**Long Island Botanical Society**
**Muttontown Preserve**
**Muttontown Lane**
**East Norwich, New York 11732**

## Programs

**April 9, 2002*** Tuesday, 7:30 PM

**Steven Clemants:** Steve will share his local knowledge and ideas on **"100 Years of Change in the Flora of New York City and Surrounding Areas."** Steve is Vice President of Science at the Broodlyn Botanic Garden and Chairpeson of the LIBS Local Flora Commmittee.
Location: Bill Paterson Nature Center,
Muttontown Preserve, East Norwich

**May 14, 2002*** Tuesday, 7:30 PM

**Eric Lamont:** Join this avid field botanist to see the northern specialties and habitats in "Botanizing in Newfoundland and the Gaspe." Eric is President of LIBS and President of the Torrey Botanical Society.
Location: Museum of Long Island Natural Sciences, Earth and Space Science Building, Room 141, SUNY at Stony Brook, Stony Brook

**June 11 2002*** Tuesday, 7:30 PM

**Annual Barbeque:** The annual barbeque, featuring Chef Eric's world class hot dogs and hamburgers, will be held on the green vehind the Muttontown Preserve meeting house.
Location: Bill Paterson Nature Center,
Muttontown Preserve, East Norwich

*Refreshments and informal talk begin at 7:30.
Formal meeting starts at 8:00 PM.
Directions: 516-571-8500

## New Members

Carol Gracie, South Salem, NY

LIBS would also like to extend a welcome to new Life Member John E. Potente of Hauppauge, NY



LONG ISLAND BOTANICAL SOCIETY

# LONG ISLAND BOTANICAL SOCIETY

*Vol. 12, No.2* *The Quarterly Newsletter* *April-June 2002*

## Dwarf Growth Form of Pitch Pine

**Meryl del Rosario**
**Andrew Harrison**

The dwarf growth form of the Pitch Pne *Pinus rigida*, which is readily observed in the dwarf pine plains of Long Island's Central Pine Barrens, is considered to be globaly rare. Among its distinctive characteristics are a contorted tunk and low canopy height which ranges from 4 to 8 feet (Reschke, 1990). In contrast, maure trees exhibitin the more common, non-contorted groth form usually range in height from 15 to 25 meters, with a maximum of 30 meters (Burns and Honkala, 1990).

Establishing the basisi of the dwarf frowth form has been the subject of considerable debate. Possible genetic differences beween the growth forms and environmental factors such as soil type and chemistry, wind and light competition have all been proposed as the primary agent. Previous research has shown that soil characteristics in stands of non-co9ntorted pines are similar to those in dwarl stans (Black, 1997), and thus it is lilely that soil properties are not a direct cause of the dwarf growth form. The focus of this study was on light competition.

We chose as our study area a firebreak that intersects a stand of dwarf ines at the Air National Guard facility in Westhampton Beach. Predominantly contorted trees inhabit the areas to the north and south of the firebreak, while pines with straight trunks populate the firebreak itself. The areas outside the firebreak are characterized by an understory that is dominated by scrub oak (Quercu ilicifolia). However, only a very sparse population of scrub oak is present within the area of the firebreak. We examined this association of scub oak with dwarf, but not non-contorted, pitch pines and hypothesized that the dwarf growth form in pitch pine results from competition with scrub oak for available light.

At each of eight sites in and around the firebreak we collicted data on tre heights, trunk lengths and percent scrub oak cover. In the sites outside the firebreak, we also noted presence or absence of open cones. An important advantage that the firebreak offered us as a study site was that it seemed to miminize the potenteial for genetic differences between the dwarf and non-contorted trees, since the most likely seed source for the pitch pines in the firebreak was the surrounding dwarf pine community. (Continued on page 16)

**Pitch Pine (*Pinus rigida*)**

Long Island Botanical Society
Founded: 1986 Incorporated: 1989

The Long Island Botanical Society is dedicated to the promotion of field botany and a greater understanding of the plants that grow wild on Long Island, New York.



