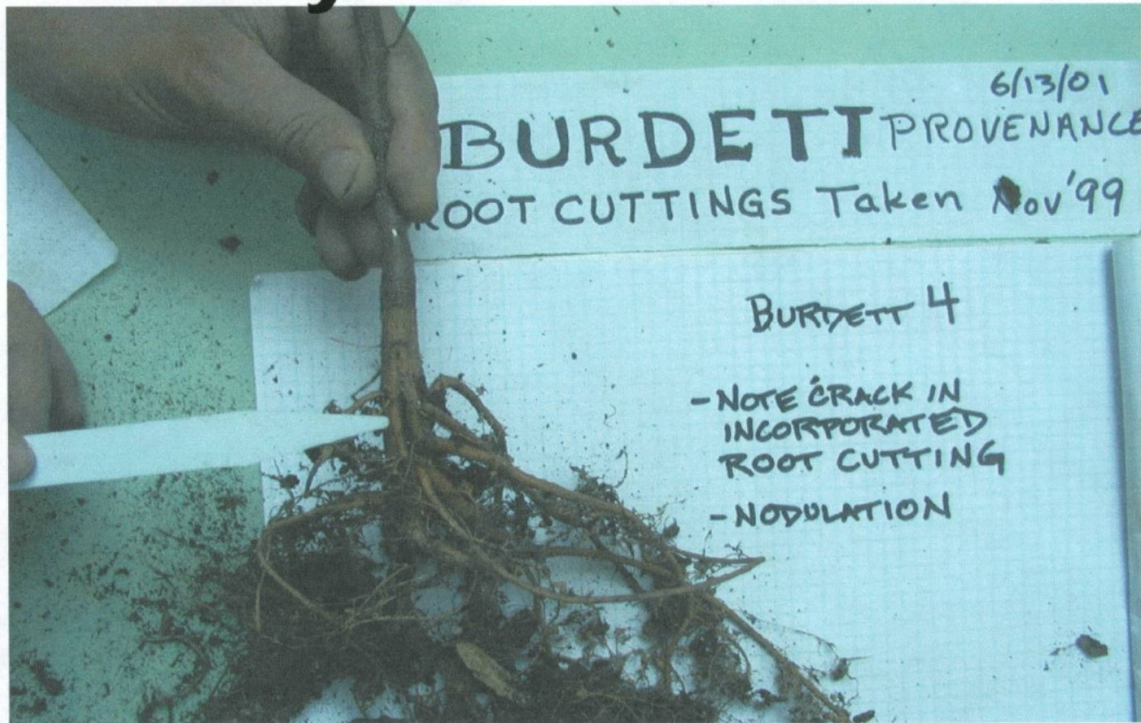


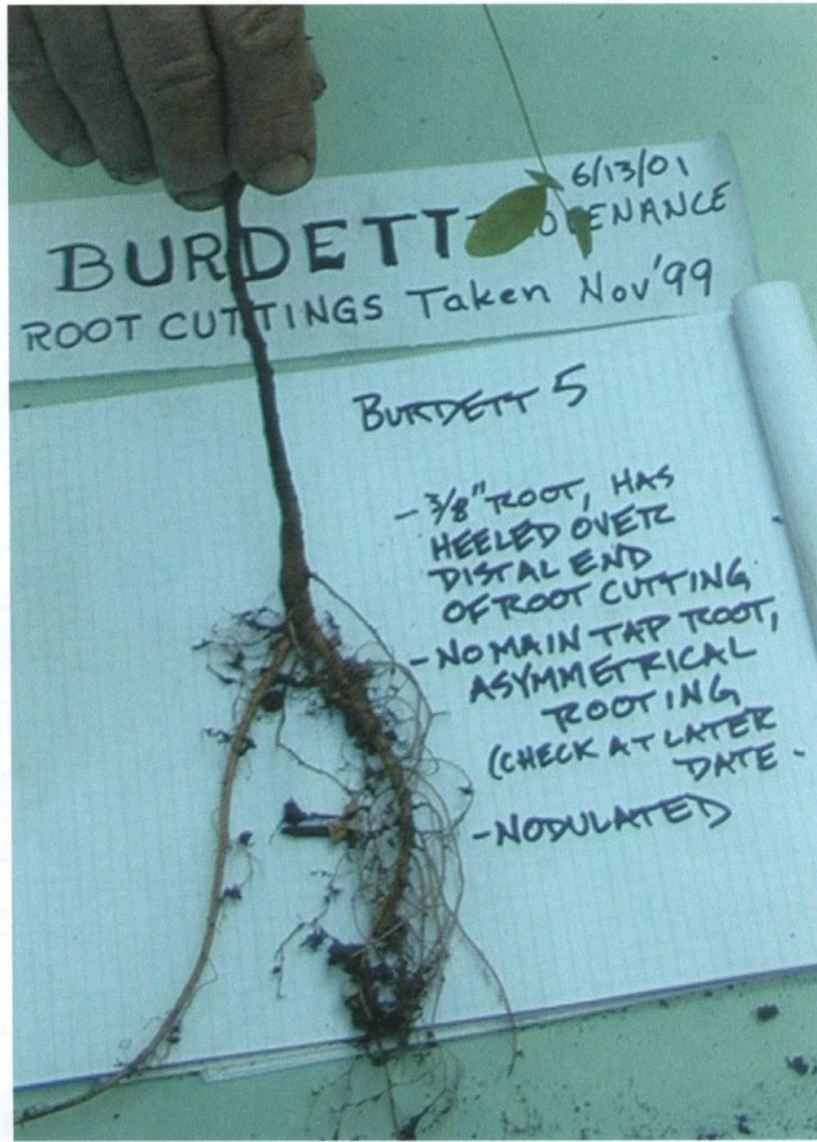
One year old clone



One year old clone





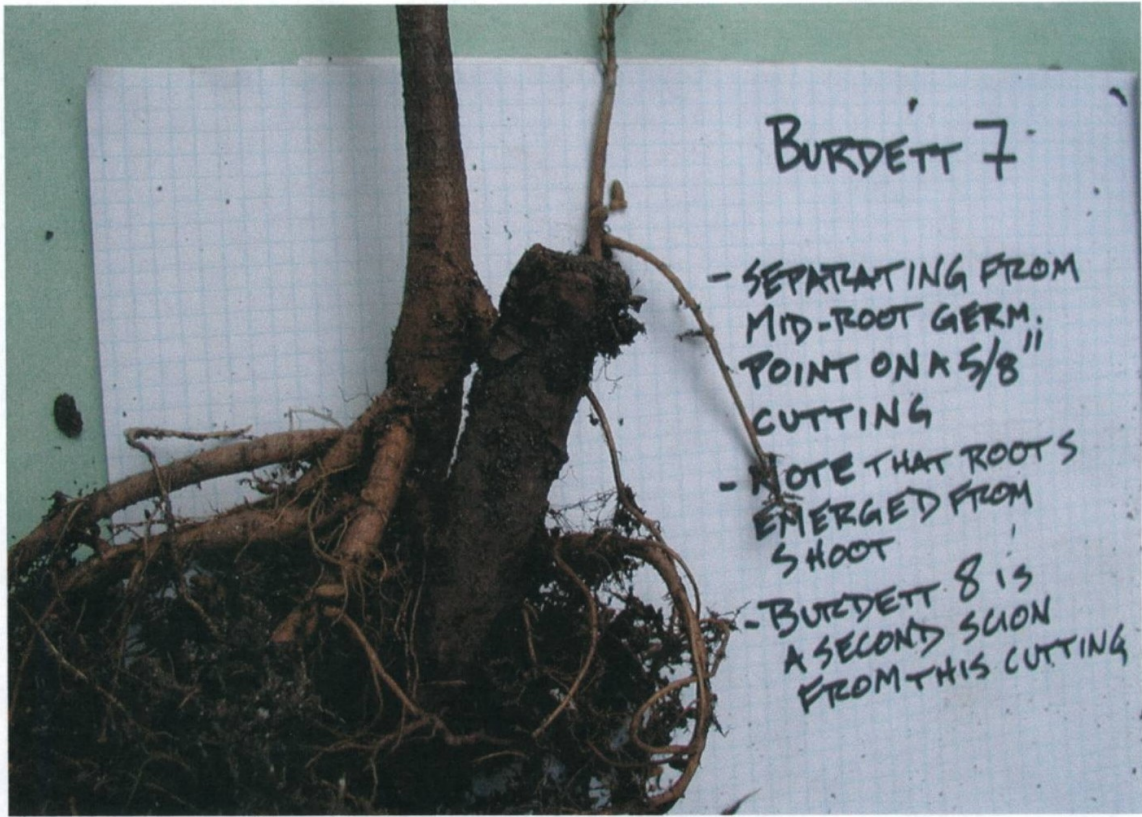


6/13/01
BURDETT
ROOT CUTTINGS Taken Nov '99

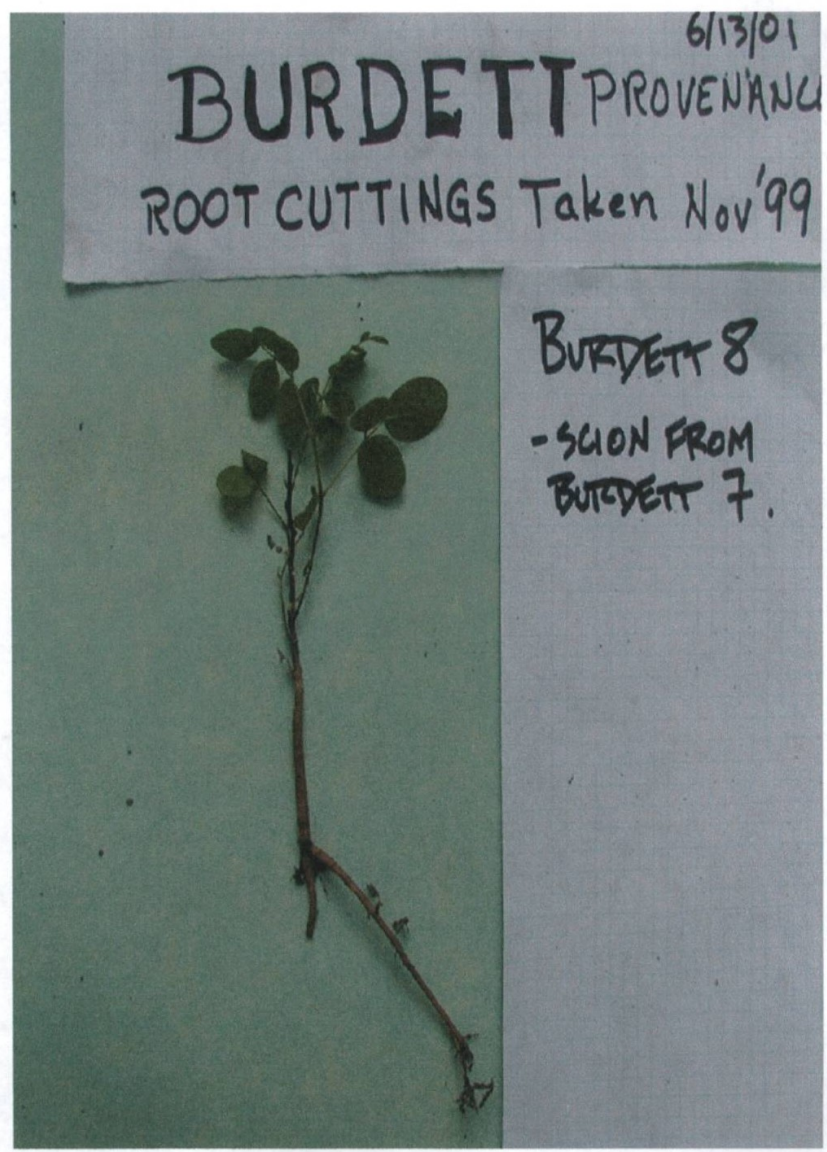
BURDETT 5

- 3/8" root, HAS HEELED OVER DISTAL END OF ROOT CUTTING
- NO MAIN TAP ROOT, ASYMMETRICAL ROOTING (CHECK AT LATER DATE)
- NODULATED

2d



2e



6/13/01
BURDETT PROVENANCE
ROOT CUTTINGS Taken Nov '99

BURDETT 8
- SCION FROM
BURDETT 7.

