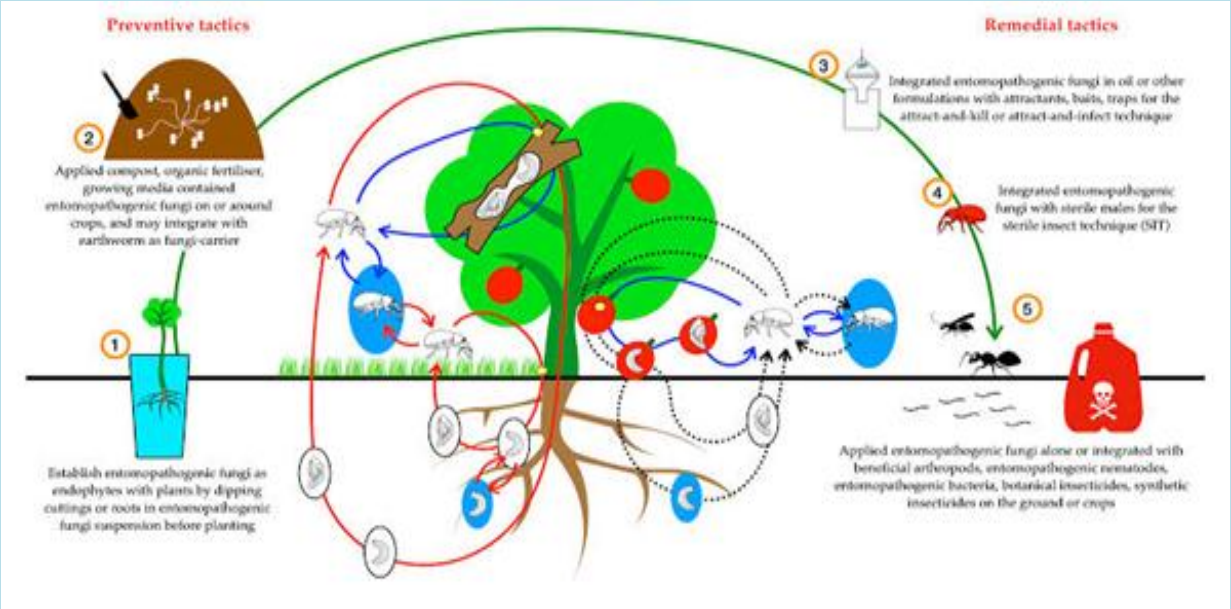
[1]PhD Research Scholar, Department of Plant Pathology, RCA, MPUAT, Udaipur-313001

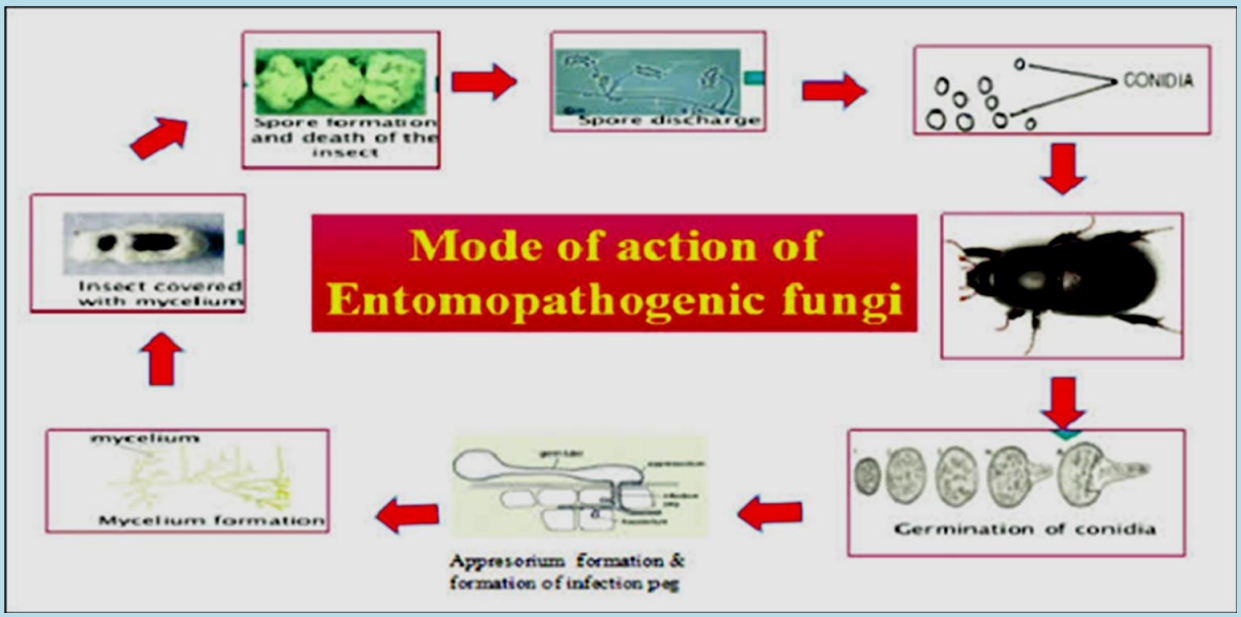
[1]PhD Research Scholar, Department of Entomology, RCA, MPUAT, Udaipur-313001

[2]Associate Professor, Department of Entomology, PGCA, RPCAU, Pusa, Samastipur-848125

[3]Professor, Plant Pathology & Nematology Department, PGCA, RPCAU, Pusa, Samastipur-848125

M.Sc. Scholar, Plant Pathology & Nematology Department, PGCA, RPCAU, Pusa, Samastipur-848125