Membership
Annual Dues of $15 payable to:
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Mail to:
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# Society News

**Courting Grandifolia:** In February of 2000, after numerous town board meetings replete with pleas of preservation from environmental groups from across Long Island, the Town of Riverhead granted Talmage and Bakst permission to run bulldozers through the Grandifolia Sandhills in Baiting Hollow. These partners of the "Traditional Links Golf Course" promptly began carving up the rare native habitat.

Now, two years later, the Appellate Division of the Supreme Court of the State of New York has found that "the Town of Riverhead has improperly segmented the review process mandated by the State Environmental Quality Review Act (SEQRA)". The decision was handed down, unanimously, by the judicial panel. The incomplete golf course and the scarred sandhills await further action.

**Hauppauge Herald:** The effort to preserve the Hauppauge Springs continues. Suffolk County has made its offer to the three owners. The owners have not accepted the offers. The situation is in stalemate. John Potente, Director of the Hauppauge Springs Coalition will give a presentation to the Hauppauge PTA at the Hauppauge Middle School on the corner of Town Line Road and Lincoln Boulevard on Tuesday, April 16 at 7:30 PM. All are welcome.

**Belauding Beitel:** Joseph Beitel, a founding member of the Long Island Botanical Society and its first Vice-President, is remembered as an enthusiastic and accomplished naturalist. While going to college, he worked during the summers for Suffolk County Parks. He inventoried the ferns and identified many previously unknown varieties occurring on Long Island (and New York State) at Montauk County Park. He led many stimulating field trips for the Long Island Botanical Society and passed away in 1991 while serving as a botanist at the New York Botanical Garden. LIBS initiated a project to place a memorial plaque, in his honor at Big Reed Pond (now called Theodore Roosevelt Preserve). Karen Blumer, Conservation Chariperson for LIBS, has contacted Suffolk County Commissioner of Parks Peter Scully for permission to mount the plaque upon an appropriate rock at the site. Both Karen and Barbara Conolly were contacted by the Suffolk County Department of Parks and Recreation and notified that LIBS is authorized to place the token memorial. It will read: "Joseph M. Beitel, 1952-1991, Talented botanist, Gifted teacher, Valued friend. We remember him here in one of his favorite places. Long Island Botanical Society."

# Plants in the News

**Mars Trek:** The National Aeronautic and Space Agency (NASA) is currently assessing he possibility of life on Mars. A $1 billion experiment placed on Mars in 1976 by the Viking mission is now yielding results. The Viking probes placed nutrients in Mars soil samples and detected gas emissions related to the metabolism of microorganisms. The recent detections of a rhythm in the readings are consistent with life as we know it. Upon hearing of the findings, LIBS began planning for a martian field trip.



# Deal

A financial transaction; the distribution of playing card; to take responsibility for circumstances and respond.

The latter definition was the one that Susan Cummings referred to when she coined this work to describe the relationship of the Pitch Pine tree to its environment. This came during a reflective circle that followed a dance performance by Martita Goshen of Earth Works at the first convocation of Synapse in The Core in Manorville.

To summarize the lifestyle of a species in a single four letter word brings with it a deep understanding of the world of a Pitch Pine tree or a human being. As we sat and watched Ms. Goshen's motions among the pitch pine forest in the core area of the New York State Pine Barrens Forest Preserve on Long Island, we took time to reflect on how they del and how we deal with similar challenges.

Violence must be dealt with; abysmal dry spells must be handled; competition from others managed. The dignity of the pitch Pine trees became more evident to me as a result of this event. This dignity is represented in the tall, straight Pitch Pine trunks. It suggested a silent dignity in its stature, beauty, grace and timeless presence.

The story of the Pitch Pine is the story of its evolution through Earth - time to be what it is today - a survivor. It survives the sandy, well-drained soils of the outwash from a glacial event long ago. It survives in a desert of heat, drought and fleeting nutrients. It has make slight adjustments over the long period of its life history. These slight adjustments are its adaptations - bark, roots, needles, sap, branches, wood and reproductive cycle.

