Phragmites australis - a cosmopolitan invasive species

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Common reed – a cosmopolitan species





Source: Clevering & Lissner 2000)



Common reed (*Phragmites australis*)







Reduced soil conditions







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Salt tolerant



Can tolerate - and contribute to the treatment of - highly polluted water



Dispersal by seeds





Rapid spreading by rhizomes





Spreading by shoots











Runners







1980'ties: Reed Die Back in Europe







1994-1998: EUREED-project

Partners:

- > Sweden
- > Denmark
- > Germany
- > UK
- > The Netherlands
- > Czech Republic
- > Hungary
- > Romania

Live collection of >250 clones

Phragmites australis (4x, 6x, 8x, 10x, 12x) Phragmites mauritianus Phragmites karka Phragmites japonicus Phragmites frutescence

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Common garden experiments in DK, NL and CZ





Plant morphology





High phenotypic plasticity in photosynthesis



Photosynthetic plasticity <u>within</u> genotypes is larger than the genotypic variation



Lessmann et al. (2001): Aquatic Botany 69, 109–126



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Distribution of Phragmites haplotypes in North America.



Saltonstall K PNAS 2002;99:2445-2449









The Mississippi River Delta













Photosynthesis and internal gas-transport





Photosynthesis











Internal gas-transport

Pressurized convective throughflow system

Important for aeration of roots







Internal gas-transport

Shoot Pressure





Stubble Pressure 100 80 Pascal 60 Air, O₂ 40 Pres-20 sure 0 Flow-DELTA EU LAND meter Stubble Flow 15 ml/min 10 5 0 DELTA EU LAND

Internal gas-transport

21-Feb-13





Internal gas-transport

Connected Pressure



0

DELTA

EU

LAND



Land type







Final remarks

- Phragmites although cosmopolitan has large genetic differences among populations
 - Phenology, morphology, length of growing season, time of flowering, photosynthesis, etc.
- High phenotypic plasticity within the genotypes
 - Growth, morphology, photosynthesis, pigments, nutrients, enzyme activity, etc.



Important in relation to: - The different uses of reeds? - Invasiveness and responses to global environmental change!





