

The Turk's Cap

THE NEWSLETTER OF THE DELAWARE NATIVE PLANT SOCIETY AUTUMN 2000

IN THIS ISSUE

- Page 1 " A Call for Articles
 " New Members
 " Letter From the President
- Page 2 " Letter From the Editor
 " Plant-animal Highlight
 " Resources and Reviews
- Page 3 " Natural Community Highlight
 " Feature Article
- Page 4 " Feature Article continued
 " Natural Community Highlight cont.
- Page 5 " Letter From President continued
 " Native Plant Highlight
- Page 6 " Natural Community Highlight cont.
 " Native Plant Highlight continued
- Page 7 " Upcoming Events
 " Feature Article Continued
 " DNPS Website

HOW CAN I GET INVOLVED?

The Delaware Native Plant Society is open to everyone ranging from the novice gardener to the expert botanist. One of the primary goals of the society is to involve as many individuals as possible.

The DNPS is working on several significant projects at this time. We are working on a forest conservation act that we hope will soon afford protection to our rapidly vanishing forests. A second initiative underway is the establishment of native plant nurseries. We have broken ground on one of these nurseries and it looks great so far. We encourage everyone to participate in these endeavors.

For more information on how to get involved, call 302.674.5187, or E-mail at dnplant@aol.com. Or visit the DNPS website at

A CALL FOR ARTICLES

If you would like to write an article for The Turk's Cap, we would love to print it. With like minded individuals as an audience, The Turk's Cap is a great venue for plant or habitat oriented writings.

We'll take just about anything from gardening tips to book reviews to poetry. Of course, it has to be about native plants, or issues related to native plants; just a minor constraint. Your imagination is the real key.

Contact Eric Zuelke for more information at (ezuelke@juno.com), or Keith Clancy at 302.674.5187.

o o o o o o

A RED, YELLOW AND ORANGE WELCOME TO OUR NEWEST MEMBERS

July through September

Claudia Alesi

Hillspring Landscape Architecture

o o o o o o

LETTER FROM THE PRESIDENT

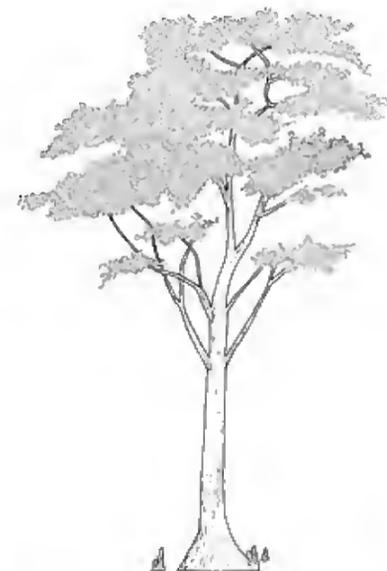
It has been quite the summer for plants. The numerous rain days we endured (I mean enjoyed) provided optimal growing conditions for plants, native and otherwise; macroscopic and microscopic. Like everyone else, I had to mow my lawn more times than I cared to; wishing I could just let it go. Believe me I would if I wasn't living in a community with zoning laws that frown on unkempt yards. In any case, the summer was quite a change from the previous one that saw consistently high temperatures and an unrelenting drought take their toll on human and plant alike. And while there were many discussions about the drought and water resources last summer, this summer there was nary a word on these topics. Instead, we were constantly fed updates on fish kills, algal blooms and red tide-like organisms in our Inland Bays.

DNREC and its biologists were scratching their heads trying to find the cause(s) for these

Continued on page 5

The DNPS Vision

The purpose of the Delaware Native Plant Society (DNPS) is to participate in and encourage the preservation, conservation, restoration, and propagation of Delaware's native plants and plant communities. The Society provides information to government officials, business people, educators, and the general public on the protection, management, and restoration of native plant ecosystems. The DNPS encourages the use of native plants in the landscape by homeowners, businesses, and local and state governments through an on-going distribution of information and knowledge by various means that includes periodic publications, symposia, conferences, workshops, fieldtrips, and a statewide membership organized by the DNPS.



LETTER FROM THE EDITOR**THE LEAVES ARE A FALLIN'**

Well, my second favorite time of the year is back. The first frost is just around the corner, my cats have quit shedding (a welcome relief for my vacuum), the apple cider has shown up at the farmers markets and it's time to fire up my stove for some power apple pie baking! And if you have the inclination to go seed collecting this autumn and disperse some acorns (perhaps to reforest an old field in your back 40) then our plant/animal highlight will enlighten you on how nature disperses those seeds. Our plant community highlight talks about a very rare plant community and the native plant highlight is about an autumn favorite with many gardeners; asters. Of course, it's never too early to think about next summers gardening and reforestation activities and a good place to start is learning about soil, which our feature article reprint is about. So there's lots to do, but first remember that October is all about candy! ❀