We, too, have used our lifetimes and history as a species to learn to deal. Trial and error learning have helped us find a role in the community as well as communicative skills in our relationship with fellow species.

We are left with a nagging question. How does our self-reflective consciousness deal with the presence of these Pitch Pines? We must hot to them, listen and look, sit and watch their dignity and take a lesson of right relationship of a species to its place. Perhaps, one lesson I learned is that the tree stays put, doesn't move about as I do. Perhaps the message of the Pitch Pine tree is to confirm my need to stay put and cut down on the frivolous coming and goings I conjure up simply because I have an ignition key on my key ring.

Tom Stock

# More on Maritime Oak-Basswood Forests

**Philip Marshall**

In belated response to articles by Eric Lamont (1997) and David Kunstler (1998), on Maritime Oak-Basswood forests of Long Island and Westchester County, NY I would like to offer some thoughts and observations on a similar association found on the north side of Long Island Sound on Chaffinch Island in Guilford, CT.

Located almost directly across central Long Island Sound from Roanoke Point in Riverhead, NY, Chaffinch Island is a small island (I estimate it to be no more than one hectare in area) now connected by a narrow causeway to the mainland at Mulberry Point. Although consisting of a lump of granite bedrock protruding from the level of the surrounding Spartina saltmarsh, thus differing markedly from the Long Island littoral, Chaffinch Island offers a miniature flora that is immediately familiar to the Long Island botanist. The forest cover is mainly Oak (*Quercus alba, Q. velutina, Q, coccinea*), with a small number of Red Cedar (*Juniperus virginiana*) and Pitch Pines (*Pinus rigida*) and an understory of Huckleberry (*Gaylussacia baccata*), Lowbush Blueberry (*Vaccinium pallidum*), Black Chokeberry (*Aronia melanocarpa*), Bayberry (*Myrica pennsylvanica*), and Poison Ivy (*Toxicodendron radicans*). In one sunlit spot can be found Prickly Pear (Opuntia humifusa) and Pasture Rose (*Rosa Carolina*), and at the water's edge are Beach Plum (*Prunus maritima*), Hackberry (*Celtis occidentalis*), and the great curiosity, several gnarled and stunted individuals of America Basswood (*Tilia americana*).

The soil of the southern tip of Chaffinch Island appears to have been formed from a giant midden of clam and oyster shells certainly of Native American origin, and the resulting anthropogenic adjustment of soil pH (which I have inferred, not actually measured) may partly explain the modern presence of *Tilia americana* on the site. But only partly. Still, I recall having seen *T. americana* in a similar maritime position at the Chandler Estate in Mount Sinai, NY, which is known to be a significant Long Island Native American archeological site. Could there be a connection between human origin for the disjunct distrubution of Black Walnut (*Juglans nigra*) in upstate New York. Why not the same for Basswood (whose phloem fibers were valued for cordage) on the shores of Long Island Sound? (I admit it is unlikely that such is the case on South Dumpling Island!)

**References:**

Kunstler, D. S. 1998. American Basswood on Huckleberry Island in Western Long Island Sound. LIBS Newsletter 8: 3-4

Lamont, Eric. 1997. The Maritime Oak-Basswood Forest on Long Island's North Fork. LIBS Newsletter 7: 27-28

Wykoff, M.W. 1991. Black Walnut on Iroquoian landscapes. Northeast Indian Quarterly, Summer 1991: 4-17



# Letters to the Editor

That "Top Twenty Invasive Plants in New York State" list (Jan.-Mar. 2002) is an excellent summary--looks like you rounded up all the usual suspects" and more! No quarrel from me--although I don't mind Black Locust...in its place.

But, I am wondering if there might be another potential problem species or two. I first became familiar, not long ago, with Yam-leaf Clematis (*Clematis terniflora*) around my former house in Greenport (North Fork)--not a lot and not an unattractive "escape". Last season, I saw several patches of *ternifolia* up the Hudson, around Constitution Island. So far, no "menace", I thought... unlike that damn Swallow-wort (*Cynanchum*).

