

LAB 2: HOXIE GORGE

<http://www.cortland.edu/outdoor/hoxie/>

The field trip to Hoxie Gorge Preserve, 160 acres of old-field, streams, and forest owned by Cortland, provides a good opportunity to see a large diversity of organisms in their natural habitat. In lecture, we studied the diversity of life from an evolutionary perspective, beginning with the scientific hypotheses for the origin of life and continuing with the evolution of increasingly complex organisms to the present dominant forms. Part of this evolutionary history of life can be seen at Hoxie Gorge, both in fossils and living relatives of ancient organisms.

The rocks at Hoxie Gorge were formed from the sediments of an ancient sea which covered this region 400 million years ago during a period known as the Devonian. Fossils commonly found in this area are Brachiopods, animals with a hinged shell, and Sea Lilies (Crinoids), sessile animals related to starfish which attached to the sediments by a stalk and filtered particulate food material from the water with radiating arms. By analyzing wave patterns in the rocks and by studying the movement of continental land masses, experts in continental drift have placed the central New York area 400 million years ago at about the latitude that Florida occupies currently, making a much warmer climate. Fish were present in the seas at that time, but their skeletons were rarely fossilized in this area.

About this time plants invaded the land. We will not find fossils of these early land plants here, but their remains are abundant in the coal fields of northern Pennsylvania. Relatives of early land plants remain today; they are the primitive mosses, liverworts, club mosses, horsetails and ferns. The latter three groups are greatly reduced in size from their tree-like ancestors found 300 million years ago. Sexual reproduction in these plants is dependent upon water and this limits the effectiveness of sexual reproduction in providing variation in the species, a prime ingredient for evolution. Dispersal of new generations in these plants is by spores.

The overwhelmingly dominant plants at Hoxie Gorge are the flowering plants, or Angiosperms. They are completely adapted to life on land. With the evolution of the pollen grain, sexual reproduction is no longer dependent upon water. Angiosperms are found in many sizes and habitats, from the small, non-photosynthetic Indian Pipe and Beech Drop to the large Beech and Maple trees. As you study the Angiosperms, consider the importance to their dominance of their multitude of sizes and habitats and their unique pollination and seed dispersal mechanisms. Why are they more effective than the primitive plants?

Animals first invaded the land after colonization by plants. These animals had a waterproof outer covering and were the ancestors of modern Arthropods (like spiders and millipedes) which can be found at Hoxie Gorge. Some of the ancient Arthropod species were much larger than their modern relatives.

GOALS:

-Start looking at the diversity of organisms and adaptations to ensure survival.
-Be able to identify the specimens that we observe on the field trip. You will need to know:

- Their name
- What they look like (*you may have to identify them from a sample*)
- Their Kingdom
- If they have a specialized relationship with another organism (symbiotic/parasitic)

For Kingdom Plantae also know:

- If they are vascular or non-vascular
 - If they are spore producers or seed producers
 - If they are gymnosperms or angiosperms
 - Be able to describe different methods of dispersal
- Know why non-vascular plants need to live in wet areas.
-Know what symbiotic and parasitic relationships are and be able to give examples.
-Be able to describe what the Hoxie Gorge area looked like 400 million years ago based on the fossils that you observe.

KEY TERMS:

Kingdom	Animalia	Fungi
Plantae	fossil	spore
reproduction	decomposer	heterotroph
symbiotic	parasitic	photosynthesis
vascular	non-vascular	angiosperm
gymnosperm	sorus (pl. sori)	cone
seed	flower	fruit
composite flower	dispersal	pollen grain
pollination	opposite leaves	alternate leaves
compound leaves	simple leaves parasitic	gall

NOTES:

Common organisms found at Hoxie Gorge

I. Kingdom Animalia:

A. Invertebrates: (do not have a spinal column)

Brachiopod (fossilized)
Sea Lily or Crinoid (fossilized)
Insects

B. Vertebrates: (with a spinal column)

White-tail deer
Eastern Chipmunk
Gray Squirrel
Birds

II. Kingdom Fungi: produce spores

Bracket Fungi
Mushrooms
Lichenized fungi (lichens)

III. Kingdom Plantae

A. Non-vascular: no transport tissue (xylem, phloem), produces spores

Mosses

B. Vascular: has transport tissue (xylem, phloem)

1. Spore-producing:

Club Mosses (Lycopodium)
Horsetails (Equisetum)
Ferns:
 Christmas tree fern
 Sensitive fern
 Wood fern

2. Seed Plants:

a. Gymnosperms: no flowers, seeds found in cones

Hemlock

b. Angiosperms: flowering plants, seeds enclosed in fruits

American Beech
Apple
Ash
Aster
Beech Drops
Black Cherry
Black-eyed Susan
Burdock
Goldenrod
Indian Pipe
Jerusalem Artichoke
Maple
Milkweed
Quaking Aspen
Queen Anne's Lace (wild carrot)
Staghorn Sumac
Touch-me-not (Jewelweed)
Witch Hazel