oooo Eric Zuelke, Editor

o o o o o o

PLANT-ANIMAL HIGHLIGHT**GO WEST YOUNG SEED**

In nature, autumn is a time of change, movement, life and death, decay and dormancy. These characteristics are especially relevant in the life of plants. Flowers wither and vegetation dies or goes dormant. But before they reach this point, many plants display one last burst of color and have made assurances that life, in the form of their progeny, will carry on. While all of us have been going about our business over summer, so have the plants-producing seeds within fruits of all shapes, sizes and kinds (e.g., nuts, berries, pomes, drupes, achenes, capsules and caryopsis, to name a few). These fruits and their associated seeds are the final result of successful fertilization of all those brilliant and drab flowers. But now comes the hard part; getting all this potential life out into the world.

This is where successful seed dispersal systems come into play. Plants have evolved numerous methods of seed dispersal that include passive dispersal through water, wind, or animal mediated movement, and active dispersal through explosive release or hygroscopic awns or bristles. All these different methods have evolved because of factors working against seed survival. Research has shown that seeds dropping directly below a parent plant suffer higher mortality rates than those that are dispersed. A seed that is dispersed has less competition from sibling plants and the parent plant, has less potential for disease, are harder for seed predators to find and may colonize new areas of suitable habitat, thus expanding the range of that species and enhancing genetic variation over time. Of all the dispersal methods known, animal dispersal (zoochory-pronounced zô-a-chorry) is one of the most effective.

Seeds are dispersed by animals in many different ways. Some fly off with birds to be cached in a tree trunk hundreds of meters away from the parent tree (ornithochory). In the temperate zone, well known examples of this are the caching behaviors of Acorn Woodpeckers and different species of jays. Scientists have even suggested that Blue Jays may be solely responsible for the overall maintenance of oak forest ecosystems, particularly in areas where few other acorn dispers-

ing animals are present. Mammals, such as squirrels, chipmunks and mice also aid in this nut dispersal. These critters will frequently bury nuts they pilfer from the jay's caches. Often these buried nuts are never retrieved and thus, have the opportunity to germinate.

Another dispersal strategy is to produce an irresistible fruit with an extra strong seed inside. Many species of birds live solely on fruit at certain times of the year, and because the inner seed is so tough, it passes through the digestive tracts unharmed and can be deposited miles away from the parent plant (endozoochory). Though this method is very hit and miss.

Some seeds hitchhike onto the disperser via long or short barbs or sticky seed coats that hold on to fur, hair, pant legs or tennis shoes, and drop off only when they eventually become dislodged or are picked off. Large mammals, including humans, are normally the unwitting participants in this system of epizoochory. This type of dispersal can result in a seed being transported great distances from the parent plant.

One of the more interesting dispersal system is that of myrmecochory, or ant dispersal. Certain species of herbaceous plants produce seeds with a fleshy eliasome (or oil bodies) of fat that is an attractive food source for ants. After the ants transports these seeds to their nests and eat the eliasome, the seed is discarded. Ants also will gather and transport seeds without eliasomes to their nests; these to be eaten and fed to their young. Some of these seeds will germinate in the nest. In these cases, the seedlings are then carried out and deposited at some distance from the nest.

This is just a sampling of the numerous methods of seed dispersal, so take advantage of the great autumn weather and go outside and study as many of them as you can. ❀

oooo Eric Zuelke, Editor

o o o o o o

RESOURCES AND REVIEWS**WILDFLOWERS AND NATIVE PLANTS COMIC BOOK**

This new comic book is designed to teach young people about the benefits of encouraging the growth of plants that are native to an area. The 16-page comic book is sponsored and distributed by the National Association of Conservation Districts. It was created and produced by Discovery Comics in Doylestown, PA. Comment and review was provided by the Center for Plant Conservation at the Missouri Botanical Garden, the New England Wildflower Society in Framingham, MA, and the Lady Bird Johnson Wildflower Center in Austin, TX. While this educational guide does focus mostly on wildflowers, it does describe the importance of native plants in general and the danger of introduced plants that have caused problems in native habitats. It also makes the point of planting and using native species and even talks about native plant nurseries. If you are interested in receiving a copy of this comic book (it's geared to ages 8-14 but all ages can enjoy it) please contact Rick Mickowski at the New Castle Conservation District at 832-3100 ext. 113. Bulk quantities can be ordered from NACD by calling 1-800-825-5547 ext. 32. ❀

NATIVE PLANT COMMUNITY HIGHLIGHT*Pinus virginiana-Quercus* spp./*Carya pallida*

Forest Community

Virginia pine-oak/Sand Hickory Forest Community

Introduction

Within the Nanticoke Wildlife Area of southwestern Sussex County, Delaware, one encounters an interesting, almost mystical, undulating xeric landscape of pines and oaks on very well-drained, sandy substrates. The so-called ancient sand dune ridges of this area are believed to have their origins some 10,000 (or more) years ago when the climate was cooler, evergreens more prevalent and the land more exposed. Prevailing winds deposited large amounts of sands here. On the sandy ridge tops trees are extremely reduced in size, frequently only reaching 3 to 5 meters in height, species diversity is very low, and much bare sand is present. Lichens (species of *Cladonia* and *Cladonia*) may be abundant in areas. Virginia pine (*Pinus virginiana*) and a combination of oaks are the dominant tree species. The shrub layer may be well-developed at lower elevations.

