

A photograph of a tree growing on a cliff edge. The tree has a thick, gnarled trunk and a canopy of green leaves. It is positioned between two large, reddish-brown rock formations. The sky is a pale blue with some light clouds. The text 'The Newly Planted Tree: Living on the Edge' is overlaid on the left side of the image in a yellow, sans-serif font.

The Newly
Planted
Tree:
Living on
the Edge

The 
Morton
Arboretum

Gary Watson

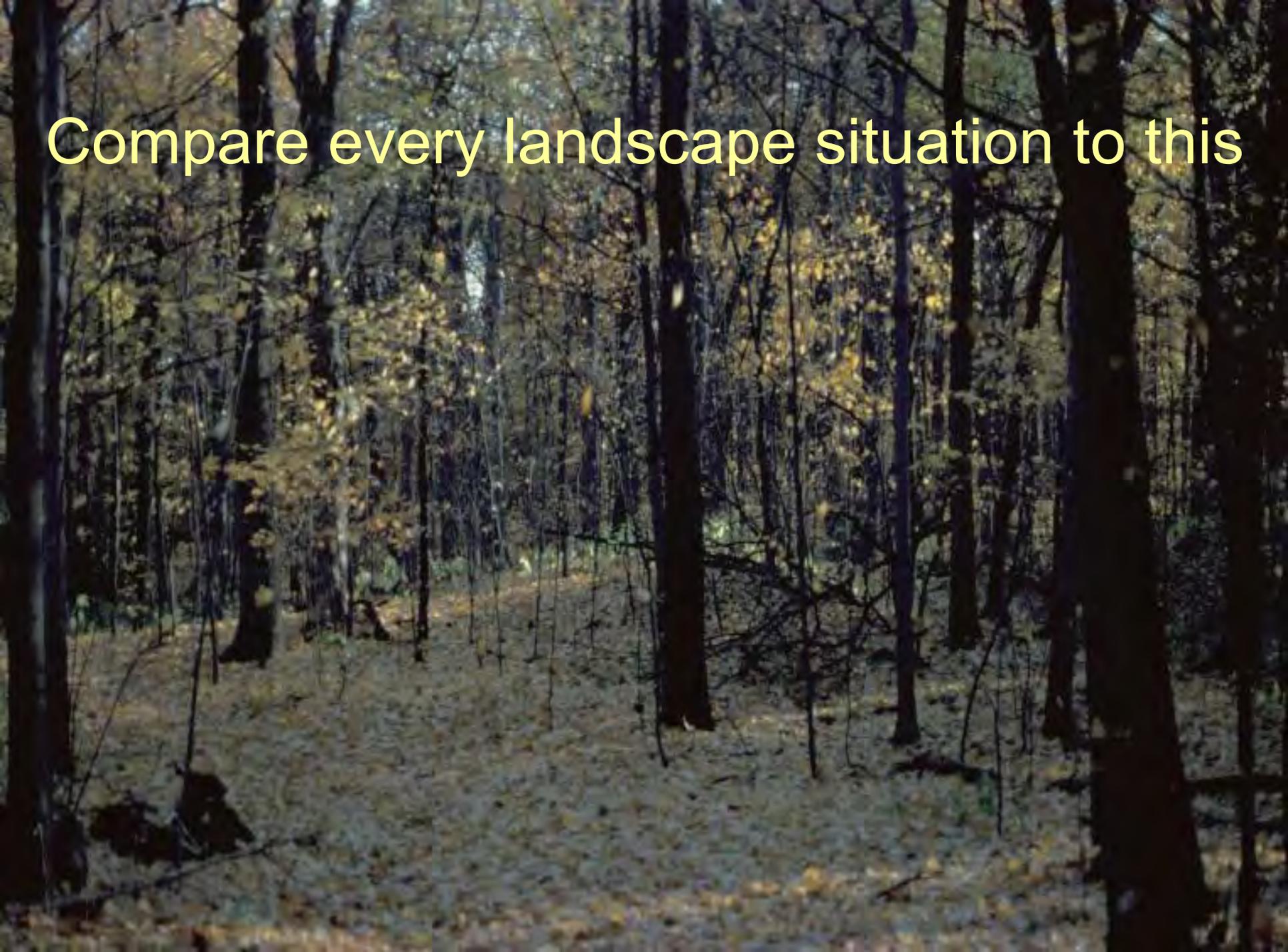


TREE ESTABLISHMENT

Resumption of pre-transplant twig growth rate.

Gilman (1993): the time required for the tree to have regenerated enough roots to keep it alive without supplementary irrigation.

