

GROWING KNOWLEDGE

Series content is coordinated by Dr. Lloyd Nackley, associate professor of nursery production and greenhouse management at Oregon State University in Corvallis, Oregon.



An ongoing series provided by Oregon State University in collaboration with the United States Department of Agriculture and in partnership with the Oregon Association of Nurseries



With trees, size matters

Measuring tree growth from Ticknor to today

Clint Taylor, Nackley Lab Nursery Production Team leader, uses traditional tools to measure birch heights in an on-going experiment at North Willamette Research and Extension Center. PHOTO COURTESY OF OREGON STATE UNIVERSITY

BY LLOYD NACKLEY

This project began the way many good nursery stories do — with an unexpected find in an old file cabinet.

While sorting through long-stored folders at the North Willamette Research and Extension Center (NWREC), I came across a worn letter and a hand-typed data sheet from Dr. Robert “Bob” Ticknor to Richard “Dick” Bocci of Carlton Plants. Anyone who has spent time in Oregon’s nursery industry knows those names. Both are hall-of-famers, innovators, and mentors whose work helped shape modern production in the Pacific Northwest.

Ticknor was one of the first scien-

tists stationed at the North Willamette Experiment Station. A professor of horticulture and nursery crops researcher, he is remembered for his azalea and rhododendron breeding, and his plant introductions — including *Pieris* selections that remain in production today.

In his Azalea Society Hall of Fame induction, Ticknor is described as focusing “on practical solutions for nursery problems ... in the areas of weed control, azalea plant hardiness, potting media, slow-release fertilizer, plant breeding and evaluation.”

If you were to swap azalea hardiness for drought tolerance and plant breeding for plant selection, his and my programs

would be nearly identical. That continuity is a reminder that many of our core challenges, from fertilization decisions to labor availability, have persisted for generations.

The letter I found, dated 1989, captures Ticknor’s request for support to publish a report titled “*Growth of Trees Planted 1965–79 in the Landscape Tree Trial at the North Willamette Experiment Station, Aurora, Oregon.*” The measurements had been completed that fall, but publication funding remained elusive. As far as I can tell, his intended long-term report was never released.

As someone who has always had a soft spot for artifacts from the 1900s >>

(a habit I've had to manage at garage sales), finding this letter felt like discovering a time capsule.

I found it fascinating that Ticknor was seeking private support from Bocci, because records show Ticknor had previously released this type of work through Oregon State University publications. For example, between 1971 and 1974, OSU published three short reports summarizing the first five years of data (1965–1969). Evidently the long-term study never made it into the Experiment Station's Circular of Information series — the predecessor of today's Extension Catalog.

Ticknor hinted at “a problem finding the funds to publish the work,” a sentiment any modern researcher knows well. Ticknor's letter to Bocci, and associated data, must have passed through many hands to make it from Ticknor's time to my start at NWREC 25 years later.

Was it another NWREC nursery per-

son like Sven Svenson, Hannah Mathers, James Altland, Robin Rosetta, Rich Regan, Jim Owens, Neil Bell or someone else who valued this file valued enough to keep? I felt like it was time to see how Ticknor's trees grew.

Revisiting the trial: what Ticknor built

More than 50 years ago, just outside my office window, Ticknor established a landmark landscape tree trial “to provide factual information on the growth characteristics of ornamental trees.” Between 1965 and 1969, he planted 237 tree selections, typically four trees per cultivar, spaced six feet apart in rows thirty feet on center. When canopies began to touch, alternate trees were removed to maintain natural growth.

As the fates would have it, as I was working on this data, the farm crew began removing some of the few remaining Ticknor legacy trees to make room for a

lawn. Seeing those familiar trunks come down felt poignant. We were losing a living connection to past research, a tangible reminder of the passage of time and the enduring impact of his work.

Some 50 years ago, Ticknor described the North Willamette Experiment station and trees as such. Elevation: 150 ft, Average frost-free season: 202 days Annual rainfall: 42.7 inches (1.3 inches in July–August). Soil: Willamette sandy loam — well-drained and fertile. His trees were planted bare-root, typically 4–9 feet tall.

Cultural practices were straightforward: annual nitrogen (~100 lb/acre), progressive pruning to lift branch structure, weed control, and irrigation comparable to a well-maintained lawn. No fungicides or insecticides were used. His measurements were deliberate, repeated, and entirely manual — calipers, tape, and a clipboard.

