

**SEASONAL POPULATION DYNAMICS OF
PHYLLOSHERE BACTERIA ON COTTON**

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Abstract

Phyllosphere bacterial populations have considerable potential for use in new biotechnological approaches to crop protection and management. Better information on the behavior of these microbial populations will aid in the development of these potential uses. To this end, the population dynamics of phyllosphere microorganisms on cotton foliage is being investigated. Seasonal development of phyllosphere bacterial populations on cotton leaves was studied in North Carolina and in the San Joaquin Valley of California. North Carolina data was collected in 1991 and 1992 on the cultivar DP51 grown under rainfed conditions with occasional sprinkler irrigation during dry periods. California data was collected in 1995 and 1996 on the cultivar Maxxa grown under furrow irrigation. Total recoverable bacterial populations were measured at regular intervals by washing five replicate leaf samples in sterile buffer to remove bacteria and then plating the washings on amended nutrient agar (10% normal nutrient strength and 100 ppm chlorothalonil fungicide). A carrying capacity model was developed using nonlinear regression methods. This model provided a reasonable fit to the data and by dampening out short term variations, allowed for comparison of population dynamics between locations and years. Phyllosphere bacterial populations in North Carolina reached higher levels (28000 cfu/cm²) than California populations (1100 to 1500 cfu/cm²). North Carolina populations reached the maximum level (carrying capacity) in 101 to 129 days whereas California populations reached maximum levels later at 136 to 144 days. Population development with respect to the carrying capacity was consistent over both years at each location.