



The "Biased Rhizosphere" Concept: Bacterial Competitiveness and Persistence in the Rhizosphere

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The association of plant surfaces with microorganisms has been the subject of intense investigations. Numerous processes have been shown to be important in plant-associative bacteria including attachment, motility, chemotaxis, nutrition, and production of signaling molecules and secondary metabolites. One strategy to favor the competitiveness and persistence of bacteria in the plant environment relies upon manipulation of nutritional compounds secreted into the phytosphere, which comprises the rhizosphere (root surface/zone influenced by secretions) and the phyllosphere (leaf surface/zone influenced by secretions). The pattern of plant host exudate can be bred or engineered to establish "biased phytospheres" with bacteria that can naturally, or by engineering, use metabolic resources produced by the host plant. Over the last two decades, natural biases, generated by opine-like molecules of Agrobacterium-plant interactions and by rhizopine-like molecules of the Rhizobium-legume interactions, have provided tactics based on unique metabolites produced by plants to favor the competitiveness and persistence of bacteria that can catabolize the host-produced novel nutrients. An overview of this field of research will be presented.