Other determinants of insect preference

Host plant stress

- Plant defenses weakened
- Makes plant more favorable

Resource rich plants

- Nitrogen needed to make proteins
- Nitrogen levels much lower in plants than animals
- Vigorously growing plants may provide more nutrient rich food

Evolution of insect plant interactions

Introduction

Insects have been feeding on plants for 100’s of million yrs

Presently 50% of all insects feed on plants

However, this great diversification of insects occurred only 60 million yrs ago. Why?

Diversification of angiosperms (flowering plants)

Specialization of insects onto plant groups or plant parts

Coevolution proposed to explain the great diversity of flowering plants and insects that feed on them.

What is coevolution?

Evolutionary change (genetic change) in one species causes evolutionary change in another
Example: crabs and shells

Over evolutionary time, shells have become thicker and crab claws have matched this

Gene for gene coevolution has been observed in wheat and hessian fly

Types of coevolution

Pairwise coevolution

Strict coevolution

Evolution of traits in one species cause changes in another

These changes in the other species cause changes in the first

Reciprocal interactions are postulated

May cause speciation

Hessian fly example a gene-for gene pairwise coevolution

Diffuse coevolution

Reciprocal evolutionary change among groups of species rather than specific pairs

Specificity of response not as important

Crab example perhaps diffuse, so would interactions between flowers and a guild of pollinators

What would constitute evidence for evolution?

Fossil record in some circumstances

Certain phylogenetic patterns

Genetic changes with a known historical basis