

Poster number: 27

Does the association between sugarcane (*Saccharum* spp.) and diazotrophic microorganisms provide pest resistance?

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Gluconacetobacter sp. and *Azospirillum* sp. are beneficial endophytic diazotrophic bacteria that can live in association with sugarcane. These bacteria can provide fixed-nitrogen and plant growth hormones to host plants, therefore promoting increase in plant biomass. Other benefits, as insect-control, have been reported to some endophytic microorganisms, however this activity have not been described to diazotrophs. Here we aimed to study the effects of the association between both *Gluconacetobacter* sp. and *Azospirillum* sp. with sugarcane plants in the sugarcane borer (*Diatraea saccharalis*) host preference and performance. Sugarcane plants cv SP-79-1011 were inoculated with a pool of diazotrophic bacteria and non-inoculated plants were used as control. The host preference behaviour was investigated using a two-choices arena. In order to assess the caterpillar relative growth rate a non-choice feeding bioassay was performed. The volatile organic compounds (VOCs) were collected from both plant treatments and identified using gas chromatography coupled mass spectrometry (GC-MS). The sugarcane borer showed a preference for the control plants avoiding the inoculated plants. There was no difference in caterpillars feeding between treated and control plants. When analysed the VOCs there were no pronounced qualitative differences between treatments, nevertheless a general suppression of the VOCs was identified in plants associated with bacteria. The results suggest that *Gluconacetobacter* sp. and *Azospirillum* sp. in addition to nitrogen fixation and plant growth promotion, can make the sugarcane less attractive to *Diatraea saccharalis*. The change in the VOCs profile may be one of the mechanisms involved. Therefore, the association between sugarcane (*Saccharum* spp.) and diazotrophic microorganisms can increase resistance to *Diatraea saccharalis*. In the future an overall understanding of the mechanisms can provide tools to maximize the benefits of this association.