

PLANT-PRODUCED QUORUM-SENSING SIGNALS EXUDE INTO THE

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Quorum-sensing (QS) is a mechanism by which a bacterial population measures its cell density. Two main processes govern a QS system: (1) production of QS signals and (2) signal detection via QS-responsive transcriptional regulators. In many gram-negative proteobacteria, the QS signals are small diffusible compounds called *N*-acyl-homoserine lactones (acyl-HSLs). As the cell density of a bacterial population increases, constitutively produced acyl-HSLs reach a threshold concentration. At this concentration the transcriptional regulator detects acyl-HSLs and induces expression of gene sets. Gene sets regulated by QS include virulence factors such as animal and plant host degradative enzymes, antibiotics and factors involved in bacterial biofilm maturation. Two acyl-HSL synthase genes, *lasI* from *Pseudomonas aeruginosa* and *yenI* from *Yersinia enterocolitica* were introduced into tobacco, individually and in combination. Transgenic plants expressing LasI and YenI signal synthases in the plastid produce multiple acyl-HSLs. Transgenic plants grown axenically exude acyl-HSLs from their roots into growth hydroponic fluids. Acyl-HSLs, while absent in plant-free soil, become a component of soil adhered to (rhizosphere) and soil not adhered to (nonrhizosphere) roots of transgenic plants. Plant-produced QS signals could be used to supplement soils with bacterial signals to influence bacterial-bacterial and/or bacterial-plant interactions.