Tankar om växtval i

Urban miljö

Temadag Träden i staden 20181116

PATRICK.BELLAN@SLU.SE

Pinus ponderosa –
gultall

Arctostaphylos uva-ursi –
mjölon

Spiraea japonica –
praktspirea


WC

Foto: Arne Mattsson

Acer x *zoeschense* ’Annae’ – dansk lönn

http://www.fastighetsvarlden.se/notiser/vasakronan-planer-100-000-kvm-nytt-goteborg/

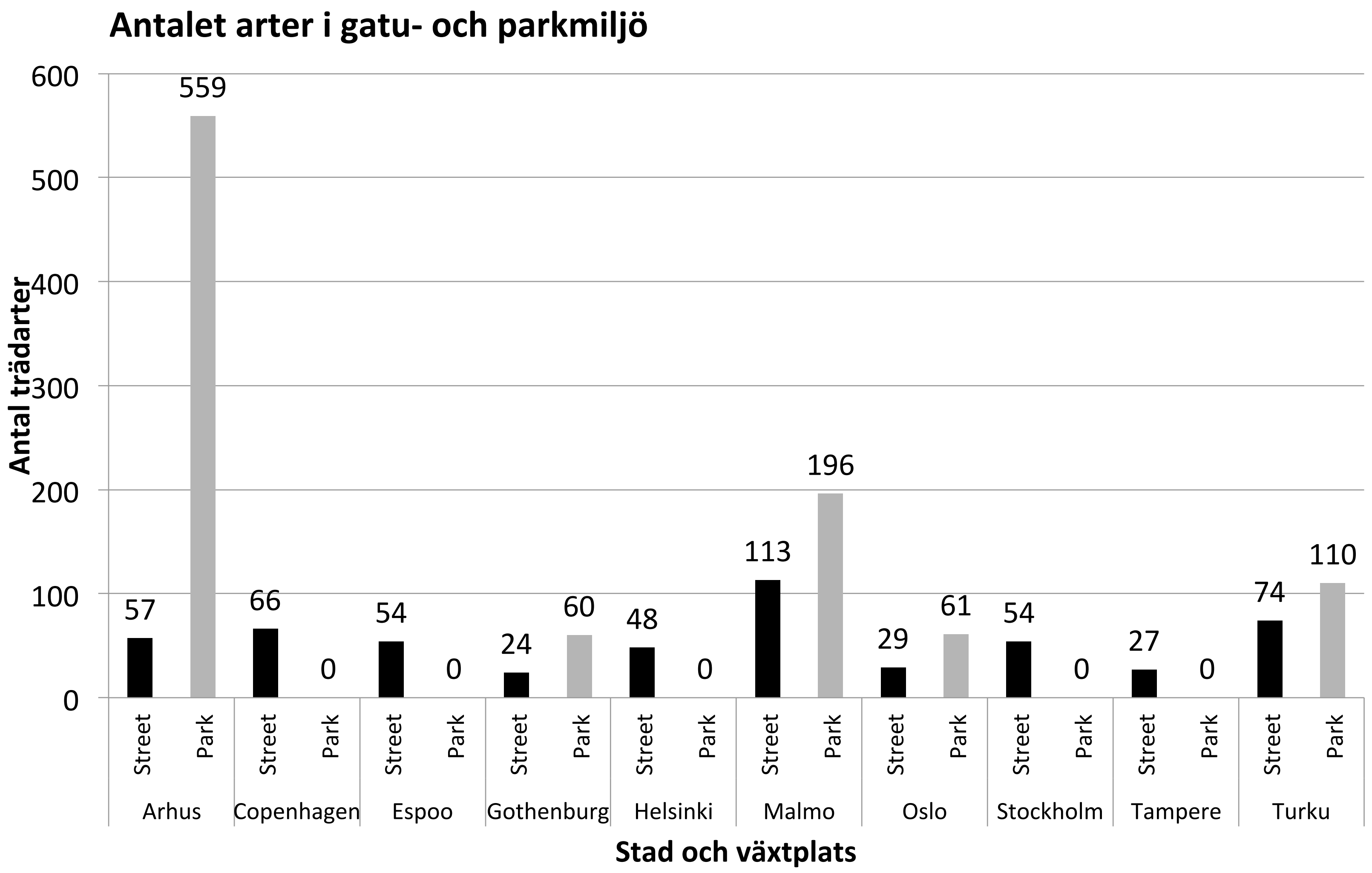
S. 'Dodong' E sol. 3x kl/co 175-200

M. ‘Yellow Lantern’ sol. 3x kl/co175-200

Amelanchier laevis sol. 3x kl/co 175-200


Avspärrat pga
risk för fallande
grenar!

vidareutveckla!