I spent a few hours transcribing the data into formats workable with electronic spreadsheets and statistical software to see how Ticknor's trees grew during their first 10 years.

Ticknor's red maples, revisited: new insights from historical data

Because red maples remain an important landscape and nursery crop in Oregon, and are of interest for Nackley Lab current research, they offer a compelling snapshot of the trial.

Ticknor evaluated 12 red maple cultivars, measured at planting and then again at 5- and 10-year intervals:

Initial height (approx. 4–10 feet):
Armstrong (4.8 ft), Autumn Flame (6.3 ft), Bowhall (5.2 ft), Drake (4.7 ft), October Glory (6.1 ft), Phipps Farm (3.6 ft), Red Sunset (5.7 ft), Scanlon (10.8 ft), Scarlet Sentinel (8.5 ft), Schlesinger (8.4 ft), Tilford (9.8 ft), Tridens (4.6 ft)

Ten-year height (range 13–36 ft):
Armstrong (36.8 ft), Bowhall (32.6 ft), Red Sunset (30.9 ft), Scanlon (34.4 ft), Schlesinger (33.5 ft), Autumn Flame (27.4 ft), October Glory (28.1 ft), Phipps Farm (23.5 ft), Scarlet Sentinel (26.9 ft), Drake (17.7 ft), Tridens (13.0 ft), Tilford (24.8 ft)

Growth rate ranking over 10 years:
1. Armstrong; 2. Phipps Farm;



DON MARJAMA NURSERY CO.

Grower of Quality Oregon Field & Containerized Stock

Conifers • Ornamentals • Japanese Maples
Dogwoods & More

11333 S.E. Bluff Road • Sandy, Oregon 97055
(503) 668-8083 • fax (503) 668-4833
sales@donmarjamanursery.com



OREGON
NURSERIES
FOUNDATION

Need a scholarship?

Scholarships from \$1,000 to \$3,000 are available for students pursuing a career in the nursery or landscaping industry.

APPLY NOW!
DEADLINE IS APRIL 15

Go to OAN.org/ONF or contact Stephanie Collins at 503-582-2001 or Scholarships@OAN.org

Chamaecyparis
 Sciadopitys
 Kalmia
 Thuja
 Picea



Rhododendron
 Boxwood
 Prunus
 Pieris
 Ilex

Container and Field Grown Ornamentals

Phone: 503-663-1200 • Fax: 503-663-5134

www.reardonnursery.com
 info@reardonnursery.com

10050 SE 282nd Ave
 Boring, OR 97009

3. Bowhall; 4. Red Sunset; 5. October Glory; 6. Autumn Flame; 7. Schlesinger; 8. Drake; 9. Scanlon; 10. Scarlet Sentinel; 11. Tridens; 12. Tilford.

These data illustrate why measurement matters. Some cultivars that start small finish strong; others with early vigor taper out. For growers evaluating new introductions today, the logic remains the same: without consistent measurement, performance differences remain invisible.

Why measurement matters in nursery production

Accurate growth measurement has always been one of the cornerstones of nursery production. Whether a grower is producing shade trees, flowering trees, or specialty crops, consistent and repeatable measurements are essential for grading plants, communicating value, forecasting readiness, and maintaining reliable inventory.

These measurements are not simply recordkeeping. They are the basis for production decisions like when to shift containers, adjust irrigation or fertilization, train leaders, or identify salable stock for upcoming orders.

The nursery industry formalized this shared understanding more than a century ago through what eventually became the American Standard for Nursery Stock (ANSI Z60). The standard provides a universal system for sizing and describing nursery stock, ensuring that a 1.5-inch caliper red maple means the same thing whether you're in McMinnville, Oregon or McMinnville, Tennessee.

This consistency across regions and growers enables fair trade, accurate grading, and clear communication with customers ranging from landscapers to municipalities.

A century of standards

The roots of the ANSI Standard reach back to 1921, when the American Association of Nurserymen — an early predecessor of modern AmericanHort — formed its first Committee on Standards. Their goal was simple but transformative: create a unified system of measurement to facilitate fair, transparent, and efficient >>



Looking for a health plan for your business, employees and family?

Providence Health Plan is proud to work with Leonard Adams Insurance to offer members of the Oregon Association of Nurseries access to quality, affordable healthcare.



