Nature Notes: Plant succession

By The Frederick County Forestry Board

By MIKE KAY and TOM ANDERSON

May 3, 2015

The succession of plants from field to forest can be seen at this demonstration area on Sugarloaf Mountain .

Staff file photo

The ecological term “succession” describes the changes a community of plants goes through over time. In most cases plant communities change from a short-lived, transitory grouping to a more permanent collection of plants as time progresses. This span of time may take a few short years or decades depending on a number of variables. To visualize this, think about a large grass covered lawn. Regular mowing and some weeding are necessary to maintain this grass community. Let’s say however that you discontinued mowing this site. The grasses will continue to grow; then other, “weeds” like pigweed, smart weed, sorrel, clover, goldenrod, honeysuckle, poison ivy etc

will begin to grow among the grasses. If the area in this example is not mowed for a season or two the plant community will change from a lawn to a field or meadow, which is a different ecological community. Suppose that this meadow is allowed to continue to develop; in time, longer-lived herbaceous and woody perennial plants will begin to invade the area such as mullein, Queen Anne's lace, ragweed, pokeweed, brambles, eastern red cedar, dogwood, sumac, hawthorns, locust, cherry etc. These more advanced meadows are often called "old fields." As the young trees and shrubs are allowed to grow, the old field becomes an old field in the shrub- sapling stage. This means that the meadow now has scattered trees and shrubs growing in it. After more time the trees and shrubs grow larger and more woody vegetation invades the field. The individual canopies begin to close together. Once "canopy closure" begins, the grasses and field vegetation are covered in the shade of the canopy and begin to die out. These young forest communities normally have a fairly open understory because much of the open field vegetation can not survive in the shade. A young forest is normally composed of those "pioneer" species that have seed that can be spread over long distances by the wind: maple, pines, tulip poplar, aspen, ash, etc., or they have seed that is spread by birds like crabapple, cedar, cherry, dogwood, persimmon etc. These pioneers typically exhibit rapid growth, need a lot of sunlight, and are relatively short-lived as far as trees go. As these young forests develop, vegetation that can develop and grow in shady areas becomes established in the understory of the forest. Once this happens typical forest understory vegetation such as mountain laurel, spicebush, witch hazel, iron wood, serviceberry, and black haw become established. Along with native shrubs and herbaceous material, many trees will also become established in the understory of a young forest. These "shade tolerant" trees are well adapted to living in reduced sunlight or can germinate and hang around until a break in the overstory occurs that they can exploit. These older growth varieties have seed that is the form of a nut or acorn. These heavier seeds need to be dispersed by animals such as squirrels or chipmunks. These tiny tree planters will gather up nuts and bury them for later consumption. Fortunately they do not have a good memory so they sow the seeds for many future nut-producing trees. Older growth trees such as the oaks, hickories, beech, white pine, red maple, or white ash will begin their development in these young forest communities and will bide their time in the understory until some breaks in the canopy occur, usually from the decline of a pioneer plant, storm damage, blow down etc. After about 30 – 50 years these older growth trees eventually make it to a place in the overstory and exert their dominance over the shorter-lived individuals. In our earlier example, the young forest community may persist for 30 – 50 years or so, but eventually a forest dominated by the oak and hickories begins to develop. This oak – hickory forest is considered to be an intermediate forest as far as succession goes. Left undisturbed, some very shade tolerant plants will develop in the understory of the oak dominated forest like beech, black gum, red maple, and sugar maple. These trees will continue to grow under the shade of the

oaks and hickories eventually replacing or joining them in about 100 years or so. The resulting beech — maple forest is considered to be a "climax forest community, meaning that it will not change much unless significant disturbances occur. In our example the lawn area develops over the span of 100 – 200 years into a beech – maple forest. This plant succession scenario is very common in upland sites in the Mid-Atlantic part of the U.S. As you might think, the types of plant communities and resulting climax plant community are quite different as you travel around the region, country or globe. Many factors influence the types of plants that are present depending on the geographic location, climate, elevation, rainfall, temperatures etc. A climax plant community might contain redwoods and western hemlock along the coast or Oregon, tupelo, bald cypress, and reeds in the everglades, or tundra and white spruce in the Arctic.