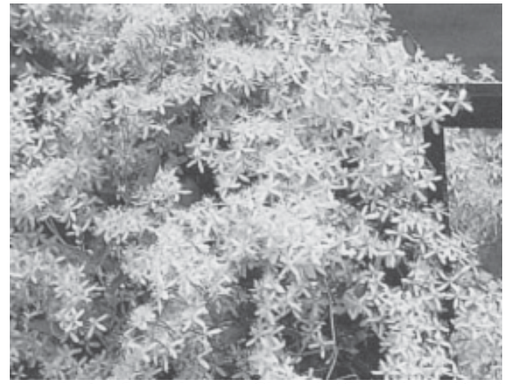
However, on a trip to south New Jersey last September 8, I was startled to see this plant literally all over Cape May County. It was in flower, so that many or most of the roadside edges (at varying heights) seemed as if they were blanketed in snow! True, most of my previous trips down there have been later in the month when I would not have noticed it so obviously. Perhaps, it has been there a long time?

I don't know whether or not this vine is spreading rapidly on Long Island (or New York State), but I think it can surely be considered a serious "invasive species", at least in southern New Jersey at present. I'd be interested in you reaction/comment.

Say, while I'm at it... isn't there another one we should keep a wary eye on--that scourge of the Western Plains, Leafy Spurge (*Euphorbia esula*)? Perhaps not on Long Island, but upstate surely a potential threat, don't you think?

Guy Tudor,
New York City Butterfly Club

Editor's note: I am all too familiar with *Clematis terniflora* and *Euphorbia esula*. Both are growing at great speed on my own property in Hauppauge. Both seem to enjoy temperate climate and are entrenching themselves on Long Island.



**Yam-leaf or Sweet Autumn Clematis (*Clematis terniflora*)**

**Map of recognized sites of Yam-leaf Clematis**

**Leafy Spurge (*Euphorbia esula*)**

(continued from page 13)

Our study sites 1 through 7 were located in this dwarf pine community. The average age of the trees here had previously been determined to be 33 years (Black, 1997). Study site 8, a stand of young pitch pines, was located in the fire break. Only two scrub oaks in site 8 were taller than 3 feet (Most were shorter than 1 foot) and they were not located in close proximity to any pines. The majority of the pines in this site were too small to bore and thus we aged them by counting branch whorls. The larger pines were aged by standard methods, in which tree rings are quantitatively counted.

The age data we obtained in this study, together with the previously obtained age data from sites 1-7, support our assumption that the dwarf pines were the seed source for the non-contorted pines in the firebreak. The oldest pine in the firebreak was approximately 26 years younger than the average age of the surrounding dwarf pines. Also, open pine cones were present on 90% of the surveyed dwarf pines. Since there were no trees in the firebreak that were significantly older than the rest, it seem unlikely that one (or several) seedling from non-contorted pines took root there and then became the seed source for the remaining trees.

Prior to this study there had been no attempts to quantify the degree of contortion in the dwarf pine growth form and relate it to possible community interactions. Therefore we developed what we call the C-index. The C-index is a ratio of the trunk length of a pine to the height of its canopy. The index ranges upward from a minium value of 1 (indicating a tree without contortion) to a theoretical maximum of infinity. C-index values increase with the degree of contortion.

We observed a clear relationship between the percentage of scrub oak at the a site and the average C-index value for that site. When the amount of scrub oak increased, the C-index also increased. Since C-index is a measure of the degree of contortion in pines, and scrub oak percentage probably reflects the amount of light competition that the pines face, the logical conclusion we inferred from our data is that observed contortion is directly correlated with the degree of light competition experienced. A good way to confirm this hypothesis would be to perform a factorial experiment; i.e., grow to maturity seedlings from non-contorted parents under shaded conditions and seedlings from dwarf parents in full light (as well as the reciprocal pairings). The result from such long-term experiment might finally provide a definitive explanation for the curious, but controversial, dwarf pine growth form.