Antalet arter i gatu- och parkmiljö
Antal trädarter
600
500
400
300
200
100
0
559
57
66
0
54
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24
60
48
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113
196
29
61
54
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27
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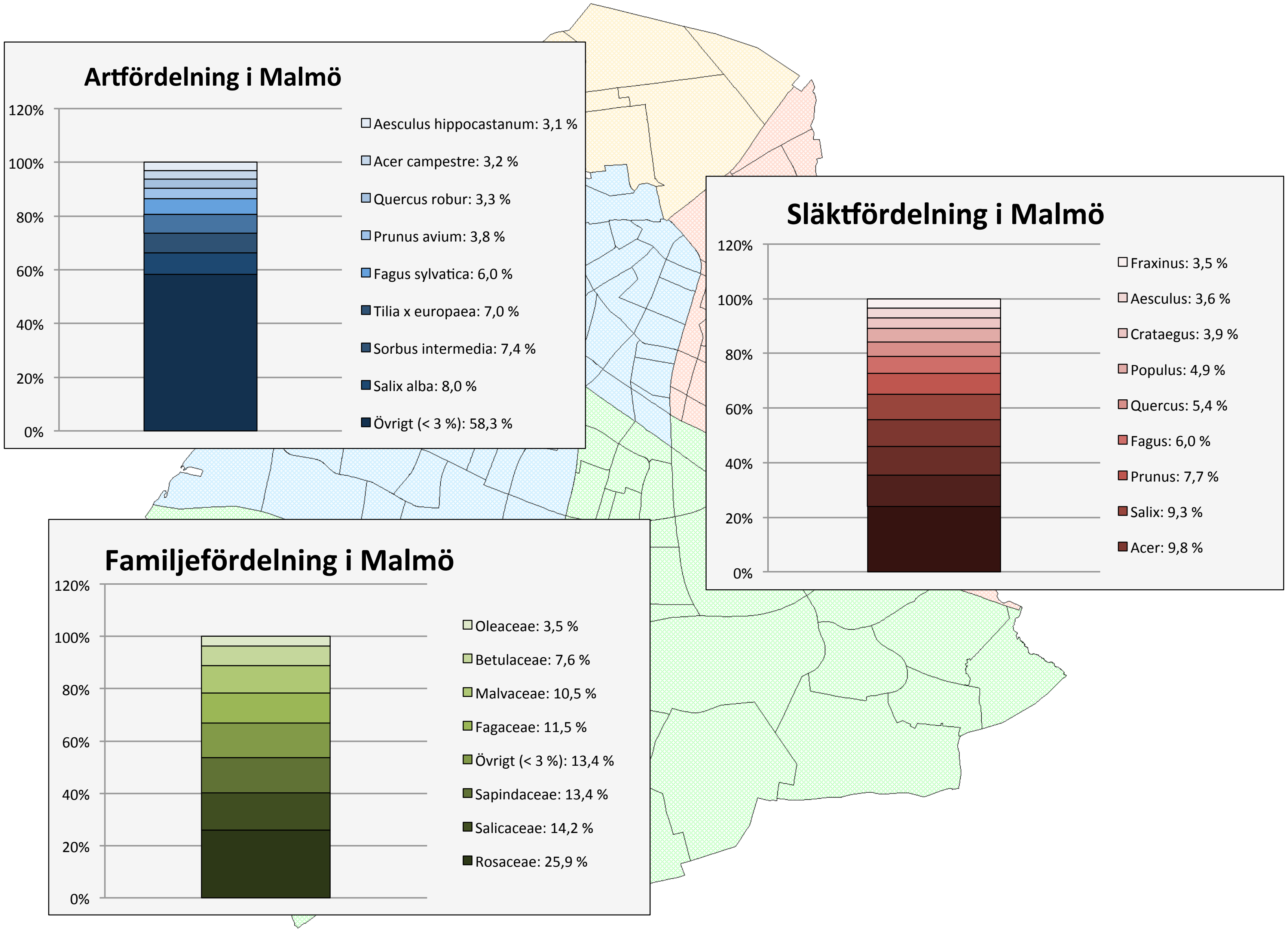
74
110
Street
Park
Arhus
Copenhagen
Espoo
Gothenburg
Helsinki
Malmo
Oslo
Stockholm
Tampere
Turku
Stad och växtplats