The Frederick County Forestry Board

The ecological term "succession" describes the changes a community of plants goes through over time. In most cases plant communities change from a short-lived, transitory grouping to a more permanent collection of plants as time progresses.

This span of time may take a few short years or decades depending on a number of variables. To visualize this, think about a large grass covered lawn. Regular mowing and some weeding are necessary to maintain this grass community. Let's say however that you discontinued mowing this site.

The grasses will continue to grow; then other, "weeds" like pigweed, smart weed, sorrel, clover, goldenrod, honeysuckle, poison ivy etc will begin to grow among the grasses. If the area in this example is not mowed for a season or two the plant community will change from a lawn to a field or meadow, which is a different ecological community.

Suppose that this meadow is allowed to continue to develop; in time, longer lived herbaceous and woody perennial plants will begin to invade the area such as mullein, Queen Anne's lace, ragweed, pokeweed, brambles, eastern red cedar, dogwood, sumac, hawthorns, locust, cherry etc. These more advanced meadows are often called "old fields."

As the young trees and shrubs are allowed to grow, the old field becomes an old field in the shrub-sapling stage. This means that the meadow now has scattered trees and shrubs growing in it. After more time the trees and shrubs grow larger and more woody vegetation invades the field. The individual canopies begin to close together. Once "canopy closure" begins, the grasses and field vegetation are covered in the shade of the canopy and begin to die out.

These young forest communities normally have a fairly open understory because much of the open field vegetation can not survive in the shade. A young forest is normally composed of those “pioneer” species that have seed that can be spread over long distances by the wind: maple, pines, tulip poplar, aspen, ash, etc., or they have seed that is spread by birds like crabapple, cedar, cherry, dogwood, persimmon etc.

These pioneers typically exhibit rapid growth, need a lot of sunlight, and are relatively short-lived as far as trees go. As these young forests develop, vegetation that can develop and grow in shady areas becomes established in the understory of the forest. Once this happens typical forest understory vegetation such as mountain laurel, spicebush, witch hazel, iron wood, serviceberry, and black haw become established.

Along with native shrubs and herbaceous material, many trees will also become established in the understory of a young forest. These “shade tolerant” trees are well adapted to living in reduced sunlight or can germinate and hang around until a break in the overstory occurs that they can exploit.

These older growth varieties have seed that is the form of a nut or acorn. These heavier seeds need to be dispersed by animals such as squirrels or chipmunks. These tiny tree planters will gather up nuts and bury them for later consumption. Fortunately they do not have a good memory so they sow the seeds for many future nut-producing trees.

Older growth trees such as the oaks, hickories, beech, white pine, red maple, or white ash will begin their development in these young forest communities and will bide their time in the understory until some breaks in the canopy occur, usually from the decline of a pioneer plant, storm damage, blow down etc. After about 30 – 50 years these older growth trees eventually make it to a place in the overstory and exert their dominance over the shorter-lived individuals.

In our earlier example, the young forest community may persist for 30 – 50 years or so, but eventually a forest dominated by the oak and hickories begins to develop. This oak – hickory forest is considered to be an intermediate forest as far as succession goes. Left undisturbed, some very shade tolerant plants will develop in the understory of the oak dominated forest like beech, black gum, red maple, and sugar maple. These trees will continue to grow under the shade of the oaks and hickories eventually replacing or joining them in about 100 years or so.

The resulting beech — maple forest is considered to be a “climax forest community, meaning that it will not change much unless significant disturbances occur. In our example the lawn area develops over the span of 100 – 200 years into a beech – maple forest.

This plant succession scenario is very common in upland sites in the Mid-Atlantic part of the U.S. As you might think, the types of plant communities and resulting climax plant community are quite different as you travel around the region, country or globe. Many factors influence the types of plants that are present depending on the geographic location, climate, elevation, rainfall, temperatures etc.

A climax plant community might contain redwoods and western hemlock along the coast or Oregon, tupelo, bald cypress, and reeds in the everglades, or tundra and white spruce in the Arctic.

Nature Notes articles are written by members of the Frederick County Forestry Board. You can contact the column editor, Ginny Brace, at kgardner@newspost.com. Please put Nature Notes in the subject line.

Nature Notes articles are written by members of the Frederick County Forestry Board. You can contact the column editor, Ginny Brace, at kgardner@newspost.com. Please put Nature Notes in the subject line.