

# A landscape architecture's insights

Material provided and presentation prepared by **Florian Paech**  
EGL - Entwicklung und Gestaltung von Landschaft GmbH

---

JUNIORPROFESSOR DR. KATHRIN BLUMENSTEIN

CHAIR OF PATHOLOGY OF TREES

MARCH 3RD, 2023



# Content of the lecture

---

1. Challenges for urban trees from the perspective of changing climate
2. Current irrigation systems for coping with the changed climatic situation (longer heat and drought periods)
3. Use of Seeds and Trees in Landscape Planning according to the Federal Nature Conservation Act

# Challenges for urban trees from the perspective of changing climate

---

Name challenges you know



Quelle: [www.Baumpflegeportal.de](http://www.Baumpflegeportal.de)

# Challenges for urban trees from the perspective of changing climate

---

Increase in annual average temperature, lower precipitation on average throughout the year, shifting of cold spells within the seasons.

- More frequent precipitation during winter months, spring dryness, heat and drought stress in summer.
- Increase in extreme weather events such as strong winds and precipitation.
- Longer heat and drought periods in summer months.



Quelle: [www.Baumpflegeportal.de](http://www.Baumpflegeportal.de)

# Challenges for urban trees from the perspective of changing climate

---

## **CONSEQUENCES FOR TREES AND WOODY PLANTS**

# Challenges for urban trees from the perspective of changing climate

---

## CONSEQUENCES FOR TREES AND WOODY PLANTS

- Longer vegetation period, earlier leaf emergence (damage to leaf development in spring due to late frost)
- Shift of the optimal location (region) of tree species
- Increase in susceptibility of previously used tree species to pests and diseases.

# Challenges for urban trees from the perspective of changing climate

---

## CONSEQUENCES FOR TREES AND WOODY PLANTS

- Longer vegetation period, earlier leaf emergence (damage to leaf development in spring due to late frost)
- Shift of the optimal location (region) of tree species
- Increase in susceptibility of previously used tree species to pests and diseases.

## CHANGED REQUIREMENTS FOR TREES IN THE FUTURE

# Challenges for urban trees from the perspective of changing climate

---

## CONSEQUENCES FOR TREES AND WOODY PLANTS

- Longer vegetation period, earlier leaf emergence (damage to leaf development in spring due to late frost)
- Shift of the optimal location (region) of tree species
- Increase in susceptibility of previously used tree species to pests and diseases.

## CHANGED REQUIREMENTS FOR TREES IN THE FUTURE

- High tolerance to climate change and increased weather extremes such as drought periods
- Resistance to increasingly occurring pests and diseases
- Higher tolerance to extreme site conditions in urban areas (emissions, winter maintenance...) compared to natural locations.

# Challenges for urban trees from the perspective of changing climate

---

## **Changed requirements for maintenance in tree nurseries and planting**

- Optimized planting and young tree care
- Improved planting location (larger planting hole, use of soil improvement materials, water-retaining granules...)
- No planting on the roadside bank
- Pruning to relief the crown → timely and professional crown development, adequate irrigation as needed

# Challenges for urban trees from the perspective of changing climate

## Strategy for the appropriate use of specific tree species in street and urban areas

GALK (Gartenamtsleiterkonferenz = Conference of Garden Department Directors) conducts long-term street monitoring tests in various regions

Involvement of several large cities from different regions of Germany/Europe:

Berlin, Dresden, Frankfurt, Hamburg, Heilbronn, Cologne, Munich, Münster, Nuremberg, Osnabrück, Rostock, Stuttgart, Basel, and Vienna.

- Since 1995, an initiative initiated by the working group on urban trees and GALK for monitoring of street trees used.
- Regular evaluation of the collected data at various locations (soil conditions, growth/habit, crown density, flowering, pest and disease infestation).