Community structure/composition

These forests occur between 3 and 10 meters above sea-level on xeric, well-drained, sandy substrates characterized by an abundance of *Pinus virginiana*, which typically comprises 51-75 (some areas to 76-100) percent of the canopy coverage. The oaks include *Quercus alba* (white oak), *Q. falcata* (southern red oak), *Q. nigra* (water oak), *Q. stellata* (post oak), and *Q. marilandica* (blackjack oak). The most common of these oaks is *Q. nigra*, which may contribute up to 75 percent (though usually less) of the canopy component (except in areas that contain dense *P. virginiana* coverage). *Carya pallida* is usually present in the sub-canopy. Canopy height varies from < 10 meters, on xeric sandy ridges, to > 20 meters at lower, more mesic elevations or in sheltered areas. Additional canopy and sub-canopy associates include *Q. rubra* (northern red oak), *Sassafras albidum* (sassafras), *Pinus taeda* (loblolly pine), *Acer rubrum* (red maple), *Prunus serotina* (black cherry), *Nyssa sylvatica* (black gum), and *Diospyros virginiana* (persimmon). The sparse to dense shrub stratum may contain shorter individuals of all of the previously mentioned species, as well as *Ilex opaca* (American holly), *Vaccinium pallidum* (hillside blueberry), *V. stamineum* (deerberry), and *Gaylussacia frondosa* (dangleberry). Less frequent associates include *Gaylussacia baccata* (black huckleberry), *Magnolia virginiana* (sweet bay magnolia), *Comus florida* (flowering dogwood), and *Epigaea repens* (trailing arbutus). *Gaylussacia brachycera* (box huckleberry) is a rare associate. Herbs are usually sparse, though they may be more abundant in openings. The most frequently observed herbs, usually in low numbers, include *Cypripedium acaule* (pink lady's-slipper), *Carex* spp. (montanae group), *Panicum commutatum* (a panic grass), *P. commonsianum* (a panic grass), *Chimaphila maculata* (striped wintergreen), *Melampyrum lineare* var. *lineare* (cowwheat), and *Mitchella repens* (partridge berry). Less frequently encountered herbs include *Euphorbia ipecacuanhae* (wild ipecac), *Baptisia tinctoria* (wild indigo), *Lupinus perrenis* (blue lupine), *Pteridium aquilinum* (bracken fern), *Chimaphila umbellata* ssp. *cisatlantica* (pipsissewa), *Monotropa uniflora* (indian

Continued on page 4

NATURAL QUOTES

'I need no inspiration other than Nature's. She has never failed me yet. She mystifies me, bewilders me, sends me into ecstasies.'

Ghandi

FEATURE ARTICLE**THE SOUL OF SOIL**

(Editor's note: This is a condensed version of an article, reprinted with permission, from the Sep/Oct 1999 issue of *Countryside Magazine* taken from the 1909 book *Elements of Agriculture* by G. F. Warren).

Most people see soil as "dirt." They almost invariably think of it as a dead thing. But in reality, soil is teeming with life, and is full of activities of the most complex and interesting kinds.

The almost universal idea is that soil consists of small particles of rock that have been made fine by the process of weathering. But no crop could grow on a soil composed entirely of rock particles. An agricultural soil also needs water, air, decaying organic matter, and living organisms in order to be productive. (Organic matter is defined as any material that is, or once was, an organism or living thing, such as wood, straw, manure, etc.).

Rock particles

Rock particles are 65 to 95 percent of the weight in most soils. (One exception is muck soils, where nearly all the solid matter is made up of organic materials. These are some of the most fertile soils on the planet.) Organic matter usually constitutes 2 to 5 percent... Most of the remaining weight is water.

The finest soil particles are called clay, the next smallest silt. The larger particles are different grades of sand and gravel.

How soils are named

The soils that contain a large proportion of the finest particles are called clay. At the other extreme we have sands and gravels. Soils that are intermediate in texture are called loams. Those with a large proportion of silt particles and not too much clay are called silt-loams.

Then these words are joined together to describe intermediate types. There are gravelly loams, sandy loams, fine sandy loams, clay loams, etc.