10-20-30


Artfördelning i Malmö
120%
100%
80%
60%
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Aesculus hippocastanum: 3,1 %
Acer campestre: 3,2 %
Quercus robur: 3,3 %
Prunus avium: 3,8 %
Fagus sylvatica: 6,0 %
Tilia x europaea: 7,0 %
Sorbus intermedia: 7,4 %
Salix alba: 8,0 %
Övrigt (< 3 %): 58,3 %
Släktfördelning i Malmö
120%
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Fraxinus: 3,5 %
Aesculus: 3,6 %
Crataegus: 3,9 %
Populus: 4,9 %
Quercus: 5,4 %
Fagus: 6,0 %
Prunus: 7,7 %
Salix: 9,3 %
Acer: 9,8 %
Familjefördelning i Malmö
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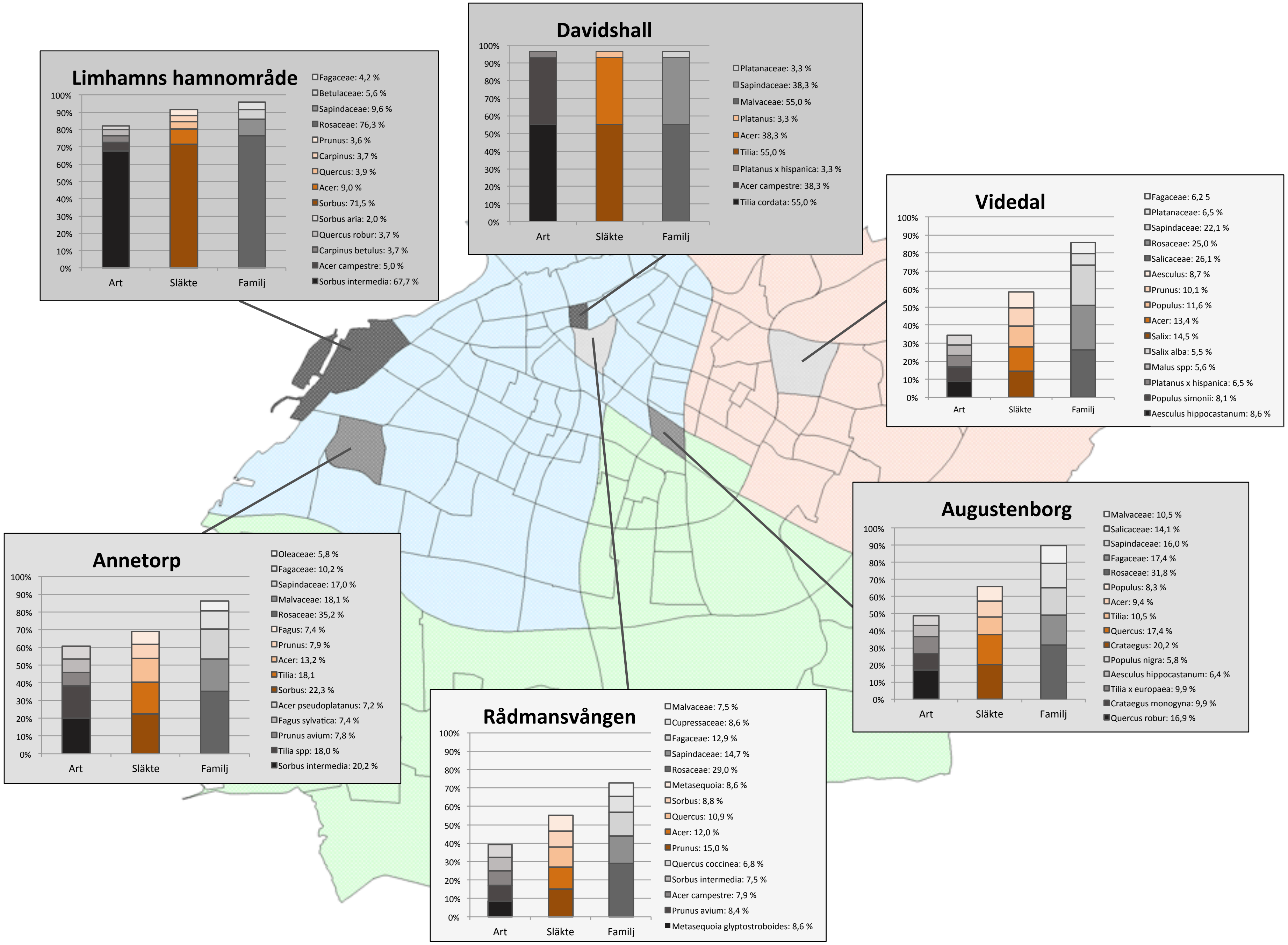
Oleaceae: 3,5 %
Betulaceae: 7,6 %
Malvaceae: 10,5 %
Fagaceae: 11,5 %
Övrigt (< 3 %): 13,4 %
Sapindaceae: 13,4 %
Salicaceae: 14,2 %
Rosaceae: 25,9 %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Sapindaceae: 9,6 %
Rosaceae: 76,3 %
Prunus: 3,6 %
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Quercus: 3,9 %
Acer: 9,0 %
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Quercus robur: 3,7 %
Carpinus betulus: 3,7 %
Acer campestre: 5,0 %
Sorbus intermedia: 67,7 %
Davidshall
Platanaceae: 3,3 %
Sapindaceae: 38,3 %
Malvaceae: 55,0 %
Platanus: 3,3 %
Acer: 38,3 %
Tilia: 55,0 %
Platanus x hispanica: 3,3 %
Acer campestre: 38,3 %
Tilia cordata: 55,0 %
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Malus spp: 5,6 %
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Malvaceae: 10,5 %
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Acer: 9,4 %
Tilia: 10,5 %
Quercus: 17,4 %
Crataegus: 20,2 %
Populus nigra: 5,8 %
Aesculus hippocastanum: 6,4 %
Tilia x europaea: 9,9 %
Crataegus monogyna: 9,9 %
Quercus robur: 16,9 %
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Oleaceae: 5,8 %
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Sapindaceae: 17,0 %
Malvaceae: 18,1 %
Rosaceae: 35,2 %
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Prunus: 7,9 %
Acer: 13,2 %
Tilia: 18,1
Sorbus: 22,3 %
Acer pseudoplatanus: 7,2 %
Fagus sylvatica: 7,4 %
Prunus avium: 7,8 %
Tilia spp: 18,0 %
Sorbus intermedia: 20,2 %
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Malvaceae: 7,5 %
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Fagaceae: 12,9 %
Sapindaceae: 14,7 %
Rosaceae: 29,0 %
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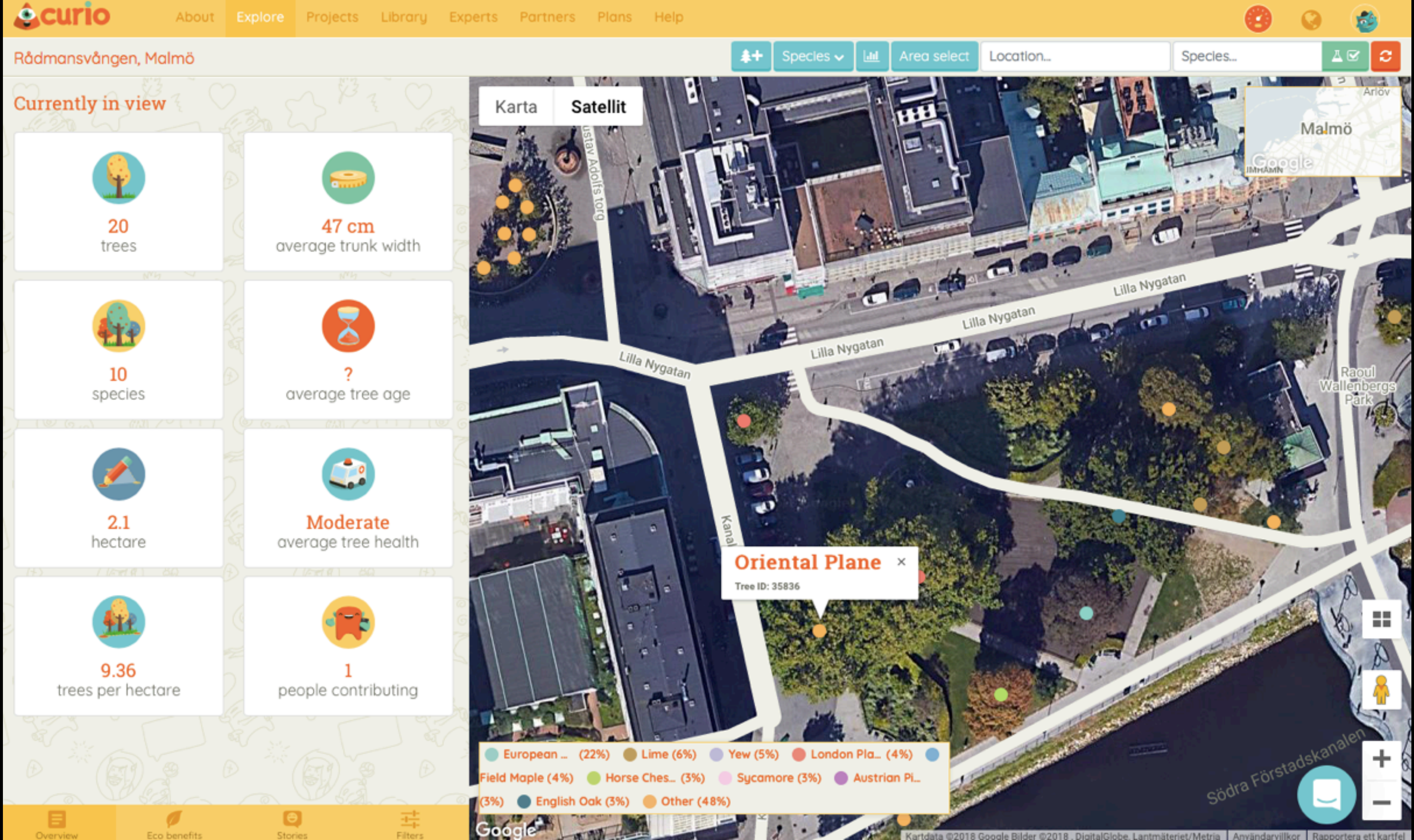
Sorbus: 8,8 %
Quercus: 10,9 %
Acer: 12,0 %
Prunus: 15,0 %
Quercus coccinea: 6,8 %
Sorbus intermedia: 7,5 %
Acer campestre: 7,9 %
Prunus avium: 8,4 %
Metasequoia glyptostroboides: 8,6 %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Species
Area select
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Species...
Currently in view
20
trees
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average trunk width
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people contributing
Overview
Eco benefits
Stories
Filters
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Malmö
Lilla Nygatan
Raoul Wallenbergs Park
Oriental Plane
Tree ID: 35836
European ... (22%)
Lime (6%)
Yew (5%)
London Pla... (4%)
Field Maple (4%)
Horse Ches... (3%)
Sycamore (3%)
Austrian Pi... (3%)
English Oak (3%)
Other (48%)
Södra Förstadskanalen
Google