Compare every landscape situation to this



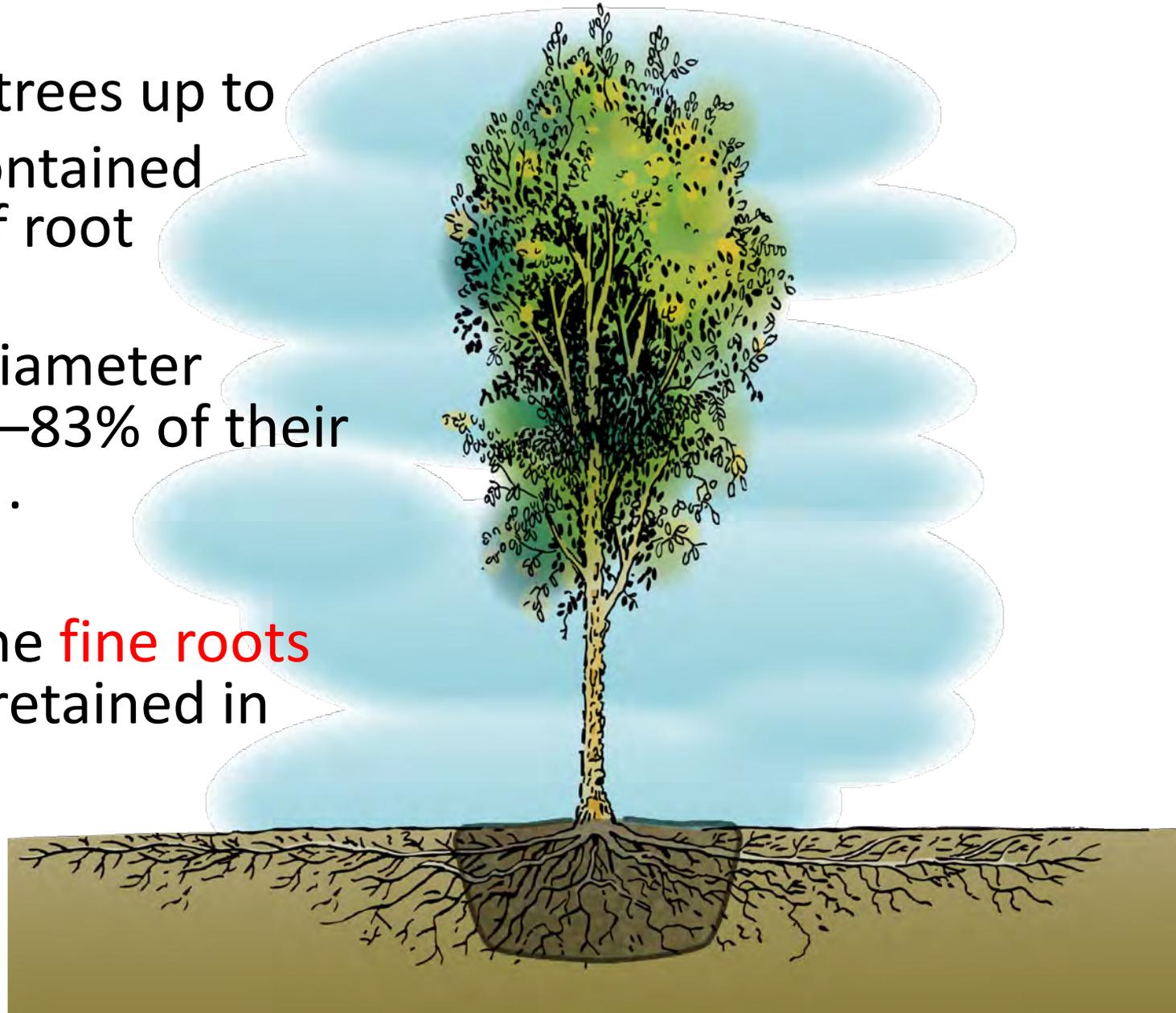


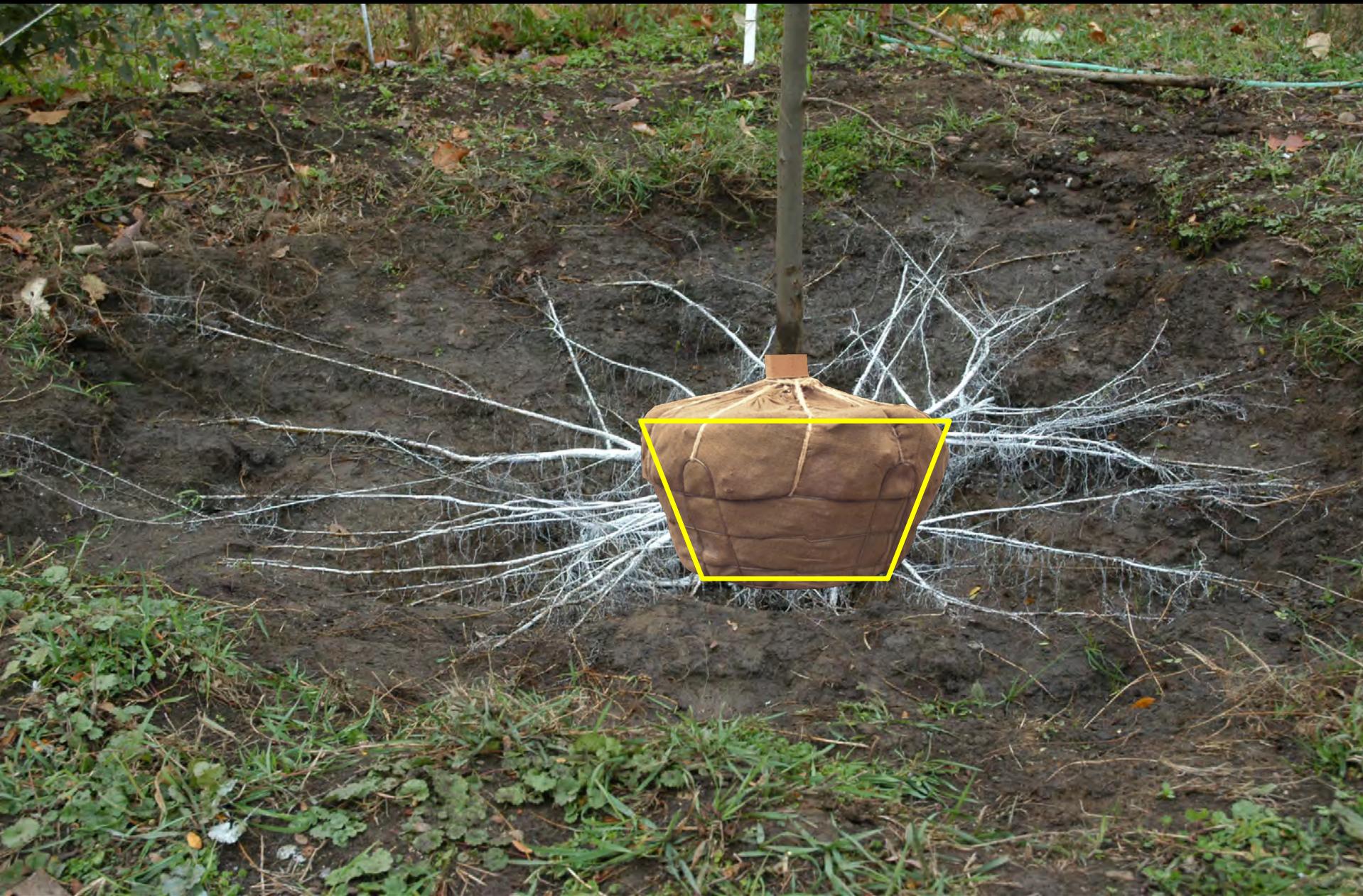
How much of the root system is in a root ball?