Soils are also named in many other ways. Glacial soils are those formed as a result of glaciation. Arid soils are those that do not receive enough rain to produce regular crops without irrigation. Humid soils are those that receive sufficient rainfall to produce crops.

The importance of the size of soil particles

The size of the soil particles influences the water-holding power of the soil, the amount of food that can be dissolved for plant use, the ease of movement of water and air, the growth of organisms in the soil, and the crop-producing power.

The rock particles of the soil can hold water on their surfaces only. Therefore the water-holding power of the soil

increases when the surface area of the particles is decreased.

The finest soil particles are extremely small - less than four hundred-thousandths of an inch in diameter... Such fine particles do not always act as individuals in holding water: some of the particles usually stick together.

The water capacity of a soil is the amount of water it will hold when all the free water is allowed to drain out. Some clay soils will retain about 40 percent of water. A cubic foot of clay weighs about 80 pounds and could, therefore, hold about 32 pounds of water... Sandy soils might have a water capacity as low as five percent...

Air

About half the volume of a dry soil is air; that is, a cubic foot of such soil contains about half a cubic foot of air. The small particles of which a clay soil is composed do not pack so closely as do the larger sand particles, because they are lighter. Therefore, there is more pore space in clay than in sand. But the spaces in a sandy soil are larger, so the air moves more freely, making such a soil better aerated.

Temperature

The temperature of a soil is influenced by its color, topography, humus content, and several other factors. But the chief factor is water capacity.

It requires about 20 heat units to raise the temperature of 100 pounds of dry soil 1 degree F. To raise the temperature of the same weight of water 1 degree requires 100 heat units. This is why gardeners often speak of "wet" and "cold" soils in the same breath.

But the effect of water is most striking when it evaporates. To evaporate 100 pounds of water requires 966.6 heat units. This explains why wet soils are always cold soils. Clay soils are cold chiefly because of the large amount of water that evaporates from them.

Few crops begin growth until the soil is 45-50 degrees...

Sandy and other well-drained soils are not only easier to till, but the number of days on which they can be worked is much greater. They can be tilled earlier in the spring, and more quickly after rains.

Flocculation

When a silt or clay soil is in good condition, many of the particles are united into compound particles. Such a soil is "flocculated." Good management of such a soil consists very largely in maintaining this granulated condition...

The relative fineness of the soil is called its texture, just as the word is used when speaking of the texture of cloth. If the soil is composed of very small particles that are flocculated, it can still be of a coarse texture.

Structure refers to the arrangement of soil particles. If small particles are united, it is possible to have a soil of fine texture and coarse structure.

Soil water

Soil water is very different from rain water. It contains all the plant foods in solution. The solution is very dilute, but plants use a large amount of it.

Water also evaporates within the soil, into the soil air. There is a constant movement of this air in and out of the soil, and this aids in drying a soil. If there is not an abundance of rainfall, it is desirable to stop this movement of water to the surface where it evaporates. Any loose mulch, like straw, on the surface of the soil will accomplish this purpose.

Amount of water

Optimum water content is 50 to 60 percent of the soil's capacity... The most serious result of too much water in the soil is the exclusion of air, which is essential for plant growth and for the activities of soil organisms. It also prevents roots from growing deeply into the soil, makes the soil cold...

One of the first effects of too-wet soil is yellowing of leaves. This is due to the lack of nitrogen. Not only does the fixation of nitrogen cease when air is excluded from the soil, but under these conditions the organisms that break down nitrogen compounds are very active, so that the nitrogen that was fixed previously is being lost.

Organic matter

Continued on page 6

FEATURE ARTICLE

Continued from page 4

NATIVE PLANT COMMUNITY HIGHLIGHT

Continued from page 3

pipe), *M. lineare* var. *pectinatum* (cowwheat), and *Desmodium strictum* (pine barrens tick-trefoil). Lichens, especially *Cladonia* spp. and *Cladina* spp. may be abundant. Vines such as *Smilax glauca* (glaucous-leaved greenbrier), *S. rotundifolia* (round-leaved greenbrier), *Parthenocissus quinquefolia* (Virginia creeper), and *Vitis rotundifolia* (muscadine) are common, but in low numbers.

Other species

A total of 16 state rare plant species are known from this community; these are generally found in scattered openings, particularly along roadsides or along powerline cuts. This forest community is important habitat for neotropical migratory songbirds (C. Heckscher pers. comm.).

Community dynamics/succession

The dynamics and successional attributes of this particular community are not clear. While the Virginia Pine-Oak Forest is thought to be an early successional type that leads to a "climax" community of shade-tolerant oaks and other hardwoods, the successional status and dynamics of this community, on these xeric sandy ridges, is not so clear. Fire may be necessary to maintain a pine-oak mixture, while past logging activities have undoubtedly affected the current expression of this community. Studies are needed to determine the dynamics and successional characteristics of this community.

