



# Epiphytic Survival of *Xanthomonas axonopodis* pv. *phaseoli* (E. F. SM)

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## Key Words

*Xanthomonas phaseoli*, bean, host, nonhost, epiphytic population.

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## 1 SUMMARY

Common bacterial blight, caused by *Xanthomonas axonopodis* pv *phaseoli*, is a major disease in beans (*Phaseolus vulgaris*) throughout the world. Field and greenhouse experiments were conducted to determine epiphytic *X. phaseoli* populations of bean varieties and nonhost plants. Leaves of three bean varieties grown in the field were sampled for *X. phaseoli* populations at two-week intervals from two weeks after crop emergence while stems, flowers and pods were assessed for the pathogen at eight weeks after crop emergence. Weeds and maize growing in the vicinity of the bean fields were also assessed for the pathogen. Epiphytic pathogen populations of up to  $3.75 \times 10^4$  cfu/ml were detected on bean varieties (Mkuzi, Cranberry and Michigan C20), while on *Zea mays*, *Oxalis latifolia*, *Cyperus rotundas*, *Bidens pilosa*, and *Amaranthus hybridus*, the pathogen population was between  $1.02 \times 10^4$  and  $2.14 \times 10^4$  cfu/ml. Leaves of *Amaranthus hybridus* and *Zea mays* hosted pathogenic strains of *X. phaseoli*, but those of *Oxalis latifolia*, *Bidens pilosa* and *Setaria spp* had nonpathogenic xanthomonads. Both plant age and bean variety had no effect on pathogen population, and bacterial populations in the nonhost plants were not significantly different from each other ( $p=0.345$ ). The study confirmed the existence of *X. phaseoli* on nonhost plants and on the stems, flowers and pods of bean varieties. The epiphytic bacteria have potential to act as inocula reservoir during and between growing seasons. The nonhost plants must be controlled as part of common bacterial blight management.

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## 2 INTRODUCTION

*Xanthomonas axonopodis* pv. *phaseoli* (E.F.SM) (synonym *Xanthomonas phaseoli*) is one of the major constraints to common bean (*Phaseolus vulgaris* L) production in the world (Opio *et al.*, 1996; Coyne *et al.*, 2003). The pathogen incites common bacterial blight, one of the five most important biotic constraints to bean production in sub-Saharan Africa (Gridley, 1994). According to Allen (1995), 19 of the 20 bean producing countries in Eastern and Southern Africa have reported the presence of the disease. Giga (1989) reported the disease as one

of the major constraints to bean production in Zimbabwe. Worldwide, the pathogen causes between 10 and 40% yield loss depending on cultivar susceptibility, environmental conditions and stage of infection (Saettler, 1989). The quantitative yield losses specific to Zimbabwe have not yet been determined.

Common bacterial blight usually occurs together with fuscous blight (caused by *Xanthomonas axonopodis* pv. *phaseoli* var *fuscans*), making it difficult to estimate yield loss by each pathogen. Diseased pods have water-soaked