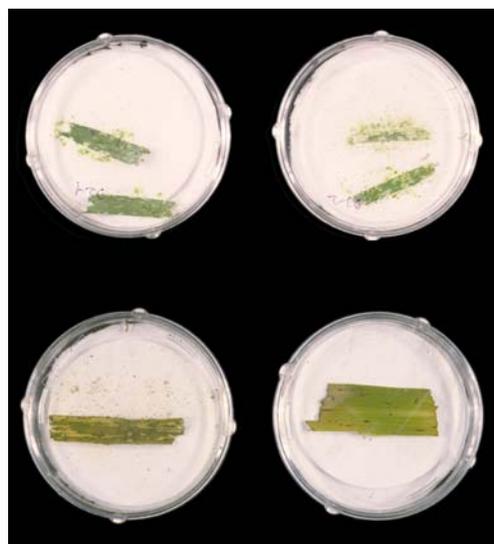


Identification of Insect Resistance Genes in Plants

What is this technology?

Identification of insect resistance genes from switchgrass and other biomass plants for sustained production.



Biomass - greenhouse

Field collected

Differential feeding by fall armyworms on different switchgrass lines

Insects are a potential problem in sustainable production of biomass grasses

- Historical observations under natural conditions of dispersed distribution indicate few insect problems
- Insects are typically much more of a problem in monocultures
- Publications on switchgrass establishment indicate insect problems can occur.

Fermentability and insect resistance are potentially incompatible

- Improved fermentability is associated with lower lignin and less crosslinking of polymers
- Lignification and polymer crosslinking are demonstrated insect resistance mechanisms
- Improved fermentability needs to be developed in conjunction with retained insect resistance

Existing switchgrass lines have highly variable resistance to insects

- Representative biomass lines tested were readily fed-on by insects
- Some field collected lines were as susceptible to insect feeding as biomass lines, but others were highly resistant and killed most insects within a few days.

Insect resistance genes can be identified and followed in breeding and genetic engineering.

- We have used bioinformatics to identify potential switchgrass insect resistance genes from existing genomic information, some of which are not associated with lignification or crosslinking.
- Cloning and expression studies can be used to identify the most effective insect resistance genes and gene combinations.

Moving Forward

- We have the existing knowledge base and transformation capability to identify insect resistance genes from switchgrass and other biomass crops.
- Collaborations are needed to realize this potential.

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