*Identification of Mechanism(s) of Resistance in Kentucky Bluegrass (*Poa pratensis *L.) for Control of Black Cutworm in Turfgrass*

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Objectives:

1. Evaluate and identify governing plant mechanism(s) responsible for resistance of twelve subgroups and respective cultivars of Kentucky bluegrass to black cutworm larvae.

Start Date: 2001
Project Duration: 3 years
Total Funding: $72,740

Numerous feeding bioassays have revealed that Kentucky bluegrass, *Poa pratensis* L., is an unsuitable host and exhibits measurable resistance to black cutworm (BCW) larvae. A multitude of mechanisms can be responsible for plant resistance, however plant resistance can be superficially categorized into two primary mechanism classes: (1) plant chemistry (i.e., alleochemical) and (2) plant morphology (i.e., physical properties).

This study revealed that BCW larvae consumed measurably less Kentucky bluegrass leaf tissue than creeping bentgrass. Also, BCW larvae fed Kentucky bluegrass cultivars had significantly slower development (i.e., weight gain) as well as survival compared to BCW larvae fed Penncross creeping bentgrass.

Laboratory feeding bioassays have revealed that young (i.e., juvenile, < 45 days) Kentucky bluegrass leaf tissue is suitable for black cutworm (BCW) larval development and survival, whereas old (i.e., reproductive, > 365 days) Kentucky bluegrass leaf tissue exhibited resistance to BCW larval development and survival.

It may be likely that the mechanism(s) of resistance of Kentucky bluegrass to BCW may be linked to plant biochemistry or secondary plant compounds.

In feeding assays, black cutworm larvae preferred creeping bentgrass over Kentucky bluegrass.

Based on these results and related evidence that plant age can affect plant-insect relationships, we hypothesized that either plant morphology (i.e., physical properties such as cell wall composition including lignin, amorphous silica, etc.) or plant biochemistry (i.e., alleochemical or secondary plant compounds) may be responsible for the respective resistance exhibited by Kentucky bluegrass to development and survival of BCW larvae.

Preliminary leaf tissue analysis of both vegetative and reproductive Kentucky bluegrass leaf tissues has revealed inconclusive evidence that plant morphology is responsible for BCW resistance. Tissue toughness was evaluated by leaf penetrometer analysis. No significant differences were observed between vegetative and reproductive Kentucky bluegrass leaf tissues.

Kentucky bluegrass plant tissues also were analyzed for content of dry matter, neutral detergent fiber (NDF), ash, and lignin. No significant correlations or differences between vegetative and reproductive Kentucky bluegrass leaf tissues were observed among any of the tested tissue characteristics. Subsequently, it may be likely that the mechanism(s) of resistance of Kentucky bluegrass to BCW may be linked to plant biochemistry or secondary plant compounds.

Summary Points

- Juvenile (i.e., young, < 45 day) Kentucky bluegrass leaf tissue exhibited measurable susceptibility to BCW larval development and survival among the 12 cultivars tested.
- Reproductive (i.e., old, > 365 day) Kentucky bluegrass leaf tissue exhibited significant resistance to BCW larval development and survival among the 12 cultivars tested.
- It may be likely that the mechanism(s) of resistance of Kentucky bluegrass to BCW may be linked to plant biochemistry or secondary plant compounds.