**References:**

BLACK, J.A. 1997. Forest Composition, Sediment and Chemical Characteristics: Westhampton Beach Air National Guard Site and Adjacent Woodlands. 1996 Department of Defense Legend Grant.

BURNS, R.M. and HONKALA, B.H. (Technical coordinators) 1990. Silvics of North America: 1. Confers. Agricultural Handbook 654. U.S.Department of Agriculture, Forest Service, Washington, DC.

RESCHKE, D. 1990. Ecological Communities of New York State. New York State Heritage Program. New York State Department of Environmental Conservation, Albany, New York.

Editor's Note: This article was submitted for publication to LIBS on June 19, 2001. Charles A. Harrison was a Research Associate at the Center for Community Research at Suffolk Community College in Selden, NY. Meryl del Rosario was affiliated with Bellport High School/ Suffolk Community College Summer Field Program.



The main incentive to the presence of all the species is the nutritious consumption products. This includes nutritive tissues for the cynipid wasp, mite, beetle and larvae. Mites and thrips, along with the cynipid wasp feed on this nutritious gall tissue to survive. These two families make their own galls and they come into this gall for more access to gall tissues, since their own gall has its own community of secondary inhabitants. (Ananthakrishnan, 1992) (Westphal, 1992). As shown in Table 1, mites were the most common species in the gall refugia. Mites were often found inside a gall with other species. This indicates that the mites did not prey upon the other species they were found with.

By contrast, ants are predators. Although, they may be preyed upon themselves. Spiders appeared to prey upon ants. Ants were plentiful in the secondary community (Table 1).

Another finding was the presence of numerous larvae left behind, many times without parents. This shows that the gall is not only a home for the cynipid wasp, but also a refuge for the larvae of other species. The larvae have a better chance of survival in a microhabitat, rather than a site that is more exposed.

**Table 1. Table of Secondary Community Inhabitants**

After placing artificial galls on the shrubs, we waited for 21 days. At the end of that time, the gall's capacity for housing animals was checked. Only 1 of 17 galls was inhabited. Fourteen adult red ants and one larval ant seemed to have favored the single artificial gall. It had been placed in an open area near many ant mounds. When the pseudohavens were retrieved, the ants had already died.

The invention was made to resemble the actual gall. The texture of the artificial gall was plastic. This is a difference of nature's provisions vs. man-made materials.

The gall itself is a very complex structure produced by a living organism. The occupation of the abandoned scrub oak gall shows great diversity for such a small biological structure.

**References:**

BLAND, Roger G., How to Know Insects. Third Edition. Central Michigan University. Wm. C. Brown Co. Pub.
BORROR, Donald J. & TRIPLEHORN, Charles A. & JOHNSON, Norman F. 1982. An Introduction to the Study of Insects: Sixth Edition. Ohio State University
FORMAN, Richard. 1979. Pine Barrens: Ecosystem and Landscape. Academic Press NY, San Francisco, London.
ROHFRISH, O. 1992 Patterns in Gall Development, Biology of Insect Inducted Galls. J.D. Shorhouse and O. Rohfrish. New York, Oxford University Press: 60-86
ROSOMER, Wm. & STOFFOLANO, J., 1998. The Science of Ent.: Fourth Ed. Ohio Univ. and Univ. of MA
ROSS, H. & ROSS, C. & ROSS J. 1982. A Textbook of Entomology: Fourth Edition. University of Georgia and Western Washington University. John Wiley and Sons
SOKAL, R. R. & BOWERS, M. 1995 Biometry, W. H. Freeman and Company. New York
SOUCY, S. & ROOT, K. 1998. Conservation Biology with RAMAS Biolab. Applied Biomathematics. Setauket, NY
TOWNSEND, C. J. & BEGON, M. & HARPER, J. L. 1996. Interactions. Ecology-Individuals, Populations and Communities: Third Edition, 211-482
VON ENDE, Carl & BROWER, James & ZAR, Jerrold. 1998. General Ecology: Fourth Ed. WCB McGraw Hill.
WENIG, J. 1976. An Int. to Env. Sci. The Ecology of LI. Env. Pub. Ass. LTD. p. 10
WHEELER, A.G. 1991. Plant Bugs of Quercus Ilicifolia: Myriads of Mirids in Pitch Pine-Scrub Oak Barrens.