Standard features available with our various health plans:

- Multiple plan offerings
- Preventive medications with a \$0 copay on traditional copay plans
- Chiropractic and acupuncture embedded for each member



Additional member perks are available to cover other aspects of life, including:

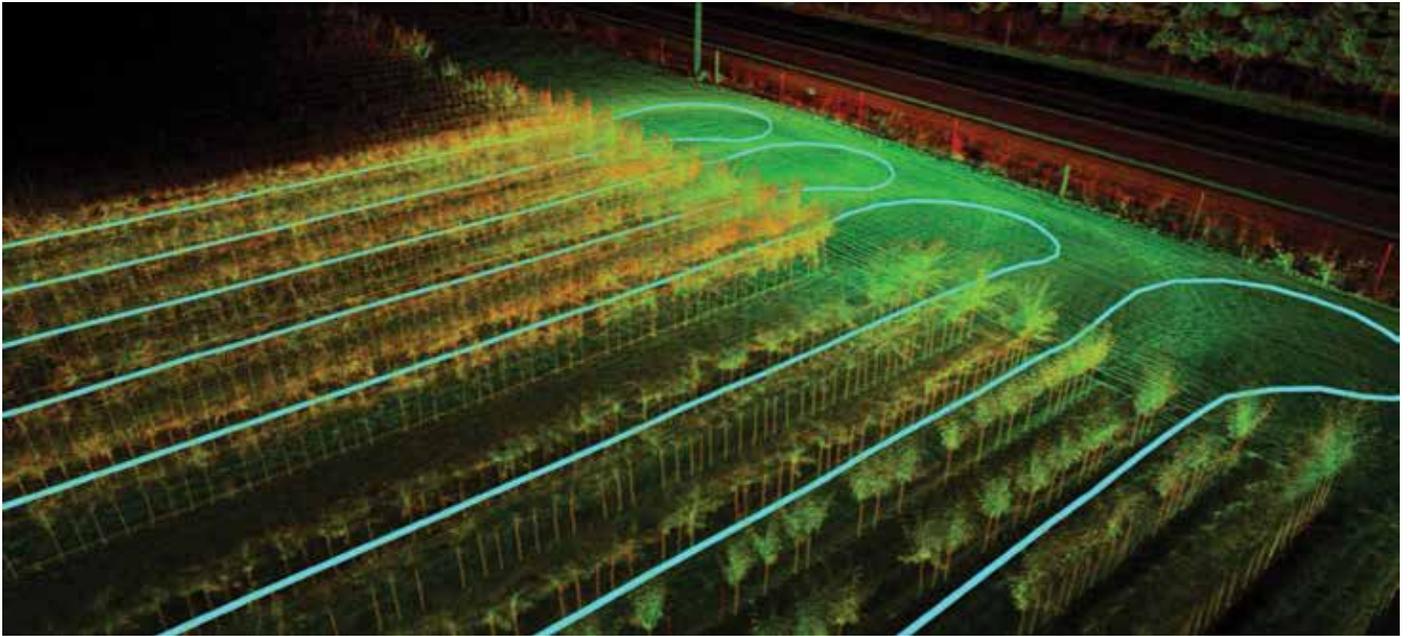
- LifeBalance - discounts on recreational, cultural, and travel activities
- Fitness center and workout video discounts
- Emergency travel assistance
- ID protection



Interested in learning more?

Visit lacoinsurance.com or contact
Leonard Adams Insurance at 503-296-0077,
 or toll-free at **866-907-1850.**

Growing Knowledge



A 3D LiDAR scan by the Moss Robotics Inc. robot, providing cm-level accuracy of tree size. PHOTO COURTESY OF MOSS ROBOTICS INC.

trade in nursery stock. The first edition of “Horticultural Standards” was published just two years later, in 1923.

As the industry grew, so did the need for national consistency. After World War II, the association sought to formalize the standards through the American Standards Association, the organization that would later evolve into today’s American National Standards Institute (ANSI).

The first nationally recognized version of the Standard was published in 1949. Since then, the Standard has been repeatedly revised to reflect new production methods, plant forms, and industry needs.

Each revision represents a consensus of industry expertise and practical experience. The most recent version — ANSI Z60.2, approved in April 2025 — was shaped through a broad national canvass of growers, researchers, government agencies, and horticultural professionals, including Tom Fessler from Woodburn Nursery and Azaleas Inc. in Woodburn, Oregon.

Notably, Dick Bocci of Carlton Plants — the same person Ticknor reached out to for support decades ago — served as a previous editor of ANSI Standards.

