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Tree planting: How to ensure failure in three easy steps

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Plant Your Tree Properly

Proper Tree Planting Diagram

Keep roots 2-3 inches from trunk

Bottoms of root ball on firm soil

Planting hole 2-3 times root ball diameter

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Step one: Don't match species and site

- **Wrong tree – wrong place**

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Tree Owner's Manual
For the Homeowner or Professional

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Wrong tree – Wrong place

- **Poor Drainage**

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Wrong tree – Wrong place

- Poor Drainage



Two photographs are shown side-by-side. The left photo shows a trench dug into the ground with a corrugated metal pipe installed for drainage. The right photo shows a tree root ball with soil, where the roots are densely packed and appear to be in a confined space, possibly leading to poor drainage.

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Wrong tree – Wrong place



A close-up photograph of a hand holding a single oak leaf. The leaf is mostly green but has a distinct yellowing or chlorotic area, which is a sign of nutrient deficiency or stress.

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Wrong tree – Wrong place

- Soil pH



A close-up photograph of several green maple leaves. The leaves are vibrant green and appear healthy, but they are shown in the context of a slide about soil pH, suggesting they might be in an environment where pH is not ideal for the tree species.

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Wrong tree – Wrong place

- Deicing salt



A photograph showing a row of young, small trees planted in a field. The trees are mostly bare, suggesting winter or late autumn. The ground around them appears to be a mix of grass and bare soil, possibly affected by deicing salt.

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Wrong tree – Wrong place



Two maple leaves are shown on a piece of paper. The leaf on the left is labeled "FM-Good" and is a vibrant green. The leaf on the right is labeled "FM-Bad" and is significantly yellowed and chlorotic, indicating a problem with the tree's health.

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Step two: plant too deep

- Improper planting depth



A photograph of a tree trunk in a hole. The trunk is buried deep in the soil, with only a small portion above ground. This illustrates the problem of planting a tree too deep, which can lead to root rot and other issues.

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Improper planting depth

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Step three: Walk away

- Lack of post-planting care

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- MSU Oak scorch project – Phillip Kurzeja, MS Thesis

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Everyone gets excited about tree planting; then what...?

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- Correlation analyses
- Only site variable significantly correlated with scorch was Depth to Original Root Flare; $r = 0.32$; $p < 0.02$
- i.e., scorch increased as planting depth increased

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Mulch x Root-ball manipulations

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Assessments



A photograph showing two individuals in a tree nursery. One person is standing and looking at a tree, while the other is bent over, possibly measuring or working on the soil. The ground is covered with mulch, and several young trees are visible in the background.

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What about other tree planting "rules"?



A photograph of a young tree planted in a hole. The tree is supported by a stake, and the hole is filled with soil. The surrounding area is a grassy field.

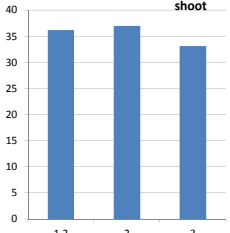
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A close-up photograph showing a shovel digging into a layer of mulch. The shovel is positioned vertically, and the mulch is being pushed aside, revealing the soil underneath.

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Effect of plant hole width on growth of green ash

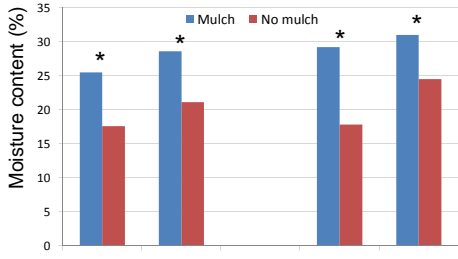


Planting hole width (x rootball)	shoot
1.2	35
2	37
3	33

Source: Watson et al. 1992. J. Arbor. 18:130-135.