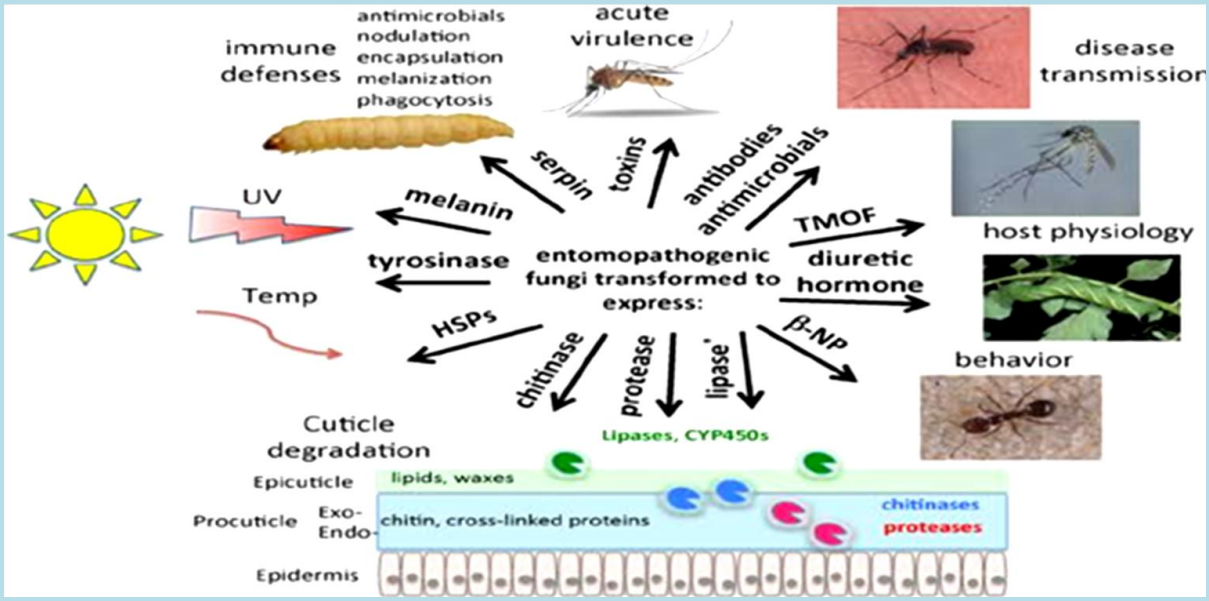
Entomopathogenic fungi: Present status

Research has shown that entomopathogenic fungi can be used in combination with other biological control agents, such as Parasitoids and predators, to enhance their efficacy. They have also been shown to have long-term effects on pest populations, reducing the need for repeated applications. Entomopathogenic fungi also have the potential to reduce the development of insecticide resistance in pest populations. Unlike chemical pesticides, which target specific biochemical pathways in insects, entomopathogenic fungi have multiple modes of action, making it less likely for pests to develop resistance.

One example of an entomopathogenic fungus is *Beauveria bassiana*, which is effective and successfully used against a wide range of cotton crop pests such as aphids, whiteflies, and thrips. Worldwide is the use of *Beauveria bassiana* to control the coffee berry borer in Central and South America. This pest is a major threat to coffee production, and chemical pesticides have been ineffective due to the pest's ability to quickly develop resistance. However, studies have shown that *Beauveria bassiana* can effectively control the coffee berry borer without harming beneficial insects or the environment. Another successful entomopathogenic fungi in pest control in India, is *Metarhizium anisopliae*, which is effective against several pests such as beetles, termites, and grasshoppers. example entomopathogenic fungi has been shown to reduce pest populations and increase crop yields, while also being more cost-effective and environmentally friendly than chemical pesticides Additionally, entomopathogenic fungi have been used to control pests in vegetable crops such as tomato and chili peppers, with promising results. They are specific to the target pest, leaving non-target organisms unharmed, and they do not leave harmful residues on crops. Furthermore, they have a low risk of resistance development in pests.

Entomopathogenic fungi: Challenges & limitations

Despite their potential benefits, there are also challenges associated with the use of entomopathogenic fungi in pest management. One challenge is that they can be affected by environmental factors such as temperature and humidity, which can limit their effectiveness. Another challenge is the need for proper application techniques to ensure that the fungi are delivered to the target pests in sufficient



quantities. This requires training and education for farmers and pest management professionals. There is also a need for further research to understand the interactions between entomopathogenic fungi and other biological control agents, as well as their long-term effects on non-target organisms and ecosystems. Finally, the cost of producing and applying entomopathogenic fungi may be higher than that of chemical pesticides, which can limit their adoption by farmers in low-income countries. Addressing these challenges will be critical to realizing the full potential of entomopathogenic fungi in sustainable pest management.

Entomopathogenic fungi: Future

The future of entomopathogenic fungi in pest management with increasing concerns about the negative impacts of chemical pesticides on the environment and human health, there is a growing demand for sustainable and eco-friendly alternatives. Advancements in technology and research are likely to lead to the development of more efficient and effective strains of entomopathogenic fungi. This could include genetic engineering to enhance their virulence and adaptation to different environmental conditions. Furthermore, the use of entomopathogenic fungi can be integrated with other pest management strategies such as crop rotation, biological control agents, and cultural practices. This integrated approach can help to improve the efficacy of entomopathogenic fungi and reduce the risk of resistance development in pests. The production and application of entomopathogenic fungi may also become more cost-effective as new methods and technologies are developed. This could make them more accessible to small-scale farmers and increase their adoption in pest management. Overall, the future of entomopathogenic fungi in pest management looks promising, and they have the potential to play a significant role in sustainable agriculture.

Referances

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