Identification of symbiotic nitrogen-fixing bacteria from three African leguminous trees in Gorongosa National Park☆

Abstract

The symbiosis between leguminous plants and symbiotic nitrogen-fixing bacteria is a key component of terrestrial ecosystems. Woody legumes are well represented in tropical African forests but despite their ecological and socio-economic importance, they have been little studied for this symbiosis. In this study, we examined the identity and diversity of symbiotic-nitrogen fixing bacteria associated with Acacia xanthophloea, Faidherbia albida and Albizia versicolor in the Gorongosa National Park (GNP) in Mozambique. To the best of our knowledge, this is the first report on the identity of symbiotic-nitrogen fixing bacteria in this region. 166 isolates were obtained and subjected to molecular identification. BOX-A1R PCR was used to discriminate different bacterial isolates and PCR-sequencing of 16S rDNA, and two housekeeping genes, glnII and recA, was used to identify the obtained bacteria. The gene nifH was also analyzed to assess the symbiotic capacity of the obtained bacteria. All isolates from F. albida and Al. versicolor belonged to the Bradyrhizobium genus whereas isolates from Ac. xanthophloea clustered with Mesorhizobium, Rhizobium or Ensifer strains. Soil chemical analysis revealed significant differences between the soils occupied by the three studied species. Thus, we found a clear delimitation in the rhizobial communities and soils associated with Ac. xanthophloea, F. albida and Al. versicolor, and higher rhizobial diversity for Ac. xanthophloea than previously reported.