Manual measurements tried and true

Fast-forward fifty years from Ticknor’s trees, and the tools have changed less than one might expect. Most nursery researchers, including our lab, continue to rely on measuring sticks for



Moss Robotics scanning device mounted on the front of an ATV. PHOTO COURTESY OF MOSS ROBOTICS INC.

height, calipers for trunk diameter, and tape measures for canopy spread. For a block of a few hundred trees, this may require multiple hours of field time.

Weekly data may be essential for fast-growing shrubs, while quarterly or biannual measurements may suffice for long-term cultivar evaluations. The constraint isn’t scientific — it’s operational.

New tools: automated growth measurement and Ag 4.0

Today, nursery measurement is entering a new phase. A small team of engineers

in east Multnomah County is developing a robotic system designed to handle one of the most challenging operational needs in nursery production: inventory.

The system — developed by Moss Ag — combines LiDAR, camera arrays, and GPS into a single sensing platform. Mounted on an ATV, the unit can be driven through every tenth row at 10–12 mph while collecting tree counts, heights, calipers and health indicators.

The efficiency gains are staggering. This system processes about 44 trees per second, compared to manual rates of

about 2.5 trees per second.

LiDAR provides centimeter-level accuracy, enabling growers to build real growth curves, identify sellable stock, verify block-level grading consistency, detect missing or declining trees, and improve forecasting for harvest, sales, and labor allocation.

Why this matters for growers

Stick and caliper skills remain essential, and ANSI Standards still rely on traditional definitions. But new technology allows:

- More consistent grading across crews and seasons.
- Improved forecasting for labor, shifting, staking, and sales timing.
- Reduced dependence on scarce skilled labor for time-consuming tasks.

For researchers, automation solves the same problem Ticknor faced: how to collect frequent, accurate measurements across many trees without sacrificing other work.

Looking ahead

The nursery industry has always adapted to new tools and growth measurement is now on the cusp of its own transformation. The rediscovered Ticknor data reminds us how valuable long-term records can be, and how much effort they once required.

The emerging generation of LiDAR-enabled systems from Moss Robotics Inc. suggests a future where growers can track growth as easily as they track weather or sales.

As technology advances, the goal remains the same: to produce high-quality, climate-adapted trees that meet industry standards and customer expectations. Measurement — whether by stick, caliper, or sensor — continues to be one of the most powerful tools to get us there. ☺

Lloyd Nackley, Ph.D., is a plant ecologist at the Oregon State University North Willamette Research and Extension Center (NWREC) in Aurora, Oregon. He can be reached at Lloyd.Nackley@OregonState.edu.



Digger MARKETPLACE

Hostetler Farm Drainage
971-275-3004

Over 100 years of continuous family owned business in providing water management.

Serving the Willamette valley and beyond on projects large and small. Our innovative team installs drainage systems tailored to meet the needs of the farmer.

www.hostetlerfarmdrainage.com

Schurter Nursery

Arborvitae—Emerald green
Virescens
Boxwood
Japanese Maples
Otto Luyken
Skip Laurel

Various sizes & Varieties
503-932-8006

B&B Spruce 4 to 24 feet
Chamaecyparis • Fir • Pine
Japanese Maple • Poodle Pine
Cut Christmas Trees

Pickels' Tree Farm LLC

(503) 630-4349
FAX (503) 630-7542
PO Box 598 – Estacada, OR 97023

Rhododendrons • Maples • Buxus • Daphne

Quality NURSERY STOCK

Deciduous Azaleas • Ilex • Kalmia • Pieris

Grafted Ornamentals • Prunus L. • Thuja

OBERSINNER NURSERY, Inc.

7886 N. Howell Rd NE • Silverton, OR
(503) 873-4004 • inquire@obersinnernursery.com
www.ObersinnerNursery.com

Tracking Trailer

TT-410

Call 503-873-9872 to order

WURDINGER MANUFACTURING

WurdingerManufacturing.com

WHOLESALE GROWERS

Motz & Son Nursery

SHADE & FLOWERING TREES
FRUIT TREES
Dwarf, Semi-Dwarf & Standard
COMBINATION FRUIT TREES (4 in 1)
Semi-Dwarf & Standard
ESPALIER APPLES
Semi-Dwarf, Combination & One Variety
WALNUTS & FILBERTS
DECIDUOUS SHRUBS

www.motzandson.com
11445 N.W. Skyline Blvd.
Portland, Oregon 97231
Phone 503-645-1342
FAX 503-645-6856