ROOT SPACE CHANNEL

ADDITIONAL NUTRIENT REDUCTION IN SWIMMING-POND WATER BODYS

MICROBES

- Worldwide ubiqitous, also in extreme areas.
- Essential part as ecosystem service provider
- Often as living community BIOFILM

BIOFILM

- in Nature-/Biopool – concentrated in the filter
- on optimated surfaces
- Mit optimierter supply/disposal (breath, nutrition)
- optimal growth

BIOFILM

- also in swimming ponds ubiquitous
- on all technical surfaces (walls, foliage,…)
- on all organical surfaces (ground, plants,..)
- on all STRUCTURES

STRUCTURES

- more structures – more life on surfaces
- more life– more nutrient uptake
- more nutrients in the Biofilm, fewer in the water body
- fewer nutrients in the water body, less life visible

- clearer water

STRUKTUREN

- green parts of plants orient themselves to the light = searching for energy
- Roots quest in the ground = searching for nutrients,
- both form networks in space
- Spaces will be developed completly
- previously neglected: ROOT SPACE

ROOT SPACE

- Roots in the ground normally - unvisible
- Roots in the water body– structure for Biofilm AND
- Nutrient uptake out of water body
- Nutrients enhanced


RAUM ausgefüllt

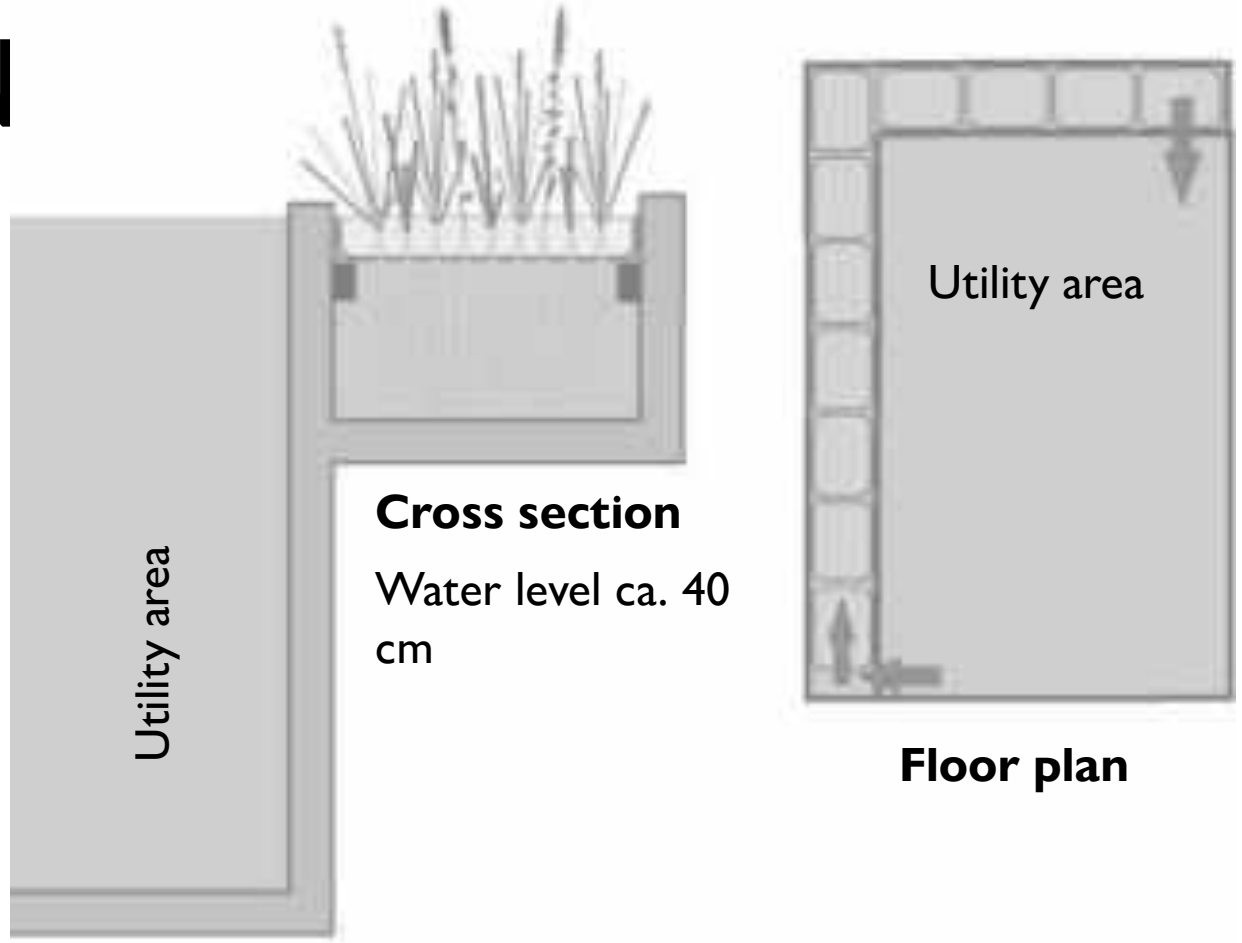
ROOT SPACE

- Water body additionally with flow:
- optimated nutrient uptake by Biofilm-growth,
- optimated nutrient uptake by plant roots

CONCLUSION

WURZELRAUM – STRÖMUNGSKANAL

Root space stream channel



ROOT SPACE CHANNEL PLANTS

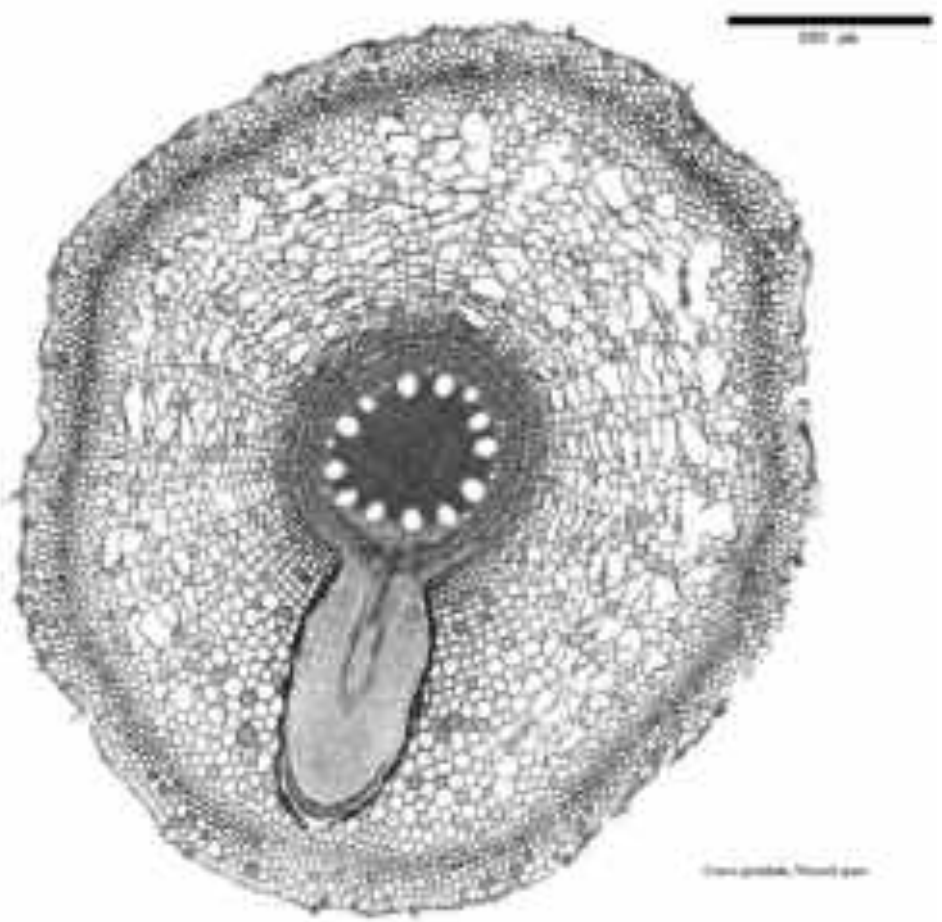
- CAREX sp.
- IRIS pseudacorus
- JUNCUS effusus
- LYTHRUM salicaria
- etc…