<b>Pyrus regelii</b>	<b>Robinia pseudoacacia 'Sandraudiga'</b>
	
<i>Hannover 2004</i>	<i>München 2004</i>
Verzweigung, Krone eiförmig bis rundlich, Blütenbaum, teilweise Fruchtbildung; gebietsweise Birnengitterrost, feuerbrandgefährdet.	Großer Baum mit lockerer unregelmäßiger Krone, in der Jugend raschwüchsig, geradschäftig, rosa Blüten.
<b>Bewertung 2000:</b> Die Einstufung reicht allenfalls als bedingt geeignet.	<b>Bewertung 2000:</b> Die Beurteilung lautet geeignet, der Baum ist keinesfalls schlechter als die anderen Robinienarten.
<b>Bewertung 2005:</b> bedingt geeignet	<b>Bewertung 2005:</b> geeignet
<b>Bewertung 2015:</b> Ei- bis kugelförmige Krone. Äste aufrecht wachsend. Starke Vergreisungserscheinungen, teils massive Ausfälle, Fruchtbehang. Schlechte Gesamtentwicklung.	<b>Bewertung 2015:</b> Kegel- bis eiförmige, dichte Krone. Äste überhängend. Trockenschäden, dadurch erhöhter Schnittaufwand. Starke Blüte, Fruchtbehang. Gute bis sehr gute Gesamtentwicklung.
Nicht geeignet	Gut geeignet

Quelle: [www.galk.de](http://www.galk.de)

# Challenges for urban trees from the perspective of changing climate

## Strategy for the appropriate use of specific tree species in street areas

A regularly updated list of usable street trees is created from the results and made available (GALK street tree list).

Fact sheets on individual tree species with location-specific data sets help prioritize the appropriate use of certain species in certain regions.



GALK Straßenbaumliste, Abfrage vom 25.02.2023  
Arbeitskreis Stadtbäume



Botanischer und deutscher Name	Wuchshöhe in m	Breite in m	Lichtdurchlässigkeit	Lichtbedarf	Verwendbarkeit	Bemerkungen
Acer buergerianum syn. A. trifidum, Dreizahn-Ahorn, Dreispitz-Ahorn	8-10 (15)	4-6	mittel	○ — ●	noch im Test	kompakte, rundliche Krone, locker verzweigte Äste, auf geschützten Standorten ausreichend frosthart, gebietsweise frostempfindlich, für enge Straßenbereiche geeignet, im <b>Straßenbaumtest 2</b> seit 2007/08
Acer campestre, Feldahorn, Maßholder	10-15 (20)	10-15	mittel	○ — ●	geeignet mit E.	eiförmige, unregelmäßige, im Alter mehr rundliche Krone, verträgt trockene Böden und hohen Versiegelungsgrad, guter Bodenbefestiger für Ufer bzw. Hanglagen, Bienenweide
Acer campestre 'Elsrijk', Feldahorn	6-12 (15)	4-6	mittel	○ — ●	geeignet	wie die Art, jedoch gerader durchgehender Stamm, im Wuchs schmaler und gleichmäßiger, gebietsweise Frostschäden in der Krone, mehltaufrei, Bienenweide
Acer campestre 'Huibers Elegant' syn. A. campestre 'Elegant', Feldahorn	6-10	3-5	mittel	○ — ●	noch im Test	sehr regelmäßiger, aufrechter Wuchs, gilt als mehltaufrei, Bienenweide, im <b>Straßenbaumtest 2</b> seit 2007/08

# Current irrigation systems for coping with the changed climatic situation (longer heat and drought periods)

---

- The irrigation of trees, especially after initial planting and during the first years of growth, has become significantly more difficult.

# Current irrigation systems for coping with the changed climatic situation (longer heat and drought periods)

---

- The irrigation of trees, especially after initial planting and during the first years of growth, has become significantly more difficult.
- Spring planting of woody plants is becoming less common.
- Initial plantings are often moved to autumn (longer wet period).
- Difficulties arising from changing climatic conditions and urban locations:
  - High surface sealing
  - Low soil infiltration capacity
  - Strong surface runoff
  - Low water storage function of the soil

# Current irrigation systems for coping with the changed climatic situation (longer heat and drought periods)

---

- The irrigation of trees, especially after initial planting and during the first years of growth, has become significantly more difficult.
  - Spring planting of woody plants is becoming less common.
  - Initial plantings are often moved to autumn (longer wet period).
  - Difficulties arising from changing climatic conditions and urban locations:
    - High surface sealing
    - Low soil infiltration capacity
    - Strong surface runoff
    - Low water storage function of the soil
- Various solutions (technical) are being sought and tested to ensure successful growth, especially in urban areas.

# Current irrigation systems for coping with the changed climatic situation (longer heat and drought periods)

---

## Tree watering bags

Which advantages can you think of?



Quelle: [www.blick.de](http://www.blick.de)

# Current irrigation systems for coping with the changed climatic situation (longer heat and drought periods)

---

## Tree watering bags

- Constant watering
- Low evaporation rates
- No marginal infiltration without effect for the tree
- Possibility of targeted addition of substrates.