Distribution

In Delaware, restricted to the inland sand dune habitats along the east side of the Nanticoke River, primarily south of Seaford. Also in the Nanticoke watershed in Maryland (W. Tyndall pers. comm.).

Conservation Status

This is a community of conservation concern. Since much of it occurs on state owned land its protection is facilitated, though active management may be necessary.

Continued on page 6

NATIVE PLANT COMMUNITY HIGHLIGHT

Continued from page 4

LETTER FROM THE PRESIDENT*Continued from page 1*

fish kills, without much success. In the meantime, a fellow named Bill Winkler floating on his surfboard, spotted some yellow-tinged water near the Indian River. He collected some water samples and sent them off for analysis. One sample made its way to the University of North Carolina's Center for Marine Research in Wilmington, North Carolina where it was found to contain single-celled microscopic algal cells identified as *Chattonella verruculosa*. This organism is known to have toxicity, similar to those organisms that cause red tides, and may be the culprit in the case of the fish kills (DNREC was looking for *Pfiesteria* spp.). Research studies have shown that increased levels of phosphates, as may occur from run-off after heavy rains, can cause outbreaks of algae and red tides (more correctly referred to as Harmful Algal Blooms, HAB, as red tides have nothing to do with the tides and are not always red). Could it be that all the rain we had this summer and the lack of buffers and filtering capacity of our shorelines led to excessive nutrient run-off, oxygen depleted waters, algal blooms and fish kills?

As our population continues to expand and our shorelines become more hardened and buffers (native plant vegetation) are reduced and more fertilizers are applied to our lands we shouldn't be surprised if we see more fish kills and algal blooms in our waterways. I hope I am wrong, but I believe it will get much worse before it gets better, despite the efforts underway to reduce the amount of nutrients running off into our waters.

So what's a body to do? What can our Society do?

We can support the efforts of the Biodiversity Implementation Strategy Working Group, or BISWG. This group was established by the Governor to address and develop implementation strategies for the recommendations listed in the Environmental Law Institute's (ELI) 1999 report: *Protecting Delaware's Natural Heritage: Tools for Biodiversity Conservation*. Among many other recommendations, this group is looking at ways to promote the establishment of vegetated buffers along Delaware's waterways; this could lead to a significant reduction in nutrient loads reaching open bodies of water, which in turn could lead to reductions in algal blooms and fish kills.

Over the past few months the DNPS has been taking part in regular meetings of the BISWG. By participating in these meetings the DNPS is able to give voice and support to several of our important conservation initiatives (e.g., forest conservation act, endangered & threatened plant legislation, habitat conservation act). If the BISWG is successful in its implementation of many of the recommendations made in the ELI report, significant progress will be made in protecting water quality of our estuaries and in restoring native plant communities.

Individually, if you own property along a waterway you can endeavor to expand its buffer by planting native trees and shrubs or allowing for natural regeneration of vegetation; the latter, however, may lead to an explosion of exotic plant species. You can talk to local government officials encouraging them to establish minimum vegetated buffer zones along streams that fall within their domain. If you live in rural settings talk to your farming neighbors about expanding buffers along streams and ditches.

You can also participate in a DNPS reforestation effort beginning on Sunday, October 15, 2000 at Prime Hook Wildlife

Area. On that day we will be collecting tree seeds from forest at Prime Hook and then directly planting most of the seeds onto cleared land that we are helping to reforest. The remaining seeds will be germinated and seedlings grown at our nursery site at the St. Jones Reserve before being transplanted back to Prime Hook. Or, volunteer to help at our nascent nursery and in return take home some native plants to plant on your property.

Well, I am going to have to rather abruptly end this letter as the editor is clamoring for my contributions to this newsletter and I need to do some preparation for tomorrow's (October 8) seed collecting trip to Delaware WildLands. I am still looking for volunteers to help out with the nursery so please email or call me (302) 674-5187 if you would like to help.

Sincerely,

Keith Clancy

o o o o o o

NATIVE PLANT HIGHLIGHT
THE ASTERS OF DELAWARE

As the growing season comes to a close, there are several species of native asters that you can still find blooming, such as *Aster divaricatus* (white wood aster) and *A. pilosus* (heath aster). Although many species of asters have ceased flowering, late blooming species provide some of the last sources of sustenance for nectar feeding insects.