2f

Nitrogen-fixing nodules





LOGS FROM
BURDETTE
SITE.

(PREVIOUS MECHANICAL
DAMAGE LEFT ENTRY
FOR HEAT-ROT FUNGUS)

TRACTOR WAS USED TO OBTAIN ROOT-
CUTTINGS FROM BLOWDOWNS IN A LOGS^{STAND} STAND.

select
WHEN GROWN FROM SEED, 80%
GREW STRAIGHT. ↓





Dave Gell (right) chats with Arnot Forest managed Don Schauffler



By cutting between crooks, useful short beams can be harvested from crooked, common locust logs



Value added close to the resource (move lumber, not logs)



Loading up for local consumption



The finished bridge

String



This 53 ft. bridge deflected 1/8 of an inch with 40 people attending the ceremony. A string was tightly stretched from foundation to foundation and at midpoint on the bridge, a white card registered change.



Enfield ecoforesters meet the horse



Skidding logs in a low-impact manner



Testing soil pH and nutrient levels



Deciding appropriate liming rate, taking field notes



Ecoforestry students applying the lime



Planted locust seedling with deer exclosure

Enfield ecoforestry students and youth
cooperatively examine soil fertility
issues at the Arnot Forest, Nov. 4, 2000

Photo

Opinion Editor
Gary Stewart
274-9213

The Ithaca
JOURNAL
A Gannett Newspaper

123 W. State St.
Ithaca, New York 14850
(607) 272-2321

Barry Rothfeld
President and Publisher

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Marketing Director

Jim Falzone
Production Director

EDITORIAL

Cayuta Gulf, behind the trees

The presents in Catharine

First in a series of editorials about special gifts to the community at large.

They can be found deep in a remote corner of the 12,000-acre Connecticut Hill State Wildlife Management Area, symbols of community and a work ethic. Many area residents might never even see them: It takes a 1.5-mile hike off Gulf Road down the Finger Lakes Trail to reach this part of the Cayuta Gulf, a pristine woodlands gorge in Catharine, Schuyler County. But as is the case with any good gift, it's the giving that counts most.

The Cornell University student chapter of the American Society of Civil Engineers and the Cayuga Trails Club (CTC) completed their work and special connections on a cold, snowy weekend earlier this month. Thanks to their efforts, two pedestrian bridges — 53 and 40 feet long — now provide year-round access on a new loop of the Finger Lakes Trail.

The bridges are made of black locust, strong and naturally resistant to decay. The wood was custom cut by a local nonprofit organization that promotes sustainable forestry and logs were skidded in by a local horse-logger. The CTC picked up the cost of materials, more than \$5,000.

CTC member Kurt Seitz provides a gritty, nutshell description of the behind-the-trees work tackled by student and CTC volunteers over the last several weeks. It consisted of "drilling hundreds of holes in steel plates and hard black locust timbers, transporting construction materials and supplies to the isolated bridge sites and helping to build the abutments and bridge structures."

The special challenges, says Seitz, included, "digging through rock to prepare for the abutments, assembling the trusses on uneven surfaces, moving all four nearly-one-ton trusses across the streambeds and lifting the trusses onto the abutments."

It was harder than raking leaves.

As is the case with any gift, all one can really say is thanks. Thanks to Dan Mullins and Mike Tavolaro, two fifth-year Cornell mechanical engineering students who designed the bridges and managed the prep work in Hollister Hall's machine shops. Thanks to Dave Gell of Black Locust Initiative, Inc., who worked with Cornell's Arnot Forest to provide the needed lumber, and to farmer (and horse-logger) Sara Brown, who led the charge to skid the logs.

Finally, thanks to members of the Cayuga Trails Club, who literally walk the walk when it comes to drawing attention to and protecting this area's natural assets.

To see these special gifts, take Schuyler County Route 6 south from Route 79 in Mecklenburg. Continue 3.5 miles beyond Cayutaville to Gulf Road on the left. Park at the Finger Lakes Trail trailhead a few hundred feet down Gulf Road on the right side.

The first bridge is a mile and a half down the white-blazed trail, the second a few hundred feet beyond that. To hike the loop trail, continue following the white blazes another mile and a half to the junction with the orange-blazed Van Lone Hill section of the loop. Follow the orange blazes less than three miles back to Gulf Road.

Coming Thursday: They have the white stuff.

Opinion Editor
Gary Stewart
274-9213

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DARTS & LAURELS

For those who cherish nature

A round of laurels from our readers, including some appropriate submissions as we mark another Earth Day.

LAUREL: From Cayuga Trails Club President Suzanne Cohen to a supportive community: "Last winter, an Ithaca Journal editorial highlighted the building of two pedestrian bridges by the Cayuga Trails Club (CTC) and the Cornell University student chapter of the American Society of Civil Engineers (ASCE). Throughout this project, the CTC has also been the recipient of special gifts from the local community and from our larger hiking and conservation community. The most recent gift is in the form of a \$3,000 grant from the American Hiking Society (AHS), a national recreation-based conservation organization that awarded 15 trail clubs with National Trails Endowment grants for 2001.

"The 15 grant recipients were chosen from a group of 79 nationwide applicants. I have no doubt that the cooperative nature of this project and the professional planning work done by the Cornell ASCE students contributed to our success. In addition to the ASCE students, community partners include the Black Locust Initiative Inc., Finger Lakes Trail Conference, New York State Department of Environmental Conservation and Cornell Outdoor Education. Cornell Orchards, Greenstar Cooperative Market, Tops and Wegmans all donated food and drink to hungry workers.

"We invite the community to join the CTC for an official dedication and celebration at the Cayuga Trails site on Saturday, May 5 at 10 a.m. More

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<http://www.lightlink.com/ctc> or be phoning 272-5461.
Thanks to one and all."

LAUREL: From City of Ithaca Forester Andy Hillman to volunteers and city staffers who have planted many thousands of bulbs each fall for the past several years: "On or about Make A Difference Day these civic-minded folks are out there with trowels and spades and faith, that in the spring, their work will result in blooms of tulips and daffodils for all to enjoy. Too many groups and individuals have been involved to name them all here, but the Shade Tree Advisory Committee has been there consistently, planning, organizing and carrying out the work of urban beautification."