Foto: Johan Slagstedt

Foto: Anderas Lingvall


Foto: Johan Slagstedt

Journal of Arboriculture 25(1): January 1999

FLOOD-TOLERANCE RANKING OF RED AND FREEMAN MAPLE CULTIVARS

by Louis B. Anella[1] and Thomas H. Whitlow[2]

Abstract. Red maple (Acer rubrum) is often recommended for use in wet soils, yet its extensive native range suggests there may be genetic variation for traits associated with flood tolerance. Likewise, genetic variation for flood tolerance may be captured within red maple cultivars making some more appropriate than others for use in wet or low oxygen soils. Seven red maple cultivars (2-year-old trees)—'Autumn Flame'®, 'Bowhall', 'Karpick', 'Northwood', 'October Glory'®, Red Sunset®, and 'Schlesinger—and 4 Freeman maple (A. ∞ freemanii) cultivars—'Armstrong', 'Autumn Blaze', 'Morgan', and Scarlet Sentinel™, were ranked for flood tolerance by flooding the trees and characterizing photosynthesis, lenticel intumescence, and survival. Indicator trees representing the wet extreme of red maple's native range were also included for comparison. Net photosynthesis declined for all cultivars; however, 'Schlesinger', Red Sunset and 'Bowhall' had the highest net photosynthetic rates (ranging from 1.94 to 1.71 μmol/m^{2}s) after 45 days of flooding. In contrast, 'Karpick', 'Autumn Flame', and 'Northwood' had net photosynthetic rates near 0. The extent of lenticel intumescence also varied among the cultivars with 'Schlesinger' and 'Bowhall' producing the longest lenticels. All of the 'Northwood' trees died, as did two-thirds of the 'Autumn Flame' trees. The cultivars were separated into 3 overall flood-tolerance rankings: high ('Schlesinger', Red Sunset, and 'Bowhall'), intermediate ('Armstrong', 'Morgan', 'October Glory', Scarlet Sentinel, and 'Autumn Blaze'), and low ('Karpick', 'Autumn Flame', and 'Northwood').

Key Words. Genetic variation; lenticel intumescence; photosynthesis; red maple (Acer rubrum L.); Freeman maple (A. ∞ freemanii E. Murray).

Red maple has perhaps the greatest geographic range of any tree in eastern North America (Walters and Yawney 1990) but even more impressive is its ability to thrive at the extremes of soil moisture availability. Despite its prevalence on wet and dry sites, red maple is often characterized as a flood-tolerant species suitable for planting in moist soils (Dirr 1990; van Gelderen et al. 1994) and it is one of the most commonly planted landscape trees (Kielbaso 1990) with 48 recognized cultivars (Santamour and McArdle 1982).

The broad geographic and edaphic range of red maple suggests that either the species is able to acclimate to many different environmental conditions or it possesses a high degree of genetic variation. Using seedlings from throughout red maple's geographic range, Townsend (1983) reported variation for growth rate, fall color, cold hardiness, drought tolerance, ozone exposure, deicing salts, and Verticillium wilt. In contrast, Abrams and Kubiske (1990) compared the drought tolerance of red maple seedlings from wet and dry sites and suggested that genotypic variation accounted for only part of red maple's broad range and that plasticity played an important role. Testing red maple seedlings for flood tolerance, Will et al. (1995) reported no interaction between flooding treatment and maternal hydrologic conditions, while Anella (1994) reported that 1-year-old flooded wet-site seedlings maintained higher photosynthetic rates, produced larger hypertrophied lenticels, had more adventitious roots, and suffered less mortality than flooded dry-site seedlings.

Recognizing that red maple is recommended for planting in wet soils, we wondered if all red maple cultivars are flood tolerant or if some cultivars are better suited for wet soil than others. Has some of the purported genetic variation for flood tolerance been captured within the cultivars? Cultivar evaluation for abiotic stress tolerance is not common but could prove valuable for species with a high degree of genetic variation (Townsend 1983). We do not know of any studies that rank red maple cultivars for flood tolerance; however, studies evaluating ozone tolerance (Findley et al. 1996) and high root temperature tolerance (Wilkins et al. 1995) have been conducted. The later study concluded that there was enough genetic variation among red maple cultivars to recommend some over others for use in soils with elevated temperatures.