Root balls of trees up to 3-inch dbh contained 53%–100% of root **biomass**.

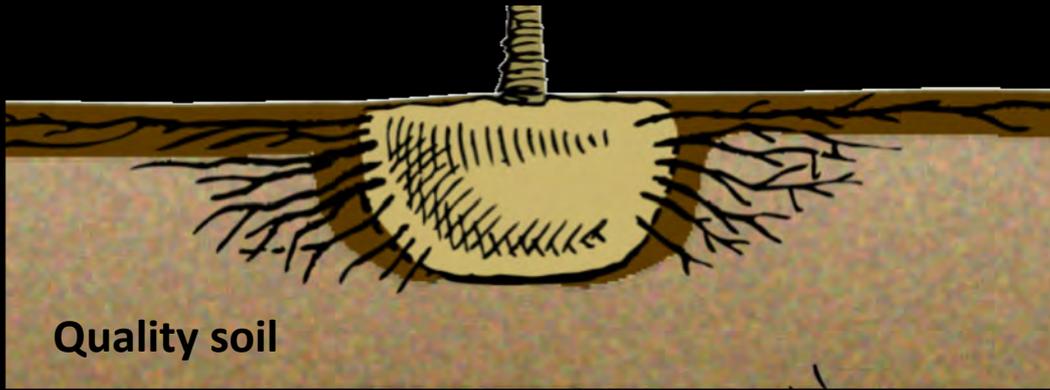
3- to 8-inch diameter retained 29%–83% of their root **biomass** .

5%–18% of the **fine roots** (<2 mm) are retained in the root ball.









Quality soil



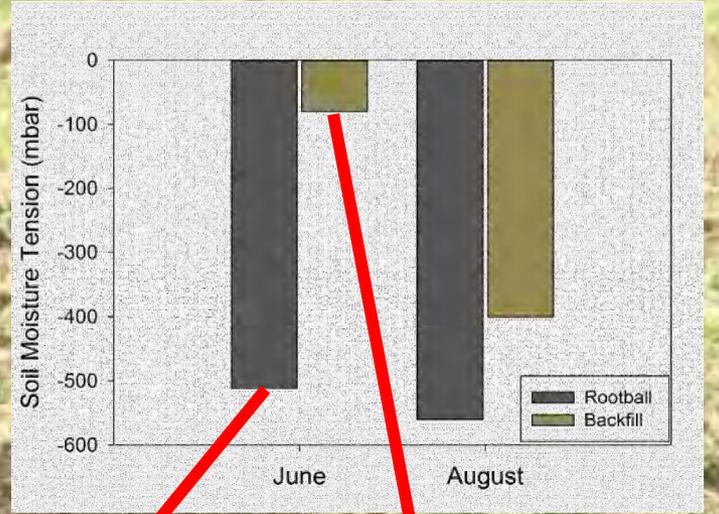
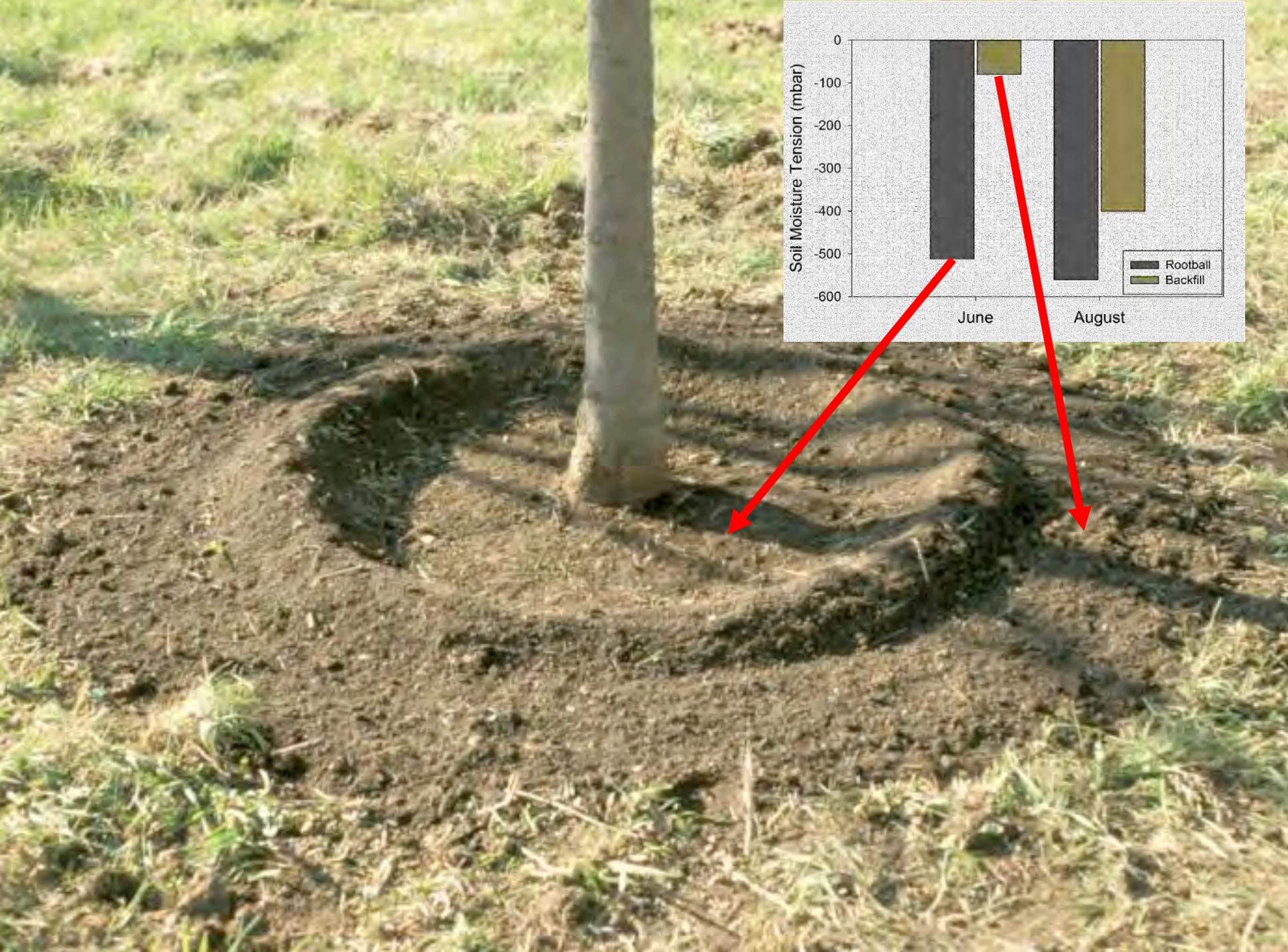