ROOT SPACE CHANNEL PLANTS

- IRIS pseudacorus and CAREX sp. started at beginning of march with root growth.
- CAREX paniculata, e.g is growing horst-like.
- If nutrient supply is low **(P < 35µg)** , reed bed plants will form root systems about 60 – 80 cm length.
- Already 6 – 8 weeks after planting plants have developed roots about **40 cm length**.
- It arises a **dense root“sponge“**.

ROOT SPACE CHANNEL PLANTS

CAREX root– cross section with aerenchym.
Oxigen promotes depostion of microbes.



ROOT SPACE CHANNEL OPERATION

Dogma swimming pond:

Water body motion less as possible.

practice swimming pond:

Calm moved = **mixed water body,**

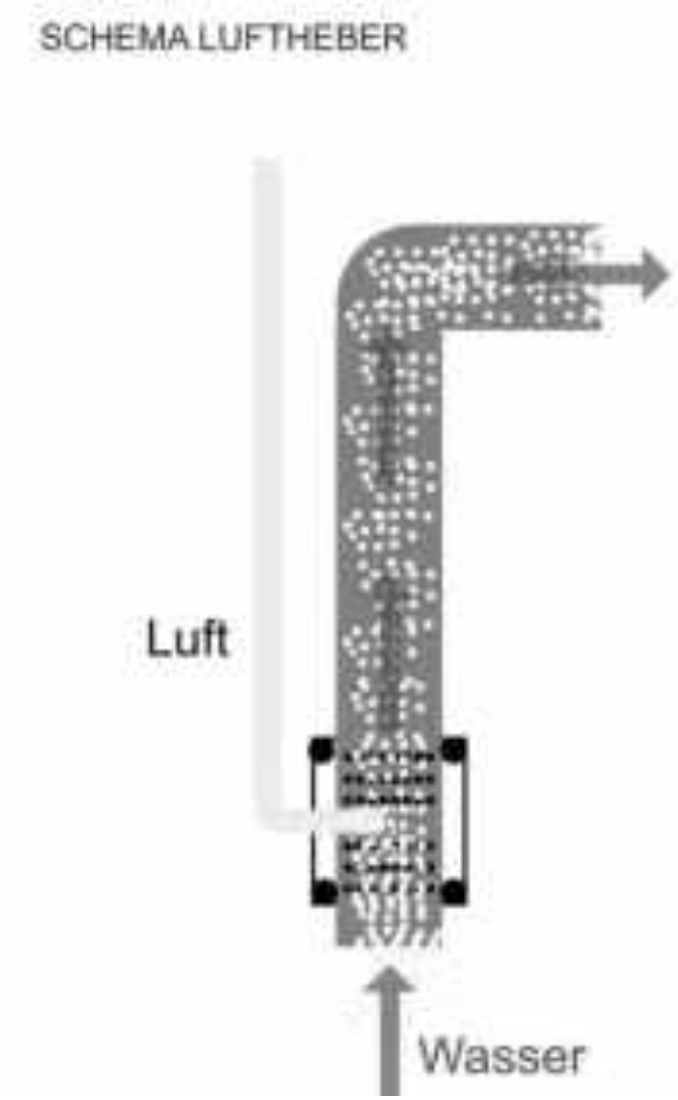
clearer water.

24h/d, every 10 min: 5 min operation, 10 min break

MAXIMAL 25% water body in 24h mixed.


Regenerationsbereich
Wurzelraumkanal
Nutzbereich

CIRCULATION with AIR JACK



AIR COMPRESSOR
49 W – 30m² H_2O


Tiefe 1,5m
Regenerationsbereich
April
Strömung
Aus Nutzbereich


Nutzbereich, Tiefe 2,1m
April


Regenerationsbereich
Juli


Nutzbereich, Tiefe 2,1m
Juli