Flood-tolerant species have been recommended for use in urban settings because of their ability to produce new, shallow root systems—an adaptation that may aid root growth in compacted urban soils

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Urban forest resilience through tree selection—Variation in drought tolerance in *Acer*

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ABSTRACT

It is widely recognized that trees contribute a range of ecosystem services in urban environments. However, the magnitude of their contribution is closely related to their physiological condition and capacity to persist within our towns and cities. Root loss during transplanting, limited soil volume, disruption to soil hydrological processes and impermeable surfaces result in water deficits being major physiological stress limiting the performance of urban trees. The leaf water potential at turgor loss (Ψ_{P0}) provides a robust measure of drought tolerance since a more negative Ψ_{P0} allows the leaf to maintain physiological function over a wider range of leaf water potentials and, by implication, soil matric potentials (Ψ_{soil}). In this study, Ψ_{P0} was calculated for 27 maple (*Acer*) genotypes based on a known linear relationship between the osmotic potential at full turgor ($\Psi_{\pi100}$) and Ψ_{P0}. In spring, Ψ_{P0} varied between −1.4 MPa in *Acer carpinifolium* and −2.7 in both *Acer rubrum* 'Northwood' and *Acer x freemanii* 'Autumn Blaze'. During summer, *Acer spicatum* had the highest Ψ_{P0} at −1.6 MPa and *Acer monspessulanum* had the lowest Ψ_{P0} at −4.3 MPa. Significant differences in Ψ_{P0} were found between cultivars of *A. rubrum* and *Acer saccharum*. A highly significant relationship was found between seasonal osmotic adjustment and summer Ψ_{P0} suggesting that osmotic adjustment is a driving force for summer Ψ_{P0} in *Acer* leaves. These data confirm the wide range of tolerance to water deficits in *Acer* and give important insight into the potential of species to tolerate periods of low water availability by providing quantitative data not previously available. The technique shows great promise as a screening tool for the drought tolerance of new and traditional plant material. This data will be highly relevant for those selecting trees for urban sites as well as for nurseries seeking to evaluate genotypes for production purposes.

1. Introduction

Trees are major components of the green infrastructure in urban environments and their contribution to a range of ecosystem services is widely recognized. These services include mitigation of flood risk, reduced energy use in buildings, increased thermal comfort, mitigation of the urban heat island effect, recreational values, and the enhancement of cultural and aesthetic qualities, etc. (in e.g. Akbari et al., 2001; Xiao and McPherson, 2002; Grahn and Stigsdotter, 2003; Gill et al., 2007; Tyrväinen et al., 2005; Tzoulas et al., 2007).

Since the provision of these services is reliant on healthy trees, assessments of projected ecosystem services frequently assume large, mature trees with good growth rates (Gómez-Muñoz et al., 2010). This assumption is misguided as many urban sites do not provide a high quality growth environment. Variation in the rooting environment of *Pyrus calleryana* Decne. trees lead to an approximately 80% reduction in evapotranspirational cooling as a result of suppressed stomatal conductance (Rahman et al., 2011). Tree height and girth (DBH at 1.3 m) of *Quercus robur* L. showed marked variation across urban sites with different levels of soil aeration (Weltecke and Gaertig, 2012) suggesting carbon sequestration is reduced where soil gas diffusivity is reduced. These data provide evidence that the magnitude of at least some ecosystem services provided by trees will be closely related to their physiological performance and condition.

Water deficits in trees develop when root uptake of water does not meet the evapotranspirational demand from the crown. In

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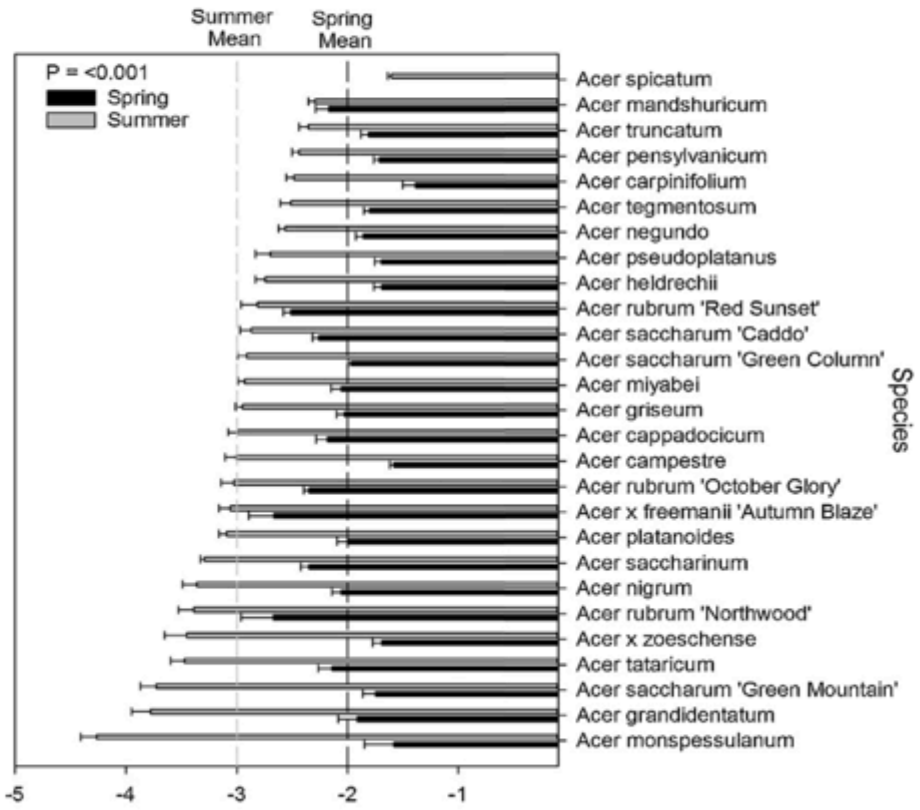
E-mail addresses: henrik.sjoman@slu.se (H. Sjöman), ahirons@myerscough.ac.uk (A.D. Hirons), nlb2@cornell.edu (N.L. Bassuk).