Root Growth and Backfill Type

	<u>Back fill</u>	<u>Site-soil</u>	<u>Ratio</u>
Unamended clay	7.3	3.2	0.44
Amended Clay	9.4	4.1	0.44
New Topsoil	7.4	3.8	0.51

One Year After Plantng, 15 cm From the Root Ball, mm² SA/cc soil

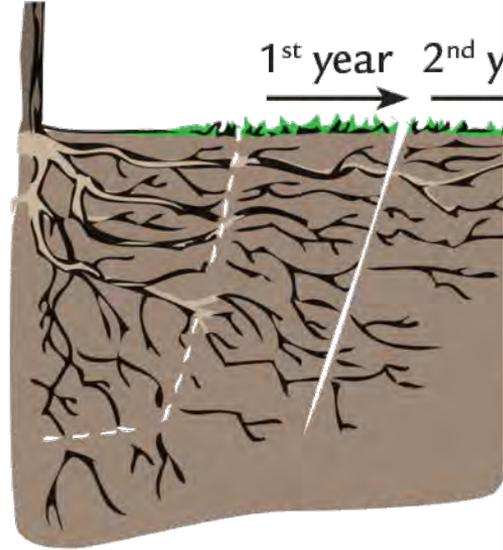




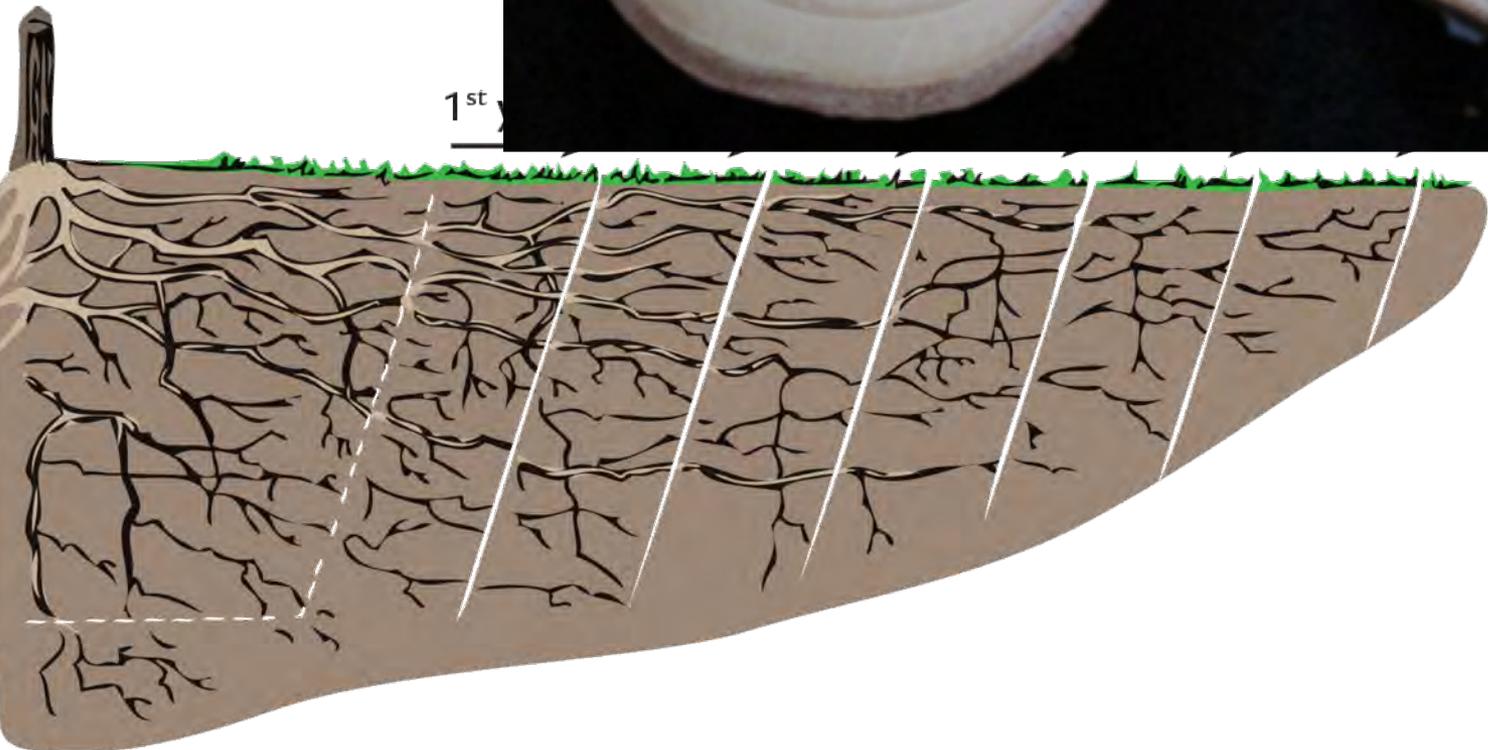
How long will it take for trees to establish after planting?



