



State Science + Technology Fair of Iowa (SSTFI)

Resource Guides

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3630 Extension & 4H Youth Building

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Abstracts

Example Submissions

Biochemistry Category

Exhibitor (2008)

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Biofilms are highly organized communities of microbial cells attached to solid surfaces. Bacterial biofilms have been linked to numerous health problems in humans and are not treatable with typical antibiotic therapies. Therefore, scientists need different treatment options. In order to combat biofilms, researchers must understand the genetic and molecular basis of their formation. This can be achieved by identifying and characterizing genes that are believed to be involved in biofilm formation. My research addresses this need by characterizing new genes required for *Myxococcus xanthus* fruiting body development, a well-studied model system for the formation of single-species biofilms.

When deprived of nutrients, *Myxococcus xanthus* initiates a developmental program allowing groups of cells to migrate to aggregation centers and begin building multicellular fruiting bodies. Once a fruiting body is molded into its final shape, individual cells within this structure become dormant spores that are resistant to environmental stresses. Fruiting body development requires that cells be motile. Therefore, I focused on putative motility genes. Mutants containing plasmid insertions in these genes were monitored for fruiting body formation using phase-contrast microscopy and sporulation by comparing their sporulation efficiency to that of wild-type cells. Also, each mutant was tested for defects in motility using swarm expansion assays.

A majority of the mutations affected motility and fruiting body formation. Results from these studies can be expanded to identify genes involved in biofilm formation in bacterial pathogens. The practical application of this information is the potential discovery of new targets for biofilm disruption and other treatment possibilities.

Botany Category

Exhibitor (1993)

ABSTRACT

BUG OFF! Creatures of the corn. A PLOT STUDY OF THE EFFECTS OF OSTRINIA NUBILALIS ON ZEA MAYS. PHASE III.

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Different varieties of hybrid seed corn respond differently to infestations of European corn borers. Some varieties also tend to show resistance. Infestations of first brood European corn borers can also effect yield loss in various varieties of hybrid seed corn. Ten hybrids of seed corn were randomly planted in nine plots to test their resistance and yield losses. The plants in all plots, except the control, were infested with European corn borers. Out of the infested plots, half were dissected and the other half were used for yield results. Of those hybrids tested, different resistance levels were observed. Visual damage and total European corn borer numbers were not directly correlated to yield loss. The research results found that there is a definite relationship between hybrid resistance to European corn borers and the income lost per acre. The statistical analysis indicated that some varieties show resistance to infestations of first brood European corn borers and some hybrids show field tolerance. Through plant breeding, hybrid corn that is more tolerant or resistant to European corn borer larvae can reduce the need for spraying harmful insecticides. This will cut down on the agricultural productionists' expenses and enable a higher profit at marketing time. The use of less insecticides will also help protect our environment and water quality, and provide safer food sources.