

Insect cuticle and yeast extract effects on germination, growth, and production of hydrolytic enzymes by *Nomuraea rileyi*

G.N. El-Sayed,¹ C.M. Ignoffo,¹ T.D. Leathers² & S.C. Gupta²

¹*Biological Control of Insects Research Laboratory, USDA/ARS, Columbia, Missouri, USA;*

²*National Center for Agricultural Utilization Research, Microbial Properties Research Center, USDA/ARS, Peoria, Illinois, USA*

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Abstract. Larval cuticle of *Helicoverpa (Heliothis) zea* and yeast extract added to a minimal medium (MM) induced germination of conidia of *Nomuraea rileyi* whereas sterile distilled water or MM alone did not. Yeast extract increased mycelial yield, but when cuticle was added, mycelial yield significantly decreased. Proteases and chitinases of *N. rileyi* were only expressed when cuticle was added to the MM.

Key words: Entomopathogenic fungi, Germination, Growth, Hydrolytic enzymes, Insect cuticle, *Nomuraea rileyi*

Introduction

The ability of conidia of an entomopathogenic fungus to adhere, germinate and then penetrate the cuticular integument, resulting in mycelial growth and death of the insect pest, is an intriguing biological process. It also is of practical importance when fungal species are being considered as potential mycoinsecticides. In a previous study [1], both the source and concentration of cuticle significantly affected the germination of conidia of the entomopathogenic fungus, *Nomuraea rileyi*. In order to better understand the penetration-infection process, our prior studies were extended to determine the influences of cuticle and yeast extract (in a minimal medium) on germination, mycelial growth, and expression of cuticle-degrading enzymes by *N. rileyi*.

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Materials and methods

Stock preparations and culturing procedures

Fungal isolate and inoculum. The origin, maintenance, host spectrum and relative virulence of *N. rileyi* strain UC-82-6(MS) have been previously described [2]. Conidia for inoculation, harvested after 7 to 10 days growth on Sabouraud Maltose Agar fortified with 1% yeast extract (SMAY), were suspended in sterile deionized water (SDW). This suspension was filtered through glass wool to remove clumped conidia and extraneous hyphae. The conidial suspension was then concentrated by centrifugation at 5000 g for 10 min (4 °C). The conidial pellet was resuspended in SDW containing equal parts of gentamicin (40 µl/ml), streptomycin (50 µl/ml) and penicillin (50 units/ml). This stock preparation was used to inoculate each flask to a final whole-culture concentration of 1.5×10^6 conidia/ml.

Source and preparation of cuticle. Integumental