1st year 2nd y

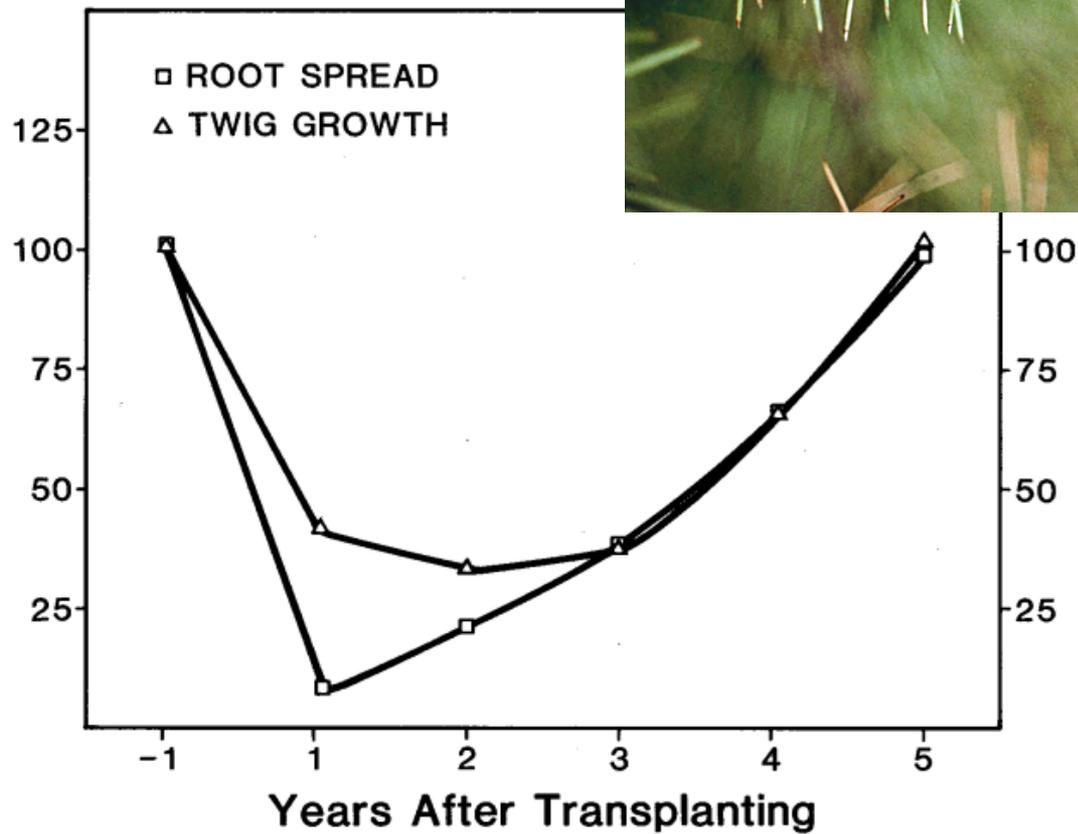


1st y





Estimated Lateral Spread of
Root System (% of Original Size)



Estimated Annual Twig Growth
(Pretransplanting Rate)