http://dx.doi.org/10.1016/j.ufug.2015.08.004



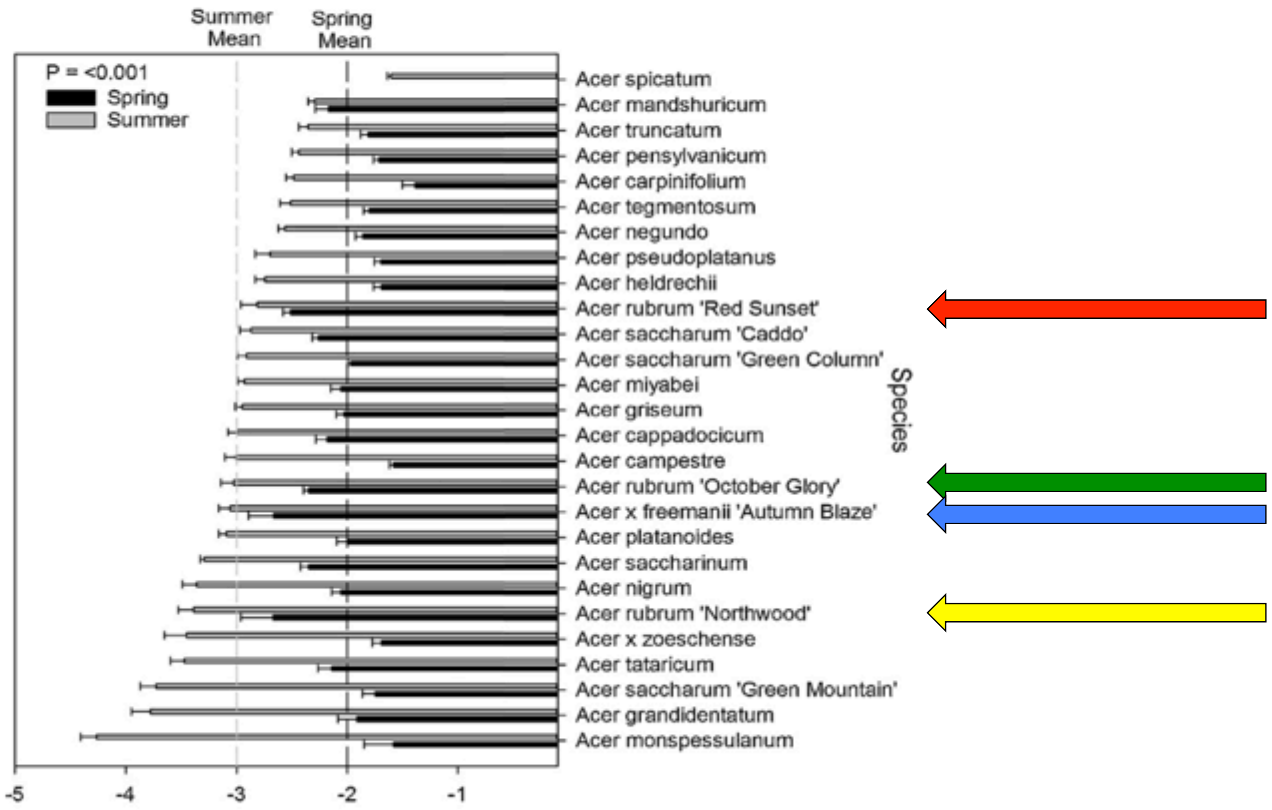
Overall ranking	Cultivar	Weighted average	Day 45, A ($\mu mol/m^2s$)	Lenticel rating	Survival (%)
	James River		1.77	0.75	100
High	Schlesinger	.68 H	1.94 H	0.58 H	100
	Red Sunset	.62 H	1.76 H	0.42 I	100
	'Bowhall'	.59 H	1.71 H	0.67 H	67
Intermediate	'Armstrong'*	.49 I	1.09 I	0.42 I	100
	'Morgan'*	.46 I	1.45 I	0.25 L	67
	'October Glory'	.38 I	0.94 I	0.33 I	67
	Scarlet Sentinel*	.37 I	0.66 I	0.25 L	100
	'Autumn Blaze'*	.33 I	0.43 I	0.25 L	100
Low	'Karpick'	.21 L	0.21 L	0.17 L	67
	'Autumn Flame'	.20 L	0.02 L	0.33 I	33
	'Northwood'	.07 L	0.00 L	0.25 I	0

*A. ∞ freemanii.

H = High flood tolerance; significantly greater than I or L at P = 0.05 using Hsu's multiple comparison test "smallest is best."

I = Intermediate flood tolerance; those means that were not identified as the best using "largest is best" or "smallest is best" tests.

L = Low flood tolerance; significantly less than H or I at P = 0.10 using Hsu's multiple comparison test "largest is best."



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	James River		1.77	0.75	100
High	Schlesinger	.68 H	1.94 H	0.58 H	100
	Red Sunset	[illegible]	[illegible]76 H	0.42 I	100
	'Bowhall'	.59 H	1.71 H	0.67 H	67
Intermediate	'Armstrong'*	.49 I	1.09 I	0.42 I	100
	'Morgan'*	.46 I	1.45 I	0.25 L	67
	'October Glory'	[illegible]	[illegible]94 I	0.33 I	67
	Scarlet Sentinel*	.37 I	0.66 I	0.25 L	100
	'Autumn Blaze'*	[illegible]	[illegible]43 I	0.25 L	100
Low	'Karpick'	.21 L	0.21 L	0.17 L	67
	'Autumn Flame'	.20 L	0.02 L	0.33 I	33
	'Northwood'	[illegible]	[illegible]00 L	0.25 I	0

*A. ∞ freemanii.
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Foto: Anderas Lingvall