Quelle: [www.blick.de](http://www.blick.de)

# Current irrigation systems for coping with the changed climatic situation (longer heat and drought periods)

---

## Tree watering ring

- constant irrigation (drip)
- low / no evaporation rates
- no peripheral seepage without effect on the tree

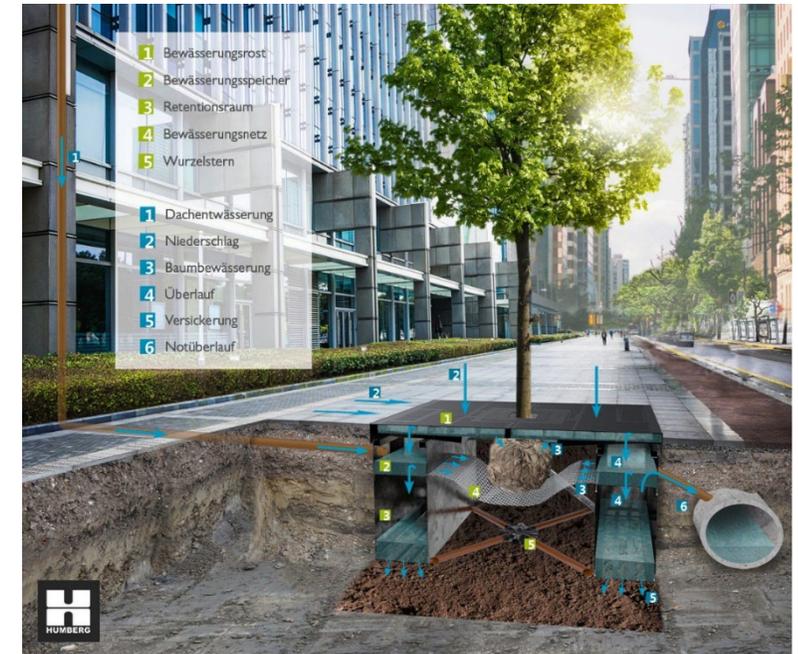


Quelle: [www.greenleafe.de](http://www.greenleafe.de)

# Current irrigation systems for coping with the changed climatic situation (longer heat and drought periods)

## Underground rainwater storage system

- Constant irrigation even in extreme/highly compacted urban areas.
- Ensuring irrigation during prolonged periods of low precipitation through irrigation storage.
- Collecting rainwater before it enters the sewer system during heavy rain events.



Quelle: [www.muensterland.com](http://www.muensterland.com)

# Use of Seeds and Trees in Landscape Planning according to the Federal Nature Conservation Act

---

**The basis for regulating the use of seeds and trees is §40 BNatSchG "Application of plants and animals" (since 01.03.2020)**

This regulates:

- The use of seeds and planting of trees depending on their origin/occurrence area
- Approval requirement for the dissemination of seeds and planting of trees which have never or have not occurred in the areas for at least 100 years
- Plantings in agriculture and forestry are exempt from this regulation
- As a transitional regulation, seeds from adjacent origin areas were also allowed due to low availability.



Quelle: [www.oekolandbau.de](http://www.oekolandbau.de)

# Use of Seeds and Trees in Landscape Planning according to the Federal Nature Conservation Act

## Allocation of origin regions/ production areas

- Germany is divided into 22 origin areas and 8 associated production areas.
- The division of origin areas was carried out as part of a DBU project in 2010.
- Production areas can be adjacent regions in addition to origin areas.
- The division is based on areas where plants showed only minor genetic differences.



Quelle: [www.natur-im-vww.de](http://www.natur-im-vww.de)

# Use of Seeds and Trees in Landscape Planning according to the Federal Nature Conservation Act

## Division of origin areas/production regions

Production and propagation are usually carried out near the collection sites

- with the same climatic conditions as in the areas of origin
- short distances in the production chain.



# Use of Seeds and Trees in Landscape Planning according to the Federal Nature Conservation Act

---

## **Difficulties in practical implementation**

Extensive and time-consuming certification process for the producers of local seeds.

- The amount of required seed cannot be guaranteed yet by producers in all origin regions. Therefore, there is often still a need to resort to adjacent origin regions.
- low availability of regional seed → shortages and higher prices for seeds from smaller origin areas (as a result of orders for large-scale projects in these areas)
- Due to the coordination process, longer waiting/approval times must be planned.
- Occasionally, executing firms use already stored seed material. (Affected areas may need to be reworked frequently.)