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Volumetric soil moisture 2013



Location	Width	Mulch	No mulch
Inside	0-15 cm	25*	18
	0-45 cm	29*	21
Outside	0-15 cm	29*	18
	0-45 cm	31*	24

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- Dig planting hole 3x width of root-ball
- **Amend back-fill**

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Caliper increase of green ash trees two years after transplanting

Treatments	Caliper growth* (mm)
Control	20.9
Peat	20.0
Gel	18.5
Gel + Peat	19.2

* Means are not different at 0.05 significance level

Source: Henderson-Cole and Hensley, 1992. J. Env. Hort. 10:218-221.



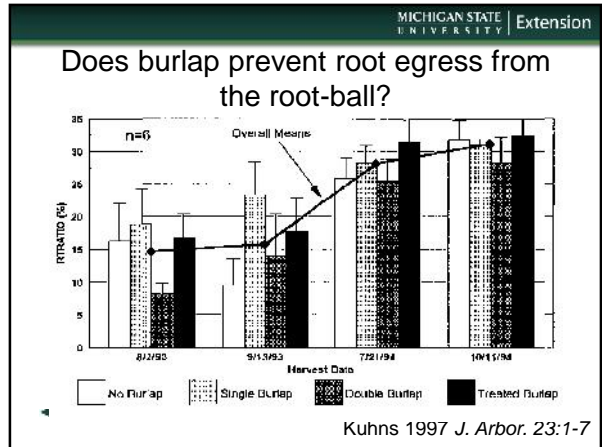
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Effect of backfill amendment on growth of red maple

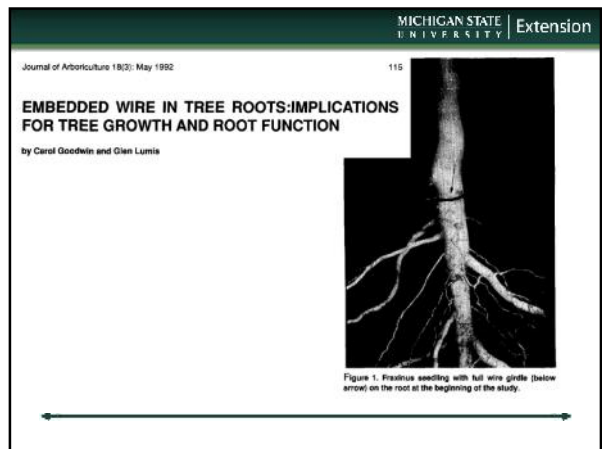
Backfill	Shoot growth (cm)	Caliper (mm)
Native soil	46a	44a
50% Soil: 50% Bark	45a	44a
50% soil: 50% CLM*	49a	45a
100% CLM	47a	44a

* CLM is a proprietary mix of pine humus, sand, crushed granite, and poultry litter

Source: Smalley and Wood, 1995. J. Arbor. 21:247-249.



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- Dig planting hole 3x width of root-ball
 - Amend back-fill
 - **Remove burlap and baskets on B&B trees**



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Re-establishment of root conductivity

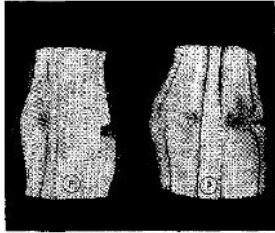
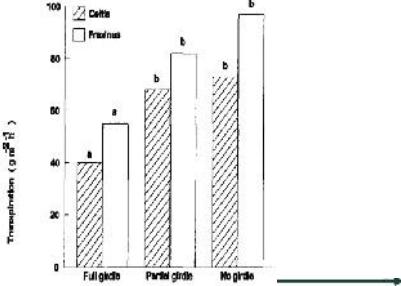


Figure 2.1. longitudinal root sections of *Fraxinus* (F, left) and *Populus* (P, right), stained with acid fast stain, showing bridging over the wire (left side of both sections) and intodging prior to bridging (right side of both sections)

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Transpiration rates of trees in response to girdling



Girdling Condition	Celtis (g H ₂ O m ⁻² h ⁻¹)	Prunus (g H ₂ O m ⁻² h ⁻¹)
Full girdle	~40 (a)	~65 (a)
Partial girdle	~70 (b)	~85 (b)
No girdle	~80 (b)	~95 (b)