

**[2156] PHYLOGENY OF PAECILOMYCES SPECIES REVEALED BY ANALYSIS OF RIBOSOMAL RNA ITS SEQUENCES**

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The 5.8S rDNA and flanking internal transcribed spacers (ITS1 and ITS2) of the ribosomal RNA gene from *Paecilomyces* species were amplified using the polymerase chain reaction and sequenced. Sequences from *P. amoeneroseus*, *P. carneus*, *P. farinosus*, *P. fumosoroseus*, *P. leycettanus*, *P. lilacinus*, *P. marquandii*, *P. penicillatus*, *P. tenuipes*, *P. variotii* and *P. viridis* were compared to published sequences and phylogenetic trees were produced. The two observed major clusters agreed with the subdivision of *Paecilomyces* species, based on morphological criteria, into the sections *Paecilomyces* and *Isarioidea*. Section *Paecilomyces* included *P. leycettanus* and the type *P. variotii* and confirmed the relationship of these species to the teleomorph genera *Talaromyces* and *Byssoschlamys*. Two clades were evident in this section, which also included *Penicillium* and *Nomuraea anemonoides*, which resemble *Paecilomyces* morphologically. These data agreed with other studies showing that the genus *Talaromyces* and *Penicillium* are not monophyletic. The relationship of *P. variotii* isolates with the two teleomorph genera indicate that it is probably a cryptic species. Section *Isarioidea* comprised three major clusters showing that this section too, is not monophyletic. One clade included *P. viridis*, *P. carneus* and isolates identified as *P. lilacinus* and *P. marquandii*, as well *N. rileyi*. Some other *P. lilacinus* and *P. marquandii* isolates were included in another clade along with *Trichoderma*. The clade containing the type for this section, *P. farinosus*, also included other entomogenous species, *P. amoeneroseus*, *P. fumosoroseus* and *P. tenuipes*. *P. fumosoroseus* was confirmed to contain a cryptic species, with one group of isolates closely related to *P. tenuipes* and another related to *P. amoeneroseus*. In this study, some prior mis-identifications were evident, proving that the ITS region can be useful to resolve the difficulties of classical taxonomy of these fungi. Our data suggest that *Paecilomyces* is a "form" genus only, and a major review is required, including the analysis of a more conserved gene region to clarify the phylogenetic relationships.

Index terms: entomopathogenic fungi, rDNA, molecular taxonomy.

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**[2158] EFFECT OF TREATMENT TIMING OF BACULOVIRUS SPODOPTERA AND BACILLUS THURINGIENSIS ON SPODOPTERA FRUGIPERDA**

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The objective of this experiment was to test the effect of treatment timing of pathogens *Baculovirus spodoptera* (B.s) and *Bacillus thuringiensis* (B.t) on *Spodoptera frugiperda* larvae, used together but at different timing intervals. *S. frugiperda* larvae were 2 and 6 days old, using 48 larvae per treatment with 4 replicates. Treatments, for each age included *Baculovirus* and *Bacillus* provided in the same solution and at the same time, *Baculovirus* provided 24, 48 and 72 hours before *Bacillus* was provided to the same insects and, *Bacillus* provided 24, 48 and 72 pathogens before *Baculovirus* was provided to the same insects. After exposure to both pathogens, contaminated larvae were transferred to artificial diet. Results showed that there was no difference in the mortality among the treatments, except when B.t was offered alone to 6-day old larvae. Mortality was high (above 89,25%) for all treatments. No difference was detected for larval and pupal development period among the treatments for both ages. Abnormalities among pupae and adults were not detected in any treatment.

Index terms: insect pathology, pathogen interaction

**[2159] BIOPESTICIDE PRODUCTS FOR MIGRATORY PESTS IN AFRICA: REGIONAL EFFORTS TO HARMONIZE REGISTRATION PROCEDURES**

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Migratory pests in Africa, such as locusts and armyworms, present a potentially large, but irregular and geographically fragmented market for biopesticides. Migratory pest control campaigns in Africa result in widespread application of broad-spectrum synthetic insecticides. By their nature, biopesticides are typically narrow-spectrum products. This narrow spectrum could be an environmental advantage for control campaigns. However, narrow specificity inherently limits the range of insects against which a biopesticide may be used, thereby restricting the market size. Another constraint not faced by synthetic pesticides is that biocontrol agents may be subject to importation restrictions as "exotic" species. Defining the "exotic" or "indigenous" status of a biocontrol agent is important for determining the geographic extent of markets, and has important consequences for the ability to use biopesticides in trans-border control programs in Africa. In addition to several efforts on the part of individual African countries, there are two regional efforts being undertaken to promote and harmonize the registration of biopesticides in Africa. The Inter-State Committee Against Drought in the Sahel (CILSS) already has regional guidelines in place for registration of synthetic pesticides among its nine member countries. Through USAID's Africa Bureau-funded biopesticide project, managed by Virginia Polytechnic Institute and State University, CILSS is developing guidelines for harmonized registration of biopesticides across West Africa. By contrast, there is no regional organization in Eastern Africa with an equivalent mandate and intergovernmental structure to that of CILSS. Therefore, regional harmonization in Eastern Africa must be approached with a different model. The Virginia Tech project is working through the Desert Locust Control Organization for Eastern Africa (DLCO-EA) – an organization with a narrow mandate for assisting its eight member countries with migratory pest control operations – to develop a consensus on a core set of items which will be common to national biopesticide guidelines as they are developed.

Index terms: regulation, biological control, locusts, armyworms