

The Athenix Pipeline

Discovering input trait solutions for corn and soybean utilizing innovation and biological diversity



Microbial Diversity Acquisition System

- High-throughput genomics approach "mines" our microbial strain collection for genes of interest
- Focus is on extra-chromosomal DNA
- Can identify distant homologs of known toxins
- Format supports directed homolog searches by PCR and hybridization.

Genomic approaches

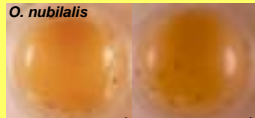
The Athenix Microbe Collection

- 20000+ strains isolated from soil and environmental samples collected worldwide
- Innovative isolation techniques generate a highly diverse collection to screen for activity

Empirical approaches

In-vitro Bioassay

- Strains tested in high throughput on main targets
- Innovative approach to strain growth conditions creates unique samples to test
- Proteome interaction mapping assay for obligate parasites
- Unique bioassay for obligate parasites



Lepidopteran active gene (Athenix Gene 'L')
Discovered through MIDAS



Coleopteran activity discovered through
homologue search (corn rootworm/ CPB)



Non-Bt Western Corn Rootworm activity
Discovered through empirical screen

Active homologues

Cloning and expression of potential toxin
Multiple expression systems
Test protein for broad activity

Protein fractionation
Identify, isolate active component
Cosmid libraries

Determine specificity

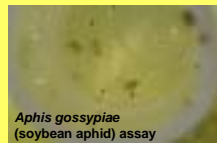
Lepidoptera: *H. virescens*,
H. zea, *O. nubilalis*,
S. frugiperda, *A. ipsilon*,
P. gossypiella, *M. sexta*



Coleoptera: *D. virgifera*,
D. undecimpunctata,
L. decemlineata, *T. molitor*



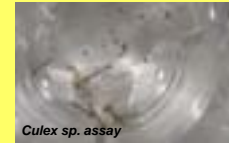
Homoptera: *A. gossypiae*,
M. persicae



Hemiptera: *L. lineolaris*



Diptera: *C. pipiens*



PLUS
Nematodes:
soybean cyst nematode

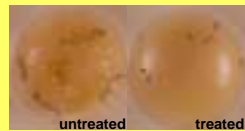


Dose response testing

Lepidopteran active gene (Athenix Gene 'L')
Discovered through MIDAS

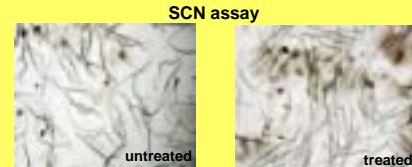


LC₅₀ for Gene 'L' against *O. nubilalis*
0.165 ug/cm² (0.129-0.207)



EC₅₀ for Gene 'L' against *H. virescens*
0.877 ug/cm² (0.806-0.954)

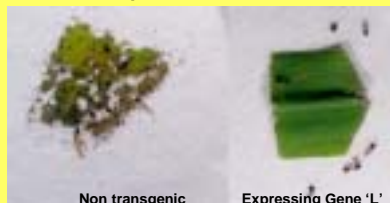
Nematode active genes
Discovered through empirical screen



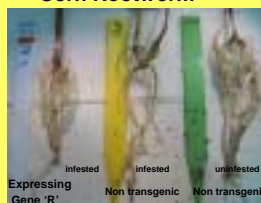
IC₅₀ for Athenix Gene 'N'
3 ug/ml

Transgenic plants

European Corn Borer



Corn Rootworm



Soybean Cyst Nematode



Expression of toxin in plants