LAUREL: From Melissa Lucklow, City of Ithaca, to Pamela Markham and the Green Rangers of West Village for their recent cleanup of the roadways and natural areas surrounding West Village: "Thanks also to Bruce Abbott for providing refreshments for participants, as well as a Dumpster and personnel to take away the recycling. This was a most successful neighborhood effort involving the children and parents of West Village and the nearby homeowners on Chestnut Street."

LAUREL: From the American Association of University Women's Ithaca branch to Deb Traunstein and Bunny McCune for their outreach and making a difference: "Deb and Bunny moderated the November 2000 'sister2sister' event for girls and the March 'women2women' meeting for adults. They have led similar events around the country, and Ithacans are fortunate that they share their talents and expertise with the community so willingly."

LAUREL: From Ithaca City School District parents and teachers to Chrissie Schelhas-Miler for her recent talks about adolescents: "Chrissie is 'one of us,' working hard to raise her own children, yet she also is a respected university teacher and counselor who can share both practical and philosophical advice on the important topic of communication with teens."

LAUREL: From Richard Jorgensen of Freeville to President George W. Bush for his handling of the recent U.S.-China crisis: "The president showed restraint while getting our 24 military folks back home safely. China owes us an apology for its attack on an unarmed 'recon' plane in international airspace. Locally, I think students from China are ignorant of the facts and way off base in their opinions on this near tragedy."

LAUREL: From backers of the recent Border Fund's Fiesta to folks who helped make it happen: "The Fiesta was a great success, thanks to Teresa B. Grady's organizing, Geri Stayman's gourmet cooking, Alpha Phi Omega's volunteers, the Ithaca Bakery's desserts, Ben & Jerry's ice cream, and donations from Wegmans, Tops and Triphammer P&C. For the 13th year, donations were made to 10 refugee shelters in the Southwest."

LAUREL: From Cornell employees to Brielle Rosa (CU veterinary student '04) and Tisa Jeoh (ag and biological engineering graduate student), who are training to run a marathon to raise money for the Leukemia and Lymphoma Society through its Team-in-Training Program. This society provides funding for research, public and professional education, and community service programs for patients and their families. If you can help, send donations in Brielle's and Tisa's name to the Leukemia and Lymphoma Society, Leabury Centre, 401 N. Salina St., Syracuse, NY 13203."

Darts and laurels deadline: Thursday noon.

ECOFORESTRY COMES TO GREENSTAR

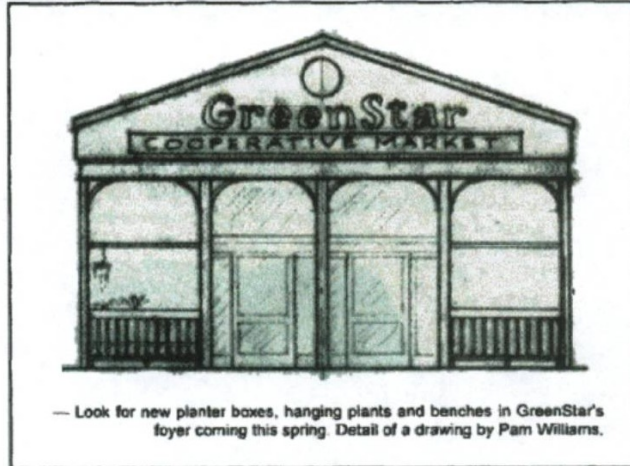
The Store Entrance project is part of GreenStar's 2000 Goal of Improving Store Appearance and was initiated by the Store Appearance Task Force.

by Sarah K. Highland

According to Dave Gell, the best way to teach kids to appreciate our forests is to let them whack a log in half with a big club. Dave runs the Black Locust Initiative, a local project whose mission is to educate about sustainable forestry and earth-friendly technology. In Black Locust's workshops, kids have turned trees into coatracks, park benches, and bridges. GreenStar is about to do a little construction, and has called on Dave for help.

GreenStar's resident architect, Pam Williams, has redesigned the foyer in front of the store entrance to include wooden railings and benches. Since the wood will be exposed to the weather, it will need to be rot-resistant. The usual choice would be pressure-treated wood, which is grown on Southern tree farms and injected with toxins. Instead, Black Locust Initiative promotes naturally rot-resistant species that grow right around us, trees like locust, white cedar, and catalpa.

As usual, kids will be part of the work crew. This project will be done by the Enfield Ecoforesters, while other youth groups could



— Look for new planter boxes, hanging plants and benches in GreenStar's foyer coming this spring. Detail of a drawing by Pam Williams.

be involved in future plans. Dave Gell believes it is especially important for young people to learn that if we use them wisely, the woods around us can supply all the lumber we need. He shows them how by taking them into the woods, choosing and felling a tree, and milling it into boards on the spot. It is great that GreenStar is keeping sustainable forestry as a goal in its construction projects.

Sarah K. Highland has helped kids whack, saw, and shave wood at Black Locust Initiative workshops.



Locust is sawn with Enfield Eco-Foresters at Cornell's Arnot Forest.

