G15 Biological Control of Annual Bluegrass with *Xanthomonas campestris*

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Xanthomonas campestris is a bacterium indigenous to the US that is currently under development as a potential bioherbicide for annual bluegrass control in turf.

Annual bluegrass exists in more than one biotype. *Poa annua* var. *annua,* the predominant biotype in the South is a true annual which dies after seeding. In Michigan, however, the predominant biotype is *Poa annua* var. *reptans* which is a true perennial that is persistent and does not die after seeding. Xanthomonas control of the annual biotype has proven to be successful under field, greenhouse and growth chamber conditions but biocontrol of the perennial biotype is more problematic. Although the perennial biotype can be controlled when grown inside under controlled conditions, effective control has not been observed under field conditions.

1992 field studies were initiated in early May when the turf was mowed for the first time. Xanthomonas needs grass plants to be wounded for infection to occur and therefore inoculations are made immediately after mowing. All studies were overseeded with bentgrass to provide competition for potentially weakened annual bluegrass. It is hoped that early season Xanthomonas application, combined with bent overseeding will aid in improving biocontrol.

The most promising field study in terms of biocontrol of the perennial biotype is a study investigating the acceleration of Xanthomonas biocontrol with chemicals. Inoculation treatments are weekly inoculations of 10^9 cfu / ml Xanthomonas at 200 gpa and a tetracycline control. Chemical treatments are 0.1 gal/A Embark (applied 4-27), 0.1 gal/A Embark (applied monthly starting 4-27), 0.3 gal/A and 0.9 gal/A Prograss (applied 4-27), 0.3 gal/A and 0.9 gal/A Prograss (applied monthly starting 4-27), 3 lb/A Pre-M (applied twice on 4-27 & 5-27), 0.7 gal/A Acclaim (applied monthly starting 5-27) and 0.2 lb/A PP333 (applied monthly starting 5-27). 10 days after initial inoculation 0.1 lb/A Embark enhanced symptoms of Xanthomonas biocontrol. This effect was gradually lost as the Embark plots greened up until 60 days after initial inoculation inoculated and non-inoculated Embark treated plots exhibited no damage. Monthly applications of 0.9 gal/A Prograss also enhanced symptoms of Xanthomonas biocontrol as soon as 10 days after initial inoculation. By 60 days, definite thinning of the annual bluegrass in inoculated plots treated with monthly applications of 0.9 gal/A Prograss was noticeable in small patches that was comparable in appearance to biocontrol of annual bluegrass observed under non-field conditions. Annual bluegrass populations were evaluated prior to initiating inoculation and chemical application and will be evaluated at the end of the season to determine whether a population shift from annual bluegrass to bent has occurred as a result of treatments.

Other 1992 field studies include:-

1. Comparison of different strains of *Xanthomonas campestris* for biocontrol
2. The effect of application volume and frequency of inoculation on Xanthomonas biocontrol.
3. The effect of long term weekly or biweekly inoculation on annual bluegrass populations.
4. Monitoring populations of Xanthomonas in different plant parts after inoculation of the annual and perennial biotypes of annual bluegrass.