In the strictest sense, there are 30 native species and varieties of the genus *Aster* known to occur in the state of Delaware. The majority are quite common, but there are 7 species that are considered to be rare in the state (highlighted in bold in list below). In addition, there are five species (*Aster cordifolius* var. *sagittifolius*, *A. ericoides*, *A. macrophyllus*, *A. radula*, *A. concolor*) that are historical in the state (not reported for 20 or more years), and one species that is considered to be extirpated (*Aster nemoralis*). Native asters in Delaware can be found growing in both the Piedmont and coastal plain physiographic provinces. There are 6 species that are restricted to the Piedmont province (designated as PD adjacent to common name in list below), 10 species restricted to the coastal plain province (designated as CP) and 14 species common to both provinces. Aster species are found in a variety of habitat types with soils that range from well drained to poorly drained. Habitats include: woodlands, swamps, marshes, wet meadows, and old fields. The majority of our native asters require open, sunny conditions in which to grow, but there are a few species that prefer the shade of forests and woodlands. All of the asters known to occur in Delaware are perennials, but one, *A. subulatus* (small flowered saltmarsh aster) is an annual and can be found growing in saltmarshes along the bay and Atlantic coasts. Thirteen species of asters in Delaware have a more northern distribution (designated as N adjacent to common name in list below) and are at or near their southern range limits in the state. Six species have more southern affinities (designated as S), and the remainder (11 species) are widespread in their geographic distribution. The genus *Aster* in Delaware:

Continued on page 6

o o o o o o

Comments

Although *Pinus virginiana* is a widespread species and, generally, is thought to form early successional communities (frequently forming on sites that previously were in agriculture), this particular community found along Nanticoke's inland sand dunes probably resulted from past logging and fire suppression, rather than agriculture. The soils are extremely xeric sands and would not likely be agriculturally productive. In addition, the shrub, herbaceous, and non-vascular components found within this community appear to be reflective of undisturbed conditions (i.e., the presence of mostly native taxa and the large lichen component). It is for this reason, and the suite of state rare species, that this community is considered to be distinct and of conservation concern. Having said that it is also a community considered to be semi-natural in that the canopy component, especially the over-abundance of *P. virginiana* most likely arose because of past logging and fire suppression (much of the land encompassing this community was previously owned by a logging company and the suppression of fire has been an active management tool for forestry managers throughout this century). Controlled burns may be of benefit to this community; it is hypothesized that burns will reduce the pines, increase the oaks, and encourage the growth of the rare species (by increasing the amount of open areas). It is postulated that this community, during pre-settlement days, contained a higher percentage of oaks, particularly *Q. marilandica*. (W. Tyndall pers. comm.).

oooo Keith Clancy, DNPS President

<i>Aster prenanthoides</i>	crooked-stem aster (N) (PD)
<i>Aster puniceus</i>	swamp aster (N)
<i>Aster radula</i>	rough-leaf aster (N) (CP)
<i>Aster schreberi</i>	Schreber's aster (N) (PD)
<i>Aster solidagineus</i> (<i>Sericocarpus linifolius</i>)	narrowleaf aster (S)
<i>Aster spectabilis</i>	showy aster (S) (CP)
<i>Aster subulatus</i> var. <i>subulatus</i>	small-flowered salt marsh aster (CP)
<i>Aster tenuifolius</i>	perennial salt-marsh aster (S) (CP)
<i>Aster umbellatus</i>	flat-top white aster (N)
<i>Aster undulatus</i>	wavy-leaved aster

oooo William McAvoy, DNPS member

All productive soils contain decaying roots, leaves and animal life. This partly decayed organic matter is called humus. It is humus that gives soils their dark color.

Humus...increases the water-holding power of soils.... It loosens heavy soil and promotes aeration.... It furnishes food for bacteria. These, acting on the humus, change nitrogen to nitric acid so that it is ready for plant food.

Another extremely important function of humus is that it encourages the growth of bacteria that fix free nitrogen from the soil air, making it available as plant food.

...If a soil is saturated with water, the oxidation practically stops and organic matter accumulates. This is the way that peat and muck are formed...

Life in the soil

As we have seen, soil is not a dead thing. It is much more than a collection of rock particles. It is teeming with life.

Earthworms serve a useful purpose in the soil by helping to break down the organic matter. They also do much good by making the soil porous. A soil that is full of earthworms is nearly always fertile.

The molds help in breaking down the organic matter, particularly the woody matter. But the most important forms of life in the soil are the microscopic organisms, yeasts and bacteria.

Soil bacteria

...bacteria are present in all soils, ranging from less than 28,000,000 per ounce of soil (and far fewer than that in many soils today) to many times that number. In fertile soils like gardens there are many billions per ounce. There is usually a relationship between the number and kinds of soil bacteria and fertility. The different chemical changes produced by soil bacteria are quite numerous...

