

Isolation and molecular characterization of fungi and bacteria associated with ambrosia beetles (coleoptera: curculionidae: scolytinae and platypodinae) from Morogoro Tanzania

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The study was conducted to identify and characterize fungi and bacteria associated with ambrosia beetles inhabiting Kimboza Forest Reserve Morogoro (Tanzania) with the broad objective of exploring the important microbe - insect symbiotic relationship. Insects and fungal mats were collected directly from the nests of active ambrosia beetles galleries, the microbes were identified using 16S and ITS rDNA analysis whereas beetles were identified using dichotomous identification keys. Two species of beetles namely *Xyleborus affinis* and *Xyleborus alluaudi* were identified. The results from rDNA analyses and multiple sequence alignment of ten isolates of Actinobacteria and nine fungi using CLUSTALX yielded 27 species of bacteria belonging to 14 genera, with the genus *Streptomyces* dominating both galleries and bodies of the beetles and 38 species of fungi belonging to 11 genera, with the genus *Fusarium* dominating the galleries and bodies of the beetles. Furthermore, ectosymbiotic fungus *Neocosmosporarubicola* was isolated from the gallery of *X. affinis*. Moreover, the most prevalent bacterial symbiont the *Streptomyces* was found to produce bioactive secondary metabolites with an MIC of 50mg/mL against *Candida*, *Bacillus* and *Pseudomonas* microbes thus indicating potential benefit of the Ambrosia beetle. This is the first study to report the association of the fungus *Neocosmosporarubicola* with ambrosia beetle. The results further confirm literature from elsewhere in the world that *Streptomyces* are symbionts of ambrosia beetles providing antimicrobial protection against pathogens in the beetle's galleries.