Upon submission of this project, Amy Ho, Hannah Kang and Krista Biendenbach attained semifinalist status in an Intel High School Competition

## Abandoned Scrub Oak Gall Refugia

**Amy Ho**
**Hannah Kang**
**Krista Biendenbach**

Scrub Oak galls are formed when a cynipid wasp oviposits her eggs on a selected oak leaf. The galls themselves are produced in response to specific plant growth regulating chemicals or other stimuli produced by the insects. It is thought that these chemicals change the DNA composition of the plant, thereby forming a hardened structure. "Tiny flies in the family cecidomyidae, order diptera, induce galls in members of about 50 plant families. The other major gall inducing family is cynipidae, order hymenoptera, a family of tiny wasps. The cynipidae have a more restricted host range, being found only on oaks and species of the family rosaceae. There are more than 700 kinds of cynidpid wasps that induce galls on oaks in the United States." (F.W. Howard). The Scrub Oak gall that is studied is a product of the cynipidae *Amphibolips ilicofoliae* on Scrub Oak (*Quercus ilicifolia*).

The Scrub Oak gall is composed of two walls: the outer gall shield that is visible and the inner portion that is a small capsule. The un-emerged cynipid wasp dwells inside the capsule. After hatching, it will leave the capsule and the gall. A hardened structure is left: the gall with an inner capsule. Two holes remain: the emergence hole and the capsule hole. This enables other animals to utilize the gall as a refuge. The aim of this study is to investigate the secondary community that inhabits the Scrub Oak Gall. Artificial gall refuges were also introduced for comparison study. The study took place in the Dwarf Pine Barrens of West Hampton Beach on Long Island. (FIgure 1)

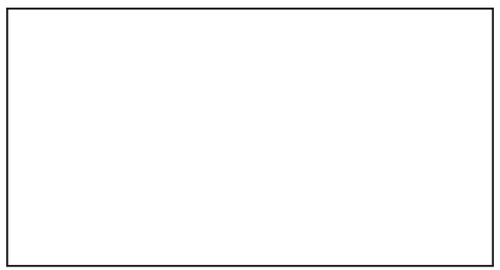
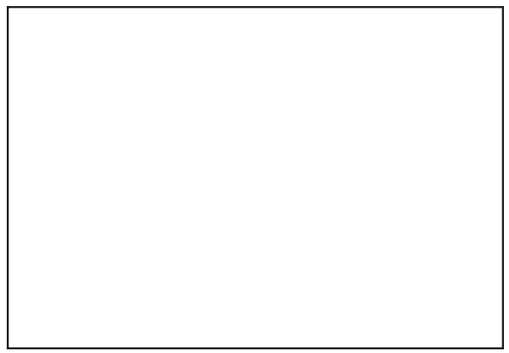


**Fig 1. Study Site in Dwarf Pine Barrens, W. Hampton, LI**

In order to determine the diversity of the secondary community in scrub oak galls in the Dwarf Pine Barrens, the team gathered post-emergence galls from the Scrub Oak shrubs. During the summers of 2000 and 2001, a total of 148 samples were garnered. Preservation of the animals was accomplished by placing the galls in separate bags at the site. They were later stored in a freezer to preserve the gall contents. The galls of each shrub were dissected and gall dimensions and inner chamber/outer exit hole sizes were measured. The animals were then taken out and placed in small vials of 70% alcohol.

Artificial plastic eggs (simulating natural galls) were placed on the scrub oak plants. (Figure 2). Seventeen eggs were camouflaged with green paint Exit holes were punctured into the artificial eggs to resemble exit holes of a gall. Contents of the pseudo-havens were checked after a 21-day interval.