1990

Clark Landing

1990

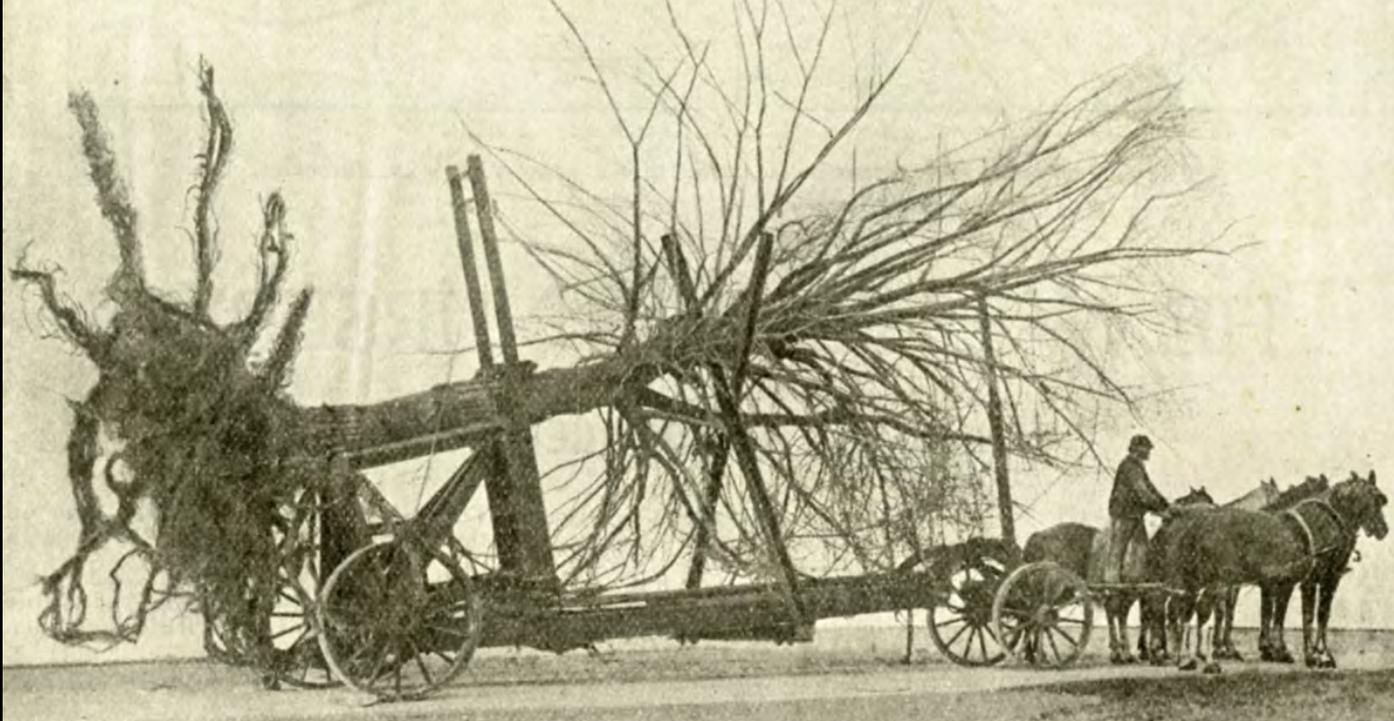
2015



Can anything
be done to
speed up
establishment?

- Fertilizer?
- Soil amendments?
- Soil Additives?
- Bigger root ball?
- Bare root?