Tilia tomentosa –
silverlind

Corylus colurna – turkisk trädhassel


Prunus ’Accolade’ högstam (4x kl) 18-20

Prunus x *yedoensis* högstam (4x kl)20-25

Salix caprea - sälg

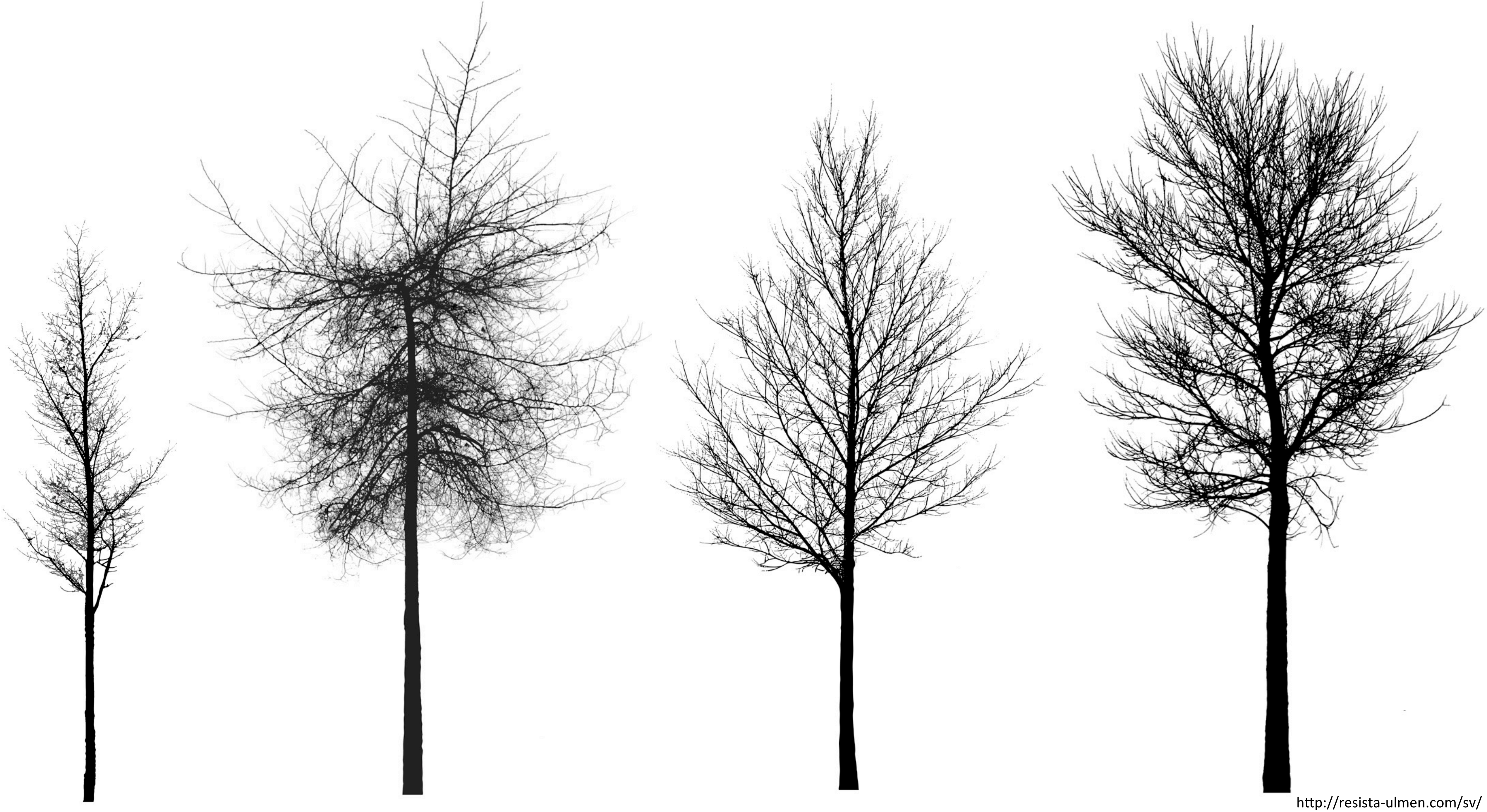
Prunus spinosa – slån

Tilia tomentosa –
silverlind

Koelreuteria paniculata -
kineträd

Heptacodium minocnioides - jasmintry

Diervilla lonicera – getris



http://resista-ulmen.com/sv/

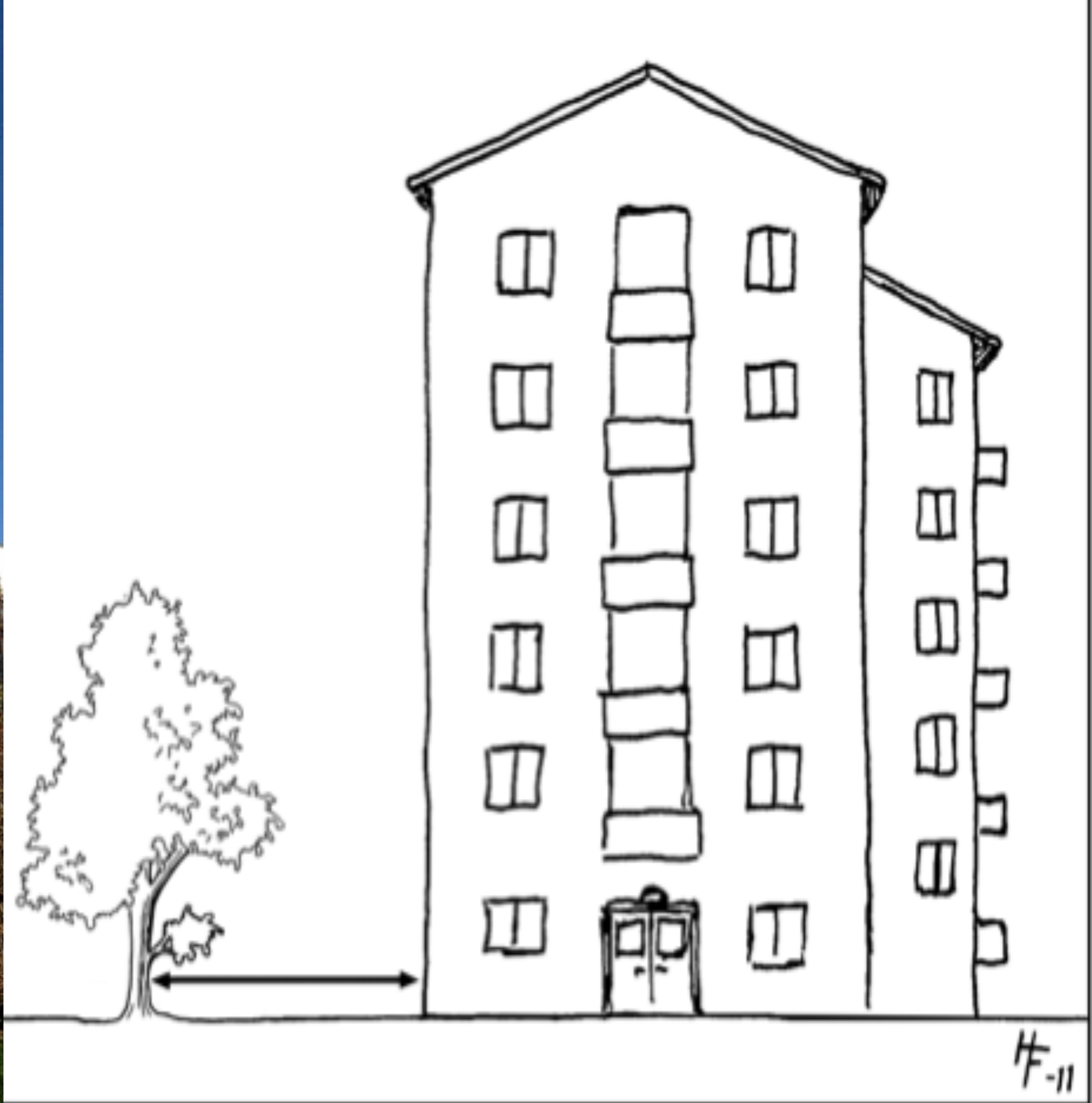
Picea omorika

By Stolz Gary M, U.S. Fish and Wildlife Service [Public domain], via Wikimedia Commons

Acacia tortilis

Carpinus betulus 'Fastigiata' - pyramidavenbok

Cedrus atlantica 'Glauca' – blå atlasceder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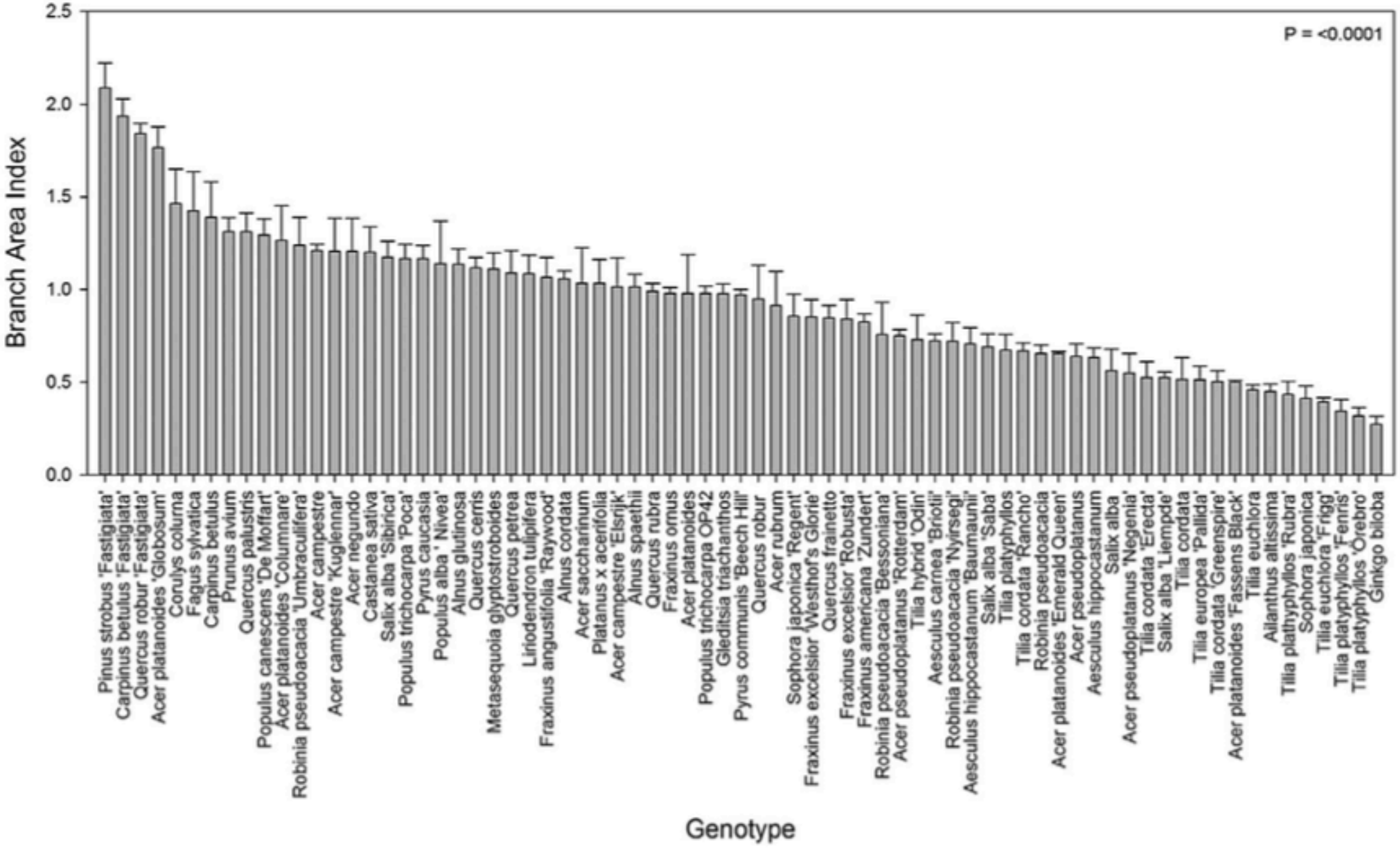
CENTRO DE

TEST!



Deak Sjöman, J. et al. (2015)
Branch Area Index of Solitary Trees: Understanding Its Signifcance in Regulating Ecosystem Services

Sveriges lantbruksuniversitet
Fakulteten för landskapsplanering, trädgårds- och jordbruksvetenskap
Landskapsutveckling

Krontätheten hos olika lövträdarter i avlövat tillstånd

– En studie av trädkronors genomsläpplighet av solljus under vintern

Crown density among various defoliated deciduous tree species
- A study of the sunlight's permeability of tree crowns during winter

Ann-Louise Dyer

Självständigt arbete/Examensarbete/Kandidatarbete 15 hp
Landskapsingenjörsprogrammet
Självständigt arbete vid LTJ-fakulteten, SLU
Alnarp 2013

Tack!

patrick.bellan@slu.se