Materials used as fertilizers

Naturally fertile soils were made that way over thousands, and sometimes tens of thousands of years, by a combination of the basic rock, plant growth and the return to the Earth of the plants, as well as the animals that fed on them, and their

Continued on page 7



FEATURE ARTICLE

Continued from page 6

NATIVE PLANT HIGHLIGHT

Continued from page 5

SCIENTIFIC NAME	COMMON NAME
<i>Aster concolor</i>	eastern silvery aster (S) (CP)
<i>Aster cordifolius</i> var. <i>cordifolius</i>	heart-leaf aster (PD)
<i>Aster cordifolius</i> var. <i>sagittifolius</i> (<i>Aster sagittifolius</i>)	blue wood aster (PD)
<i>Aster divaricatus</i>	white wood aster (N) (PD)
<i>Aster dumosus</i>	bushy aster (CP)
<i>Aster ericoides</i>	white heath aster (N) (CP)
<i>Aster fragilis</i> (<i>Aster vimineus</i>)	small white aster (CP)
<i>Aster gracilis</i>	slender aster (S) (CP)
<i>Aster infirmus</i>	cornel-leaf aster
<i>Aster laevis</i> var. <i>laevis</i>	smooth blue aster
<i>Aster lanceolatus</i> ssp. <i>lanceolatus</i> (<i>Aster paniculatus</i>)	eastern lined aster (N) (PD)
<i>Aster lateriflorus</i>	goblet aster
<i>Aster macrophyllus</i>	large-leaf aster (N) (PD)
<i>Aster nemoralis</i>	bog aster (N) (CP)
<i>Aster paternus</i> (<i>Sericocarpus asteroides</i>)	stiff aster
<i>Aster novae-angliae</i>	New England aster (N)
<i>Aster novi-belgii</i>	long-leaved aster (N) (CP)
<i>Aster patens</i>	late purple aster
<i>Aster pilosus</i> var. <i>demotus</i>	smooth heath aster (N)
<i>Aster pilosus</i> var. <i>pilosus</i>	hairy heath aster (S)

UPCOMING EVENTS

SATURDAY, 14 OCTOBER 2000 – SEVENTH ANNUAL TREE SPREE AT THE RED CLAY RESERVATION NEAR HOCKESSIN, DE. THIS EVENT, HOSTED BY THE DE CENTER FOR HORTICULTURE TAKES PLACE ON 250 ACRES OF ROLLING COUNTRYSIDE AND WILL BE FILLED WITH MANY EVENTS INCLUDING TREE PLANTINGS, EXHIBITORS, DEMONSTRATIONS, NATURE HIKES AND TREE CARE INFORMATION. FROM 10:30 AM TO 2:30 PM. CONTACT GARY SCHWETZ AT 302.658.6265 FOR MORE INFORMATION. THE DNPS WILL HAVE A DISPLAY AT THIS EVENT.

SUNDAY, 15 OCTOBER 2000 – SEED COLLECTING AND REFORESTATION AT PRIMEHOOK WILDLIFE AREA. IN THE MORNING WE WILL BE COLLECTING SEEDS AND, AFTER A LUNCH BREAK, WE WILL DIRECTLY PLANTING SEEDS AT THE REFORESTATION SITE. BRING YOUR LUNCH (IF YOU PLAN ON STAYING FOR THE PLANTING ACTIVITIES). CONTACT KEITH CLANCY AT 302.674.5187 OR AT DNPLANT@AOL.COM FOR MORE INFORMATION AND DIRECTIONS TO THE SITE.

SATURDAY, 21 OCTOBER 2000 – AUTUMN AT ABBOTT'S FESTIVAL. HOSTED BY THE DELAWARE NATURE SOCIETY AT THE ABBOTT'S MILL NATURE CENTER. LIVE ANIMALS, CANOE TOURS, GRISTMILL TOURS, NATIVE AMERICAN AND COLONIAL DEMONSTRATIONS, CRAFTS AND MUSIC. FROM 10 AM TO 4 PM. ADMISSION IS \$2.00 FOR ADULTS. CALL 302.422.0847, ON THE WEB AT WWW.DELAWARENATURESOCIETY.COM FOR MORE INFORMATION.

SATURDAY, 21 OCTOBER 2000 – HOOTS, HOWLS AND HAUNTS. THE DELAWARE MUSEUM OF NATURAL HISTORY'S ANNUAL HALLOWEEN CELEBRATION. PUMPKIN DECORATING, SCIENCE EXPERIMENTS, A HAUNTED TRAIL, COSTUME PARADES AND LIVE ANIMALS. CALL 302.658.9111 FOR MORE INFORMATION, OR ON THE WEB AT WWW.DELMNH.ORG.

19, 20 AND 21 NOVEMBER 2000 – FRESH FLOWER ARRANGING WORKSHOPS AT JUDGE MORRIS ESTATE (WHITE CLAY CREEK STATE PARK). LEARN FLOWER ARRANGING TECHNIQUES IN TIME FOR THE HOLIDAYS. \$20.00 REGISTRATION FEE. CALL 302.368.6900 FOR MORE INFORMATION, OR ON THE WEB AT WWW.DESTATEPARKS.COM.