Measurements of the capsule hole were compared to those of the gall emergence hole. The graph (Capsule Hole vs. Exit Hole; Graph 1) gives a slope of less than one. This indicate the exit holes tend to be larger with respect to the capsule hole. This suggests that the animal may have undergone a type of metamorphosis after hatching. Them animal may have been engaged in swelling, growing, or hardening. Numerous galls were found without gall emergence holes (not shown on graph 1) indicating that the wasp emerged from the capsule, but did not leave the gall. There were also galls found with exit holes that did not have a capsule hole (not shown on Graph 1) . This is evidence of the presence of an invader. Questions as to whether the invader was present before of after the pupae's demise begin to arise.



**Graph 1 Scrub Oak Capsule Hole vs. Gall Emergence Hole**



## Why is Dwarf Pitch Pine Dwarf?

**Jessica Gurevitch**
**Wei Fang**

Long Island dwarf Pitch Pine (*Pinus rigida*) are a form of Pitch Pines that grow within the Dwarf Pine Plains (once an area of 2,500 acres) in the central Pine Barrens of Long Island, New York. Instead of growing an upright single dominant trunk, as do normal-statured Pitch Pines, the Dwarf Pines send multiple trunks from the root crown. The multiple trunks grow upwards, outwards or along the ground, and are stunted and gnarled. These Dwarf Pines are usually no more than 2 meters tall, while the normal-stature Pitch Pine growing can reach 20 meters tall, although they are usually shorter on Long Island. Dwarf Pitch Pines have only been found in three places in the world: in the New Jersey Pine Barrens, in the Shawangunk Mountains in upstate New York and on Long Island.

Most of the research on Dwarf Pitch Pines was conducted on the New Jersey Pine Barrens population. It is not yet definitively established whether genetically distinct genotypes produce dwarf and normal-statured growth forms, or whether these differences are due to plasticity in response to environmental factors. If it is the later, it is not known to which environmental factors the Pitch Pines may be responding.

Starting in 1997, we addressed these questions in Long Island Pine Plains and Barrens with two reciprocal transplanting experiments. By transplanting the seedlings started in the greenhouse from dwarf or normal-statured trees, into dwarf and normal-statured sites in the field, we hope to tease apart the effects of genetic and environmental factors on seedling performance.

These experiments are still continuing. To date, the overwhelming influences on the size of pitch pine seedlings and saplings have been due to strictly environmental factors. Seedlings grew faster, survived better, and began to bear cones earlier in normal statured sites compared to those planted in dwarf sites, for both plants from dwarf and normal-statured parents. The environmental factors responsible for these differences are probably soil nutrient and moisture retention differences. However, there is also a possibility that there are genetic differences between dwarf and normal-statured pines, because the seedlings from dwarf parents grew better than those from normal-statured parents on the dwarf sites, while those from normal-statured parents grew better than those from dwarf parents at the normal statured sites.

Another suggestion that there may be some genetic differences between the two growth form is just beginning to occur, as the saplings begin to reach reproductive maturity (about 4-5 years old). Plants from dwarf populations have begun to bear cones earlier than those from normal statured populations. So far, only pines planted into the normal statured sites have begun to produce cones.

Herbivory is also important to seedling performance. Pine seedlings that had been browsed in early age tend to be shorter, fork earlier and grow less upright than seedlings never browsed. But herbivory history is not a critical driving force for the perpetuation of pitch pine dwarfism. Fire frequency can be the consequence of drier and poor soil. It is possible that frequent fires may lead to the creation of the gnarled, multitrunk form of Dwarf Pitch Pine by repeated destruction of the sapling leaders (or growing tip, the apical meristem). That hypothesis will remain to be tested in the future. In any case, it is clear that the Dwarf Pine Plains are a unique site in which the dwarf pines are able to grow and persist, whether or not these population are genetically distinct as well.

Ken Spencer/Newsday

Editor's note: This article was submitted for publication in LIBS on March 1, 2002. Jessica Gurevitch leads the Department of Ecology and Evolution at SUNY at Stony Brook. Wei Fang is currently working on her Ph.D. in Ecology & Evolution at SUNY Stony Brook