THE TRUMANSBURG FREE PRESS

NUMBER 19 • MAY 9, 2001 • 50¢

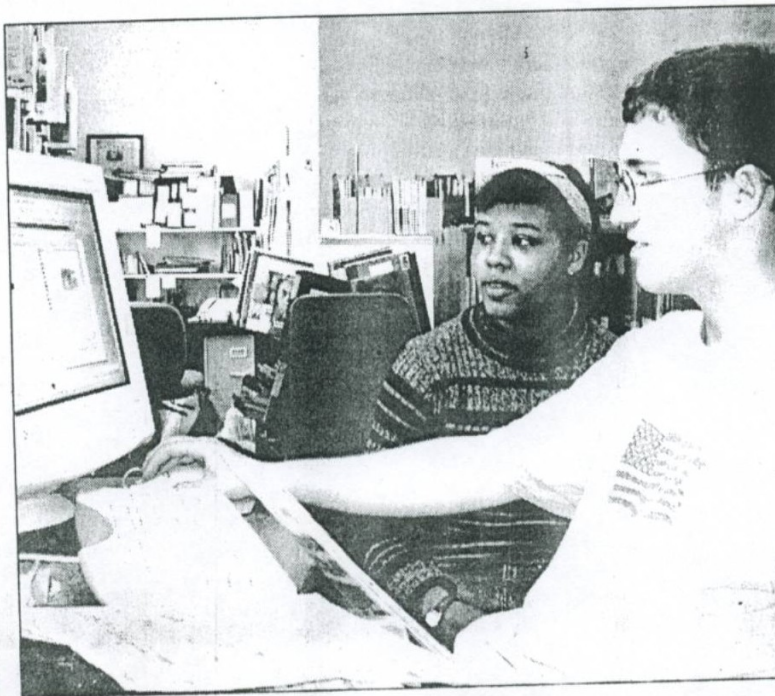


photo Jennifer Smith

Enfield Eco-Foresters Semonae Morris and Mike Parks try out the new computer at the Ulysses Philomathic Library last week.

The combination of members of the Enfield Eco-foresters, who were eager to caption photos of outdoor, environmental work they have done recently, and a new computer at the Ulysses Library made a perfect match last week when the Eco-Foresters tested out the new computer while captioning their photos.

With help from Dave Gell of Black Locust Initiative and Shannon McSurely of the Enfield Youth Services, the Eco-Foresters reinforced the work they did, increased their vocabularies, and learned to use the new computer and its photo programs.

TRUMANSBURG TREE PRESS

NUMBER 26 • JUNE 27, 2001 • 50¢



Mike Morris and Teresa Panek work with instructor, Dave Gell, to measure the height of the Rongo building to determine the accuracy with which they are measuring trees. They will use this "twigonometry" to measure trees in the National Forest.



Mike Morris and Chris Parks learn to measure the bark index of a tree behind the Ulysses Philomathic Library to determine the variety of locusts.

photos: Jennifer Smith

*** ALL DATA ON THIS SIDE OF SHEET SHOULD BE RECORDED IN CENTIMETERS ***

Bark Characteristic Data

Site code:

Date:

Tree I.D. Number :

Your name:

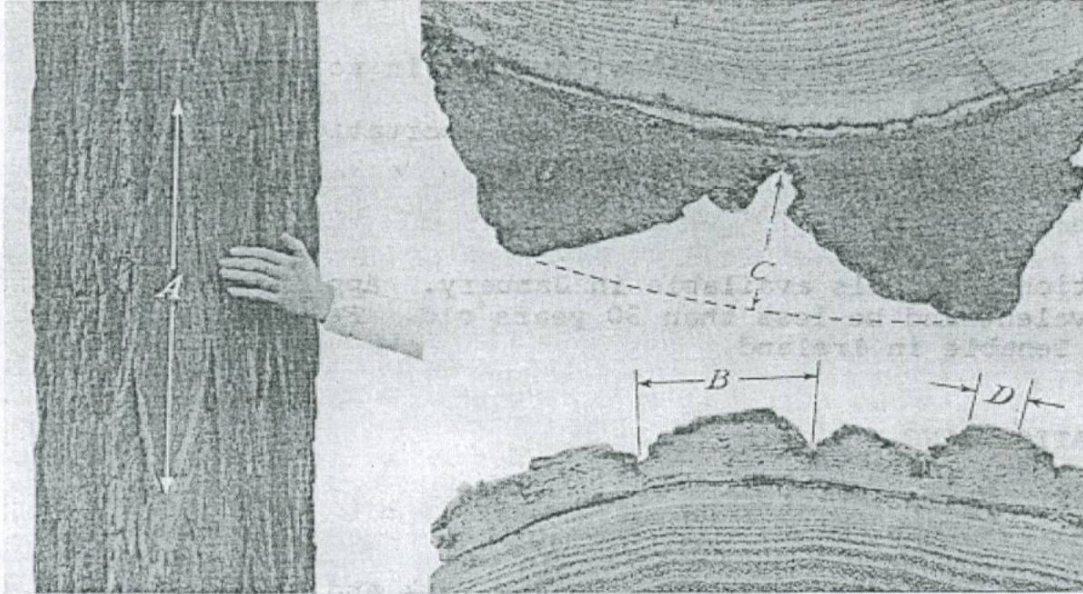


FIGURE 4.—Measurements of bark: A, Length of furrows; B, width of segments; C, depth of furrows; D, width of flat crests of segments.

S TECHNICAL BULLETIN 142 U. S. DEPT. OF AGRICULTURE

Diameter at breast height :

Number of furrows at 4.5 feet:

(in centimeters. Convert from inches using: cm = 2.54 * in)

(count going around the tree)

Bark Data: (measure all furrows at 4.5 feet, beginning with North and proceeding to the right. Use a ruler for Length and Depth. Use calipers for Width of Segment and Crest (see photo))

		Furrow Number										
		F#1	F#2	F#3	F#4	F#5	F#6	F#7	F#8	F#9	F#10	
A	Length of Furrow (cm)											
B	Width of Bark Segment											
C	Depth of Furrow											
D	Width of Bark Crest											
		F#11	F#12	F#13	F#14	F#15	F#16	F#17	F#18	F#19	F#20	Average
A	Length of Furrow											
B	Width of Bark Segment											
C	Depth of Furrow											
D	Width of Bark Crest											

Bark Index = Q = 0.1572 * A + 0.0185 * B + 0.1161 * C - 0.1597 * D - 0.0096 * dbh

Q=

Prototype Root Harvest Contract – Black Locust Initiative, Fall 2000

Landowner receives 10% of the value of the tree. Tree volume measured per UDSA table (attached). Unit price = \$200/mbf (thousand board feet). Payment is in return for 10% of roots from the tree, obtained only in the following manner:

1. Tree is numbered, photographed, and data are collected regarding bark morphology (taxonomy), height, diameter at breast height (dbh), and log straightness.
2. A marked buttress root in a cardinal direction is excavated using air tools, and the azimuth is recorded in the photo, so that future researchers can determine the time it takes for the tree to replace harvested roots, and whether the young, regrown roots are more easily propagated. (A fair sized tree has approximately 10 buttress roots, so harvest of one should yield about a 10% harvest).
3. Roots are always tagged before cutting with sterile tools and removing from context.
4. A bucket of sandy loam is added to replace lost material at time of backfilling.
5. Roots are instantly heeled-in in moist sandy peat (neither wet nor dry), with redundant tagging and labeling, and stored in appropriate conditions (35 deg F) until planting in early spring.
6. When cutting roots to length for planting, they are arranged anatomically and keyed and photographed.

