

#### Slide 1

Natural selection states that organisms that are best suited to an environment are most likely to survive and produce offspring.

Major environment resources that plants need to grow and reproduce include water, nutrients, and light.

Two types of changes in environmental factors can impact plant growth:

Disturbances or temporary changes in the environment – such as being eaten by animals, infected by pathogens, changes due to incidents such as fires, high wind, flooding etc. AND

Stresses – such as availability of water, nutrients, light, suitable growth temperature and presence/action of toxins.

#### Slide 2

With these factors in mind, ecologist John Philip Grime described three plant strategies for growth in different environments - Competitors, Stress tolerant, and Ruderal

#### Slide 3

Competitors grow in areas with plenty of resources like temperate forests, where they compete for light, water, and nutrients. These species have a rapid growth rate - laterally, in height, and underground in root mass to allow them to best capture necessary resources.

#### Slide 4

Stress-tolerant species have evolved to function in harsh environments where resources are scarce, but disturbances are low. These species have slow growth rates, long lived leaves, and high rates of nutrient retention.

#### Slide 5

Ruderal species are best suited to environments where disturbance is common. They grow fast, complete their life cycles rapidly and produce high amounts of seeds.

#### Slide 6

Of these 3 plant strategies, competitors demonstrate an interesting phenomenon called Allelopathy. In addition to growing large, quickly these species are able to limit the growth of their competition, for example by secreting chemicals to limit germination and growth rate of other plants around them.

#### Slide 7

Derived from 2 words - *allelon* which means "of each other", and *pathos* which means "to suffer" **Allelopathy** is a biological phenomenon in which plants produces biochemicals to influence the growth, and reproduction of another plant (or other organism). The biochemicals or **allelochemicals** are often secondary metabolites and not required for its growth, development, and reproduction.

#### Slide 8

For example, the black walnut produces compounds called juglones which are found in leaves, roots, twigs, and fruits. These compounds can volatilize from leaves, leach into the soil by rain, and exude from roots. When taken up by roots, they prevent the growth of other species.

Slide 10

Did you know that Caffeine made by tea, coffee, and cacao plants is also an allelochemical?