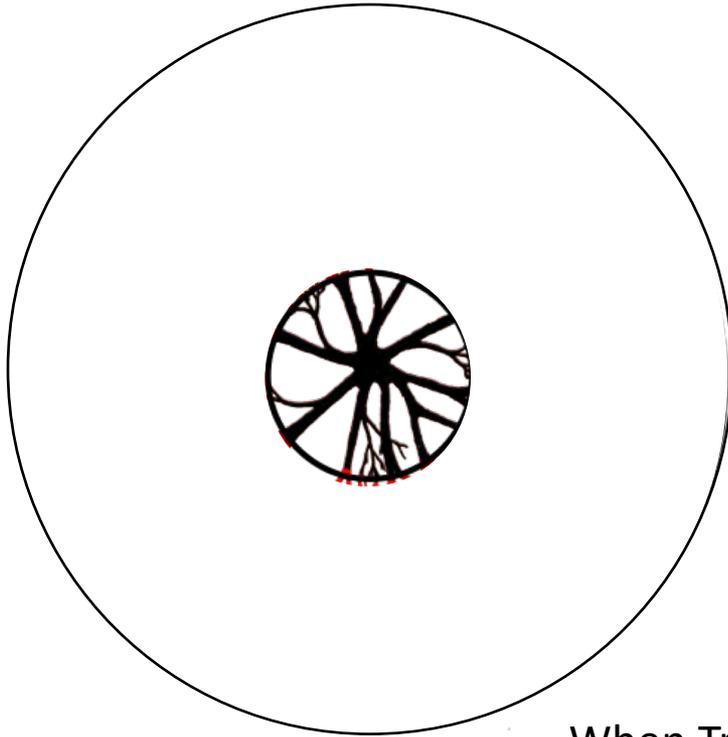




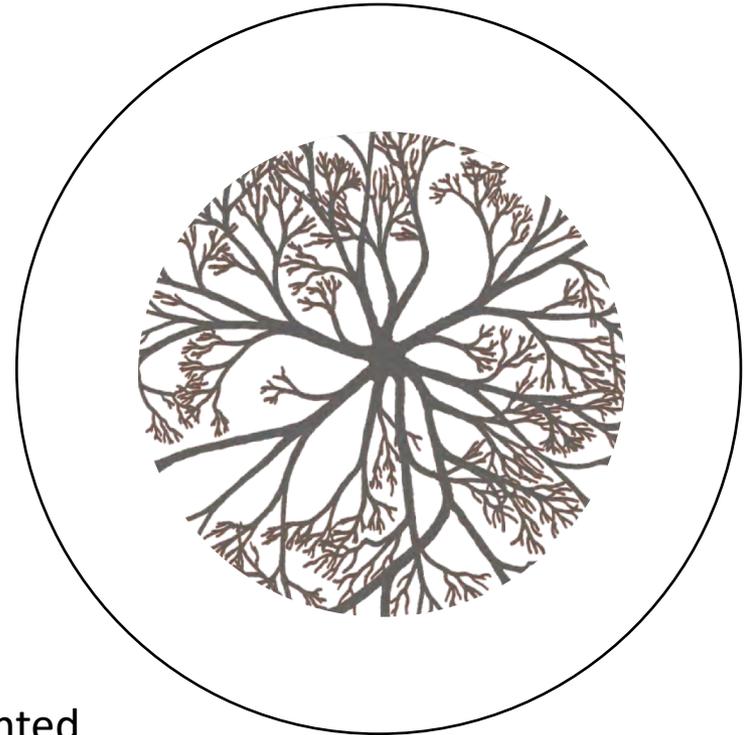




Balled and Burlap



Bare Root

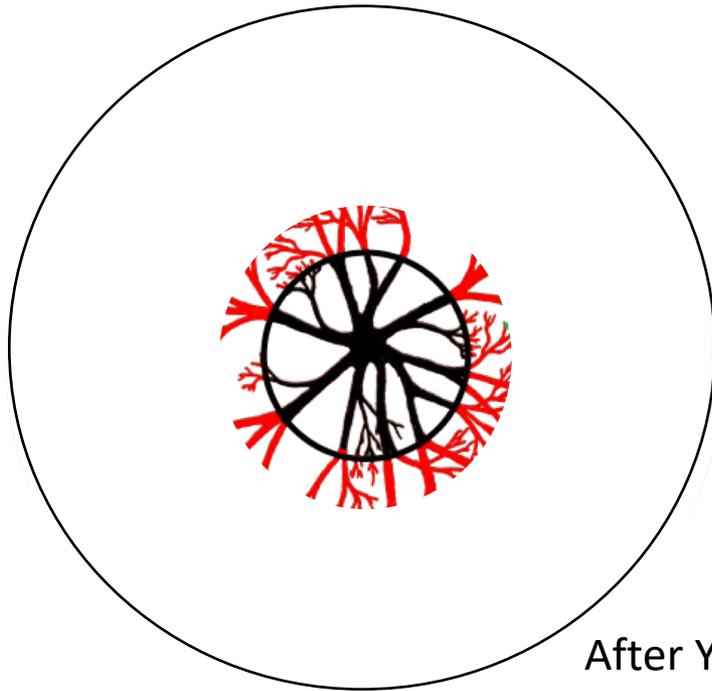


When Transplanted

After 8 weeks
in Missouri
Gravel Bed



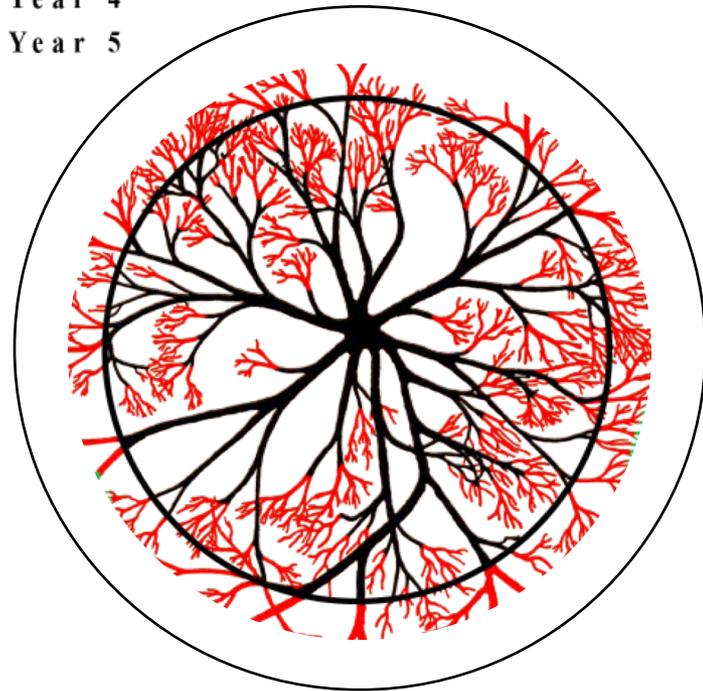
Balled and Burlap



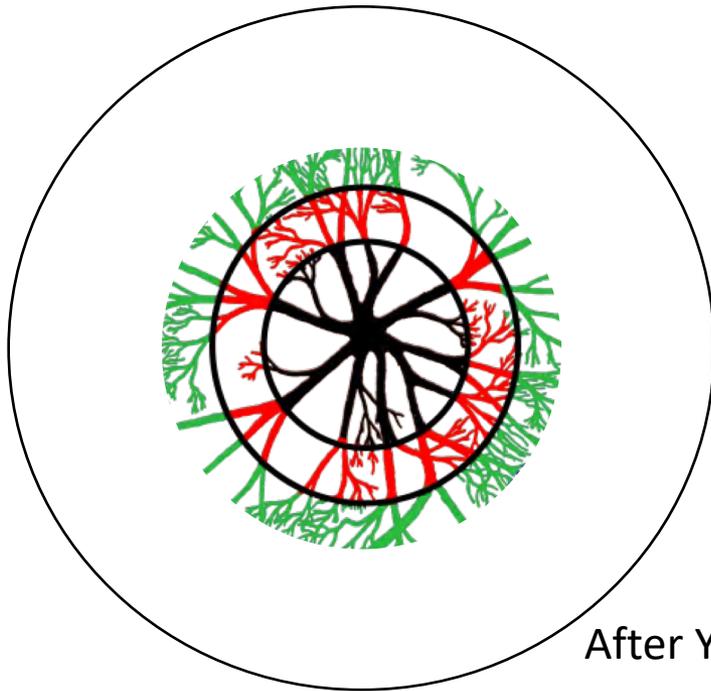
After Year 1

- Transplanted
- Year 1
- Year 2
- Year 3
- Year 4
- Year 5

Bare Root



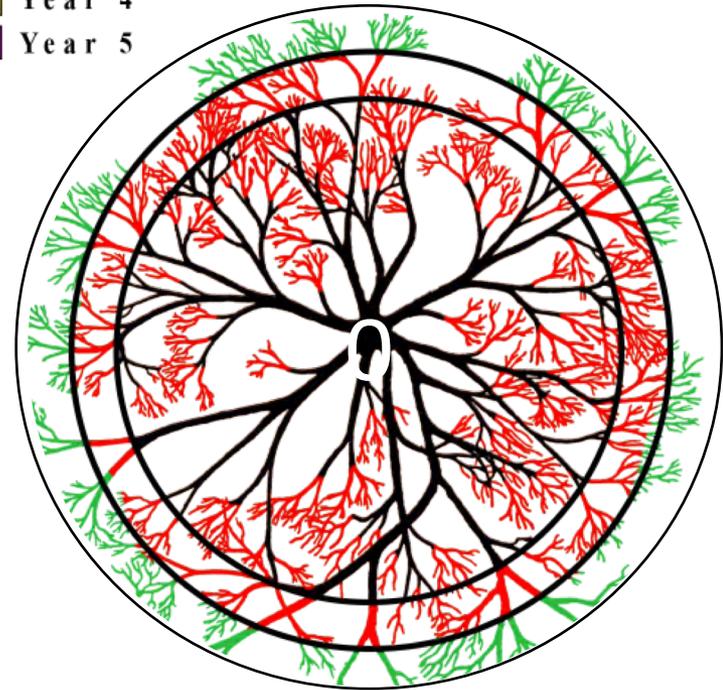
Balled and Burlap



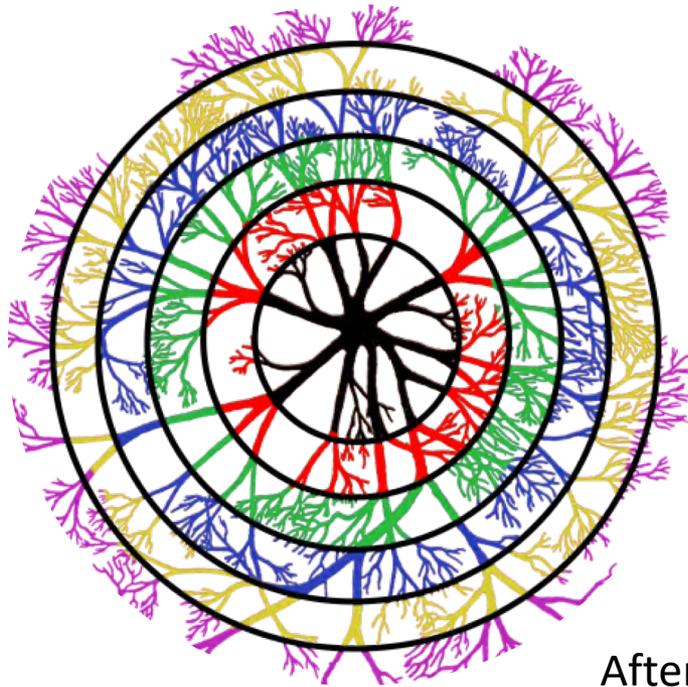
After Year 2

- Transplanted
- Year 1
- Year 2
- Year 3
- Year 4
- Year 5

Bare Root



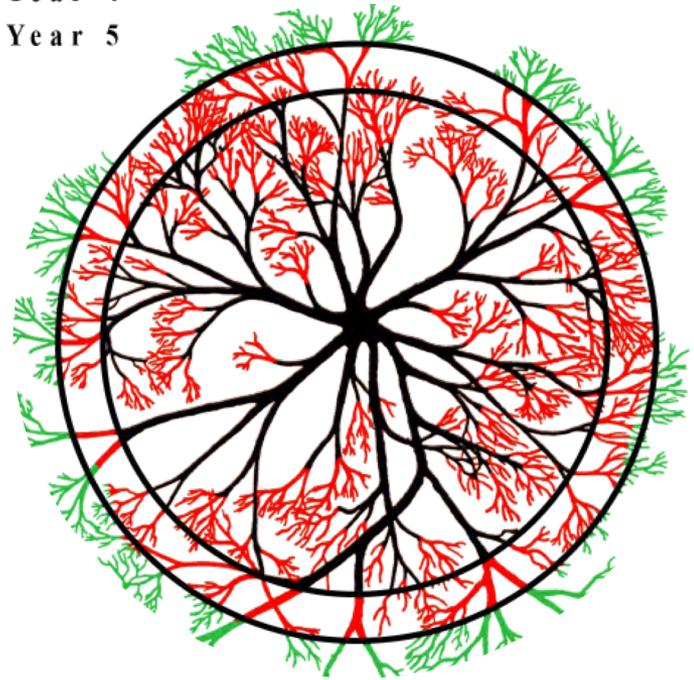
Balled and Burlap



After Year 5

- Transplanted
- Year 1
- Year 2
- Year 3
- Year 4
- Year 5

Bare Root



The Burnley Method

Six factors were selected as being indicative of successful or poor establishment:

- whether trees had been planted too deeply (or too shallow)
- whether trees have trunk movement at or below the soil surface,
- damage to the trunk,
- trunk sunscald injury,
- presence of epicormic shoots on the trunk/branches
- whether there were co-dominant stems

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Table 2. Number of trees exhibiting the conditions used as criteria for tree establishment.

Number of trees	Trunk Movement	Trunk Damage	Epicormic shoots	Sunscald	Codom- inance	Planted too deep
510	214	42	61	64	25	62