Landowner still has the capital (the tree) and has received a dividend and a database to determine the rate of increase of the capital (tree volume over time), and may choose to continue this procedure, or to ethically harvest this tree when 10 progeny have been securely established.

Richard Cahoon, patent att'y for
Cornell, has drafted an improvement

Q Values for sampled black locust individuals, 12/01

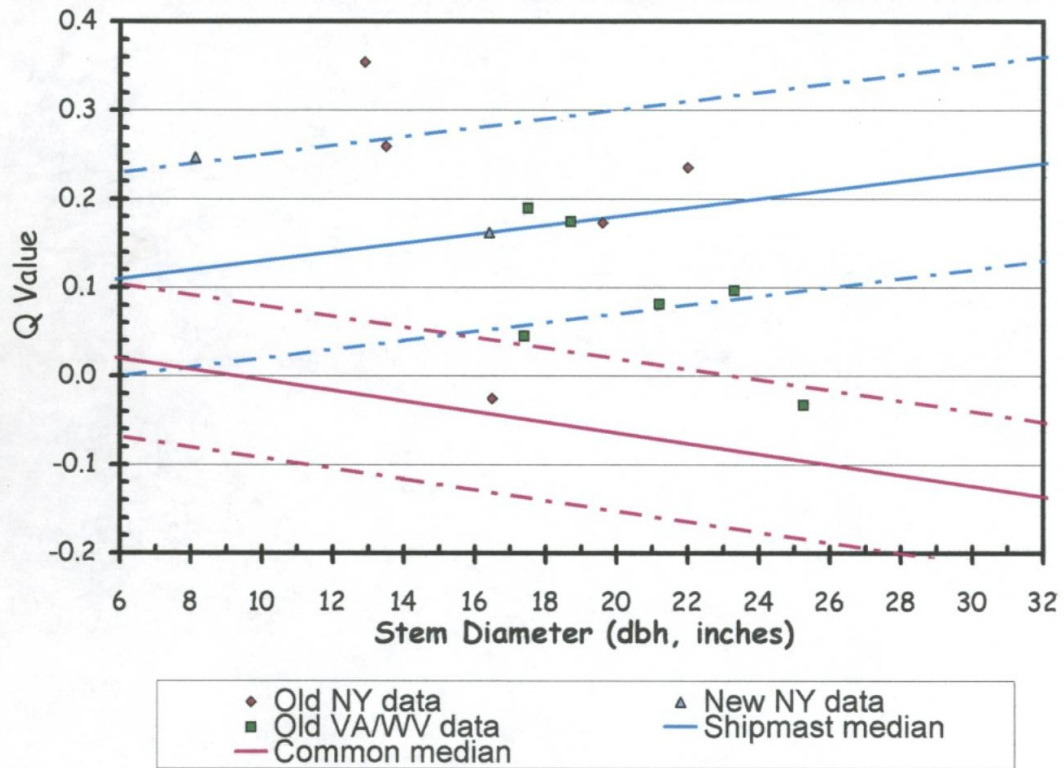


Figure caption:

Tree diameter at breast height (dbh) vs. mean Bark Index Q value.

$Q = 0.1572*A + 0.0185*B + 0.1161*C - 0.1597*D - 0.0096*dbh$, where A= av. furrow length, B= av. bark segment width, C= av. furrow depth, D= av. width of bark crest.

Q value calculation was developed by H.Hopp (193x) in Long Island, NY, as a method of distinguishing between the common (var. xx: and shipmast (var. rectissima) varieties of Black Locust (*Robinia psuedoacacia*).

n= 4,5 (square, diamond); n=15+ (triangle)

$$4. \quad \vec{F} = \nabla V = \frac{\partial V}{\partial x} \hat{i} + \frac{\partial V}{\partial y} \hat{j} + \frac{\partial V}{\partial z} \hat{k}$$

16

$$= (3x^2y^2z + z) \hat{i} + 2x^3yz \hat{j} + h(x,y,z) \hat{k}$$

$$\frac{\partial V}{\partial x} = 3x^2y^2z + z \Rightarrow V = x^3y^2z + xz + f(y,z)$$

$$\frac{\partial V}{\partial y} = \frac{\partial}{\partial y} (x^3y^2z + xz + f(y,z)) = 2x^3yz + \frac{\partial f}{\partial y} = 2x^3yz \text{ from}$$

$$\therefore \frac{\partial f}{\partial y} = 0, \text{ i.e. } f = f(z, \text{ only})$$

$$\frac{\partial V}{\partial z} = \frac{\partial}{\partial z} (x^3y^2z + xz + f(z, \text{ only}))$$

$$= x^3y^2 + x + \frac{df}{dz} = h(x,y,z) \text{ from}$$

So \vec{F} is conservative and a choice for h is

$$h(x,y,z) = x^3y^2 + x \quad [f \text{ chosen as zero}]$$

Check $\nabla \times \vec{F} \stackrel{?}{=} 0, \quad \vec{F} = (3x^2y^2z + z) \hat{i} + 2x^3yz \hat{j} + (x^3y^2 + x) \hat{k}$

$$\nabla \times \vec{F} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ \frac{\partial}{\partial x} & \frac{\partial}{\partial y} & \frac{\partial}{\partial z} \\ 3x^2y^2z + z & 2x^3yz & x^3y^2 + x \end{vmatrix} = \hat{i}(2yx^3 - 2x^3y) + \hat{j}(3x^2y^2 + 1 - 3x^2y^2 - 1) + \hat{k}(6x^2yz - 6x^2yz) = 0 \quad \checkmark \text{ok}$$