Manure management

waste products, all worked upon by the activity of soil biology.

Barnyard manure and wood ashes are among the oldest fertilizers used by humans to maintain or restore natural fertility. The Indians taught European settlers in America how to grow corn and use fish as fertilizer.

Nitrogen

All nitrogen comes from the air. There is no nitrogen in stone. Nearly four-fifths of the air is nitrogen... No plants except legumes are able to use atmospheric nitrogen. Nitrogen from the air can be "fixed" by bacteria on legumes.

Note that the legumes themselves do not fix nitrogen. This is done by the nitrogen-fixing bacteria that live in the root nodules of the plants. If the right kind of bacteria are not in the soil, a legume cannot produce nitrogen, for itself or for subsequent crops.

Grasses don't have the power to obtain nitrogen from the air, but when land is left in sod there is usually a considerable gain in nitrogen... This is partly due to the humus added by the decaying roots... Probably the humus has much to do with the nitrogen fixation.

There are other organisms in the soil which accomplish the opposite results. They act on nitrogen compounds and break them up so that the nitrogen escapes into the air as free nitrogen. This is called denitrification. Composting manure is the best way to retain the nitrogen in it.

DNPS WEBSITE

The DNPS website is continuing to experience a bit of a lag at the moment. Your continued patience is appreciated. A notice will be placed here in a future issue when the website has been updated. Until then, if you want to revisit any past newsletter articles for Vols. 1 and 2, you can check them out at www.delanet.com/~dnpswp.

Membership Application

DELAWARE NATIVE PLANT SOCIETY

Member Information

Name:

Business Name or Organization:

Address:

City and Zip Code:

Telephone (home/work):

E-mail address:

" Individual \$15.00

" Full-time Student \$10.00

" Family or Household \$18.00

" Contributing \$50.00

" Business \$100.00

" Lifetime \$500.00

" Donations are also welcome \$_____

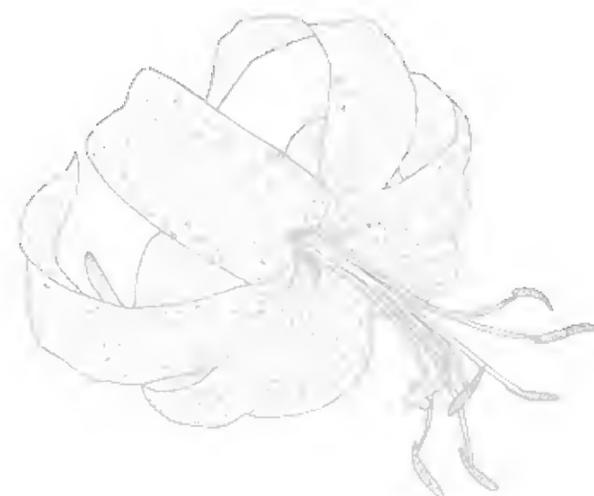
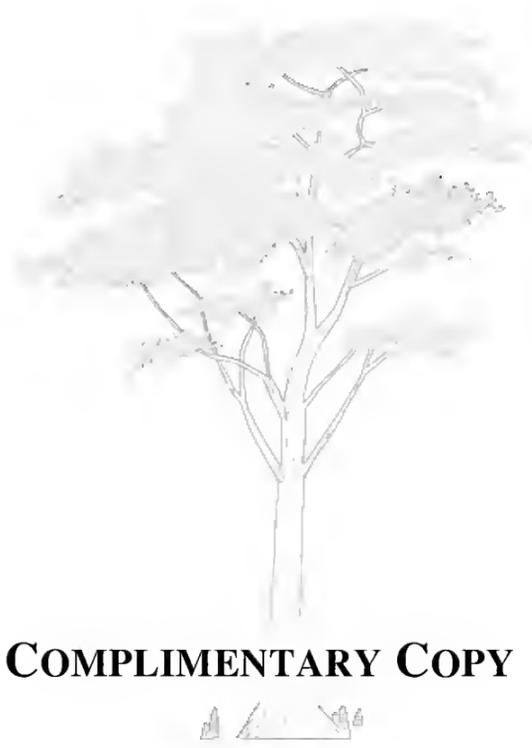
Membership benefits include:

- * The DNPS quarterly newsletter, The Turk's Cap
- * Native plant gardening and landscaping information
- * Speakers and field trips

Total Amount Enclosed: \$

**Make check payable to:
DE Native Plant Society
P.O. Box 369, Dover, DE 19903**

**DELAWARE NATIVE PLANT SOCIETY
P.O. BOX 369
DOVER, DELAWARE 19903**



COMPLIMENTARY COPY