	41.96%	8.23%	11.96%	12.55%	4.9%	12.16%





Average tip extension of trees with and without trunk movement. The asterix indicates measurements with significant difference ($p < 0.05$), using a two sample t-test.

Species	Months after planting	Number of trees	No. of trees with trunk movement	Average tip extension of affected trees (mm)	Average tip extension of non-affected trees (mm)
<i>Angophora costata</i>	12	37	19	*44	67
<i>Brachychiton acerifolia</i>	44	10	8	1yr = 112 2yr = 119	1yr = 72 2yr = 102
<i>Celtis australis</i>	12	28	16	104	81
<i>Corymbia maculata</i>	12	89	64	*39	52
<i>Eucalyptus scoparia</i>	12	17	9	104	84
<i>Olea europaea</i>	40	66	16	201	190
<i>Platanus x acerifolia</i>	12	40	10	126	110
<i>Platanus x acerifolia</i>	40	38	7	*1yr = 219 *2yr = 259	1yr = 294 2yr = 278
<i>Pyrus calleryana</i>	12	37	10	*15	34



CONCLUSION

For the field arborist, three practical criteria for street trees establishment:

- tip extension,
- percentage of canopy dieback
- trunk movement in the root ball

Provide useful data for management decisions

All three criteria can be easily and quickly applied and do not require specialist or expensive equipment.



THE LANDSCAPE BELOW GROUND **IV**

International Conference on
Tree Root Development in Urban Soils

PRE-CONFERENCE WORKSHOPS

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CONFERENCE PROGRAM

October 16-17, 2018

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