Black Locust Bark Characteristic - Master Data Compilation - Fall 2000

Tree ID #	State	Date	CALCULATED AVERAGES										Q	Q Classification	Furrow #1				
			dbh	dbh	height	# furrows	furrow	segment	furrow	bark crest	furrow	segment			furrow	bark crest	furrow		
			in	cm	ft	at 4.5ft	length	width	depth	width	length	width			depth	width	length		
GRMK1	NY	2/2/01	8.1	20.6	54	18	63.5	2.7	1.2	1.2	0.25		21.2	2.7	1.2	1	56.00		
GR3	NY	12/16/00	16.4	41.7		15	51.8	5.1	2.1	1.3	0.16	Shipmast	28	3.8	1	1.2	41.00		
GR1	NY	7/22/00	12.9	32.8		16	97.9	4.0	2.0	2.4	0.35	Shipmast plus	ft	in	in	in	ft		
GR2	NY	7/22/00	22.0	55.9	108	33	66.8	4.6	2.8	1.0	0.24	Shipmast	2.25	2.25	1.5	0.25	5.33		
GR3	NY	7/22/00	16.5	41.9	100		46.2	8.9	2.4	4.4	-0.03	common/error	1.75	3.5	1	2	1.00		
GR4	NY	7/22/00	13.5	34.3	130	18	82.2	6.7	2.7	3.3	0.26	Shipmast	1.83	2.16	0.84	0.9	4.45		
GR5	NY	7/22/00	19.6	49.8		22	59.3	7.3	3.7	2.7	0.17	Shipmast	2.2	2.4	1.5	0.9	2.30		
RR1	WV		21.2	53.8	135+	39	62.2	3.9	1.3	2.0	0.08	Shipmast	ft	in	in	in	ft		
RC1	WV		23.3	59.2	120	30	60.4	5.2	2.5	2.3	0.10	Shipmast	2.50	1.75	0.10	0.80	1.30		
RC2	WV		17.4	44.2	110est	21	66.9	4.6	0.3	2.9	0.04	either	2.15	2.63	1.10	1.00	2.00		
JG1	WV		18.7	47.5	120@50'	19	88.9	9.7	0.3	3.0	0.17	Shipmast	2.00	2.00	0.10	1.30	2.20		
OD1	VA		25.3	64.1	95	25	75.2	7.6	0.4	4.0	-0.03	Common	1.20	3.56	0.11	1.25	3.90		
OD2	VA		17.5	44.5	110	18	84.7	7.2	0.3	2.3	0.19	Shipmast	2.5	3.5	0.15	1.50	3.40		
BR1	VA		41.7	105.9	broke40	33	110.2	11.2	0.5	3.8	0.03	off chart	3.60	3.50	0.12	1.00	2.20		
CM1	WV		22.1	56.1	120								3.65	6.00	0.20	1.13	3.40		
MM1	WV		13.1	33.3	100est								6.00	1.00	3.60	2.75	no data (revisit)		

Graph lines:

	Equation	Point 1x	Point 2x	Point 3x	Point 1y	Point 2y	Point 3y
Shipmast+	$y=0.005x-0.030$	0.0000	14.0	40	-0.030	0.040	0.170
Shipmast median	$y=0.005x+0.080$	0.0000	10.0	40	0.080	0.130	0.280
Shipmast -	$y=0.005x+0.200$	0.0000	10.0	40	0.200	0.250	0.400
note: s- displacement is greater than s+ displacement, on the published graph							
Common+	$y=-0.006x-0.032$	0.0000	14.0	40	-0.032	-0.116	-0.272
Common median	$y=-0.006x+0.056$	0.0000	16.0	40	0.056	-0.040	-0.184
Common -	$y=-0.006x+0.14$ ($x=dbh(in)$, $y=Q$)	0.0000	10.0	40	0.140	0.080	-0.100

Soil analysis data, Black Locust project sites.

Unless otherwise specified, samples are bulked from 6-10 subsamples.

Humus is above mineral soil, with loose fresh leaves removed. Soil is 6" cores.

Processed at 8th floor Bradfield, Cornell soils lab.

Site code	Sample type	Date	O.M. %	pH	avail. P lb/Acre	avail. NO3 lb/Acre	avail. K lb/Acre	avail. Mg lb/Acre	avail. Ca lb/Acre	avail. Fe lb/Acre	avail. Al lb/Acre	avail. Mn lb/Acre	avail. Zn lb/Acre	avail. Cu lb/Acre	Exchange acidity cmol/Kg	moisture %
Arnot I	Soil	11/04/00	4.8	4.7 <i>LOW 4.0?</i>	2.6	151 ↑	17	115	1530	52	323	66	3.2		22.0	
GR North	Humus	Nov-00	10.4	5.3	2.6	45	216	320	3122	10	101	68	3.7	1.2	16.9	1.352
GR North	Soil	Nov-00	6.4	4.7	0.0	24	102	107	948	43	316	28	3.3	0.8	15.7	0.932
GR South	Humus	Nov-00	19.3	4.4	3.8	89	178	304	3122	65	215	69	8.3	0.8	30.5	2.262
GR South	Soil	Nov-00	7.1	4.4	1.0	24	60	51	452	93	485	14	2.8		20.0	1.184
Pond	Soil	Dec-00	5.8	4.5	3.0	47	180	110	1010	71	399	36	2.7		25.0	



Germination tests. Healthier looking tray (on left) grew in a 1/5 acre clearing in 100 ft tall woods. Lesser tray (on right) grew in an open field. (Same soil and dates)



Pot trial with ⁵4 soil changes (pH, Mg, Ca, control, 1% by weight added). Since there was not a measurable difference, next time we will use deficient soils.

Trial with soil from the parent tree's rhizosphere added at transplant



BLI – Cowden Root Harvest – 3/2/01



Locating a root to follow



Following the root to the source tree

Air-spade trial run



Excavating the root for harvest



Root cut at a harvest 10 years ago has branched and healed nicely

BLI – Cowden Root Harvest – 3/2/01

50



Filling excavated hole with imported sand



Collecting bark taxonomy data on harvested tree



BLI – Cowden Root Harvest – 3/2/01

5d



Stand mapping

Identifying species,
location, and dbh of all
trees in circular $\frac{1}{4}$ acre plot





Lisa discusses her art which is displayed in a locust outdoor frame. Her work depicts her father discovering the "neutrino."

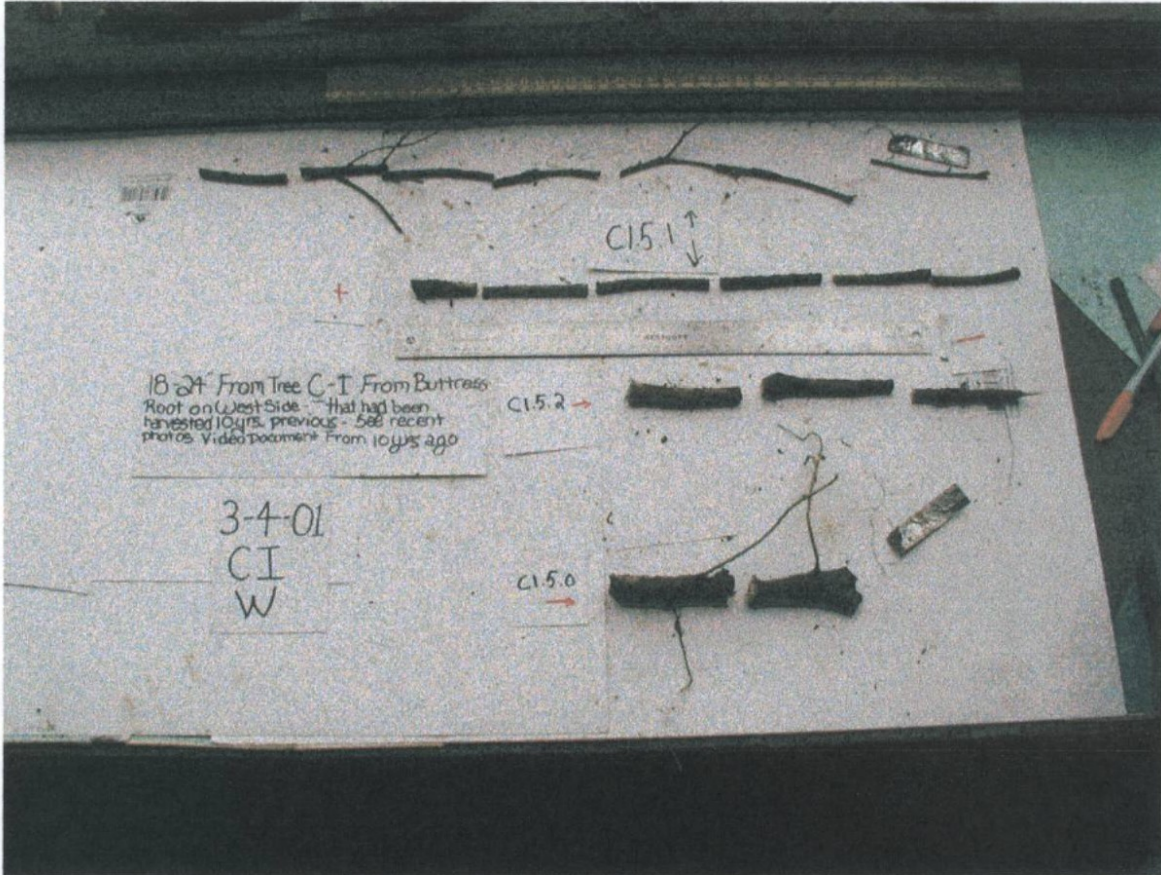


Using bark measurements, Lisa discovers a "newtreenow."





Harvested roots are immediately stored in damp (not wet) peat, 35 degrees F.

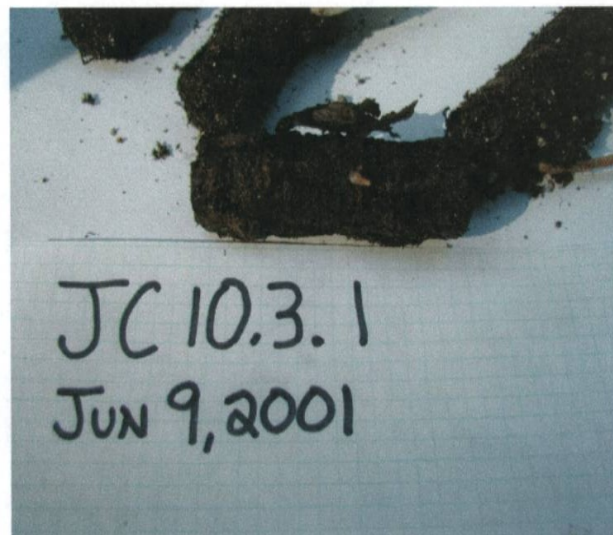
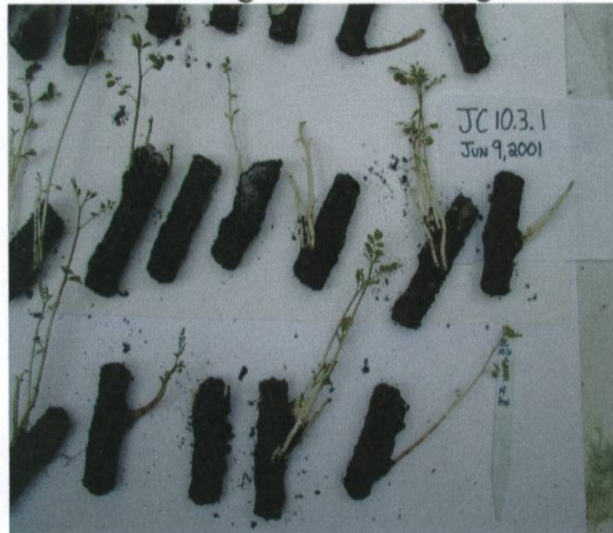


After cutting to length roots are assembled and photographed anatomically and sowed in order proximal to distal.

The most successful roots have no taper or branching



Various stages of root emergence



With more bottom heat, better root emergence is expected



**Sprouts from roots emerge without cotyledons
(white sand is added for contrast)**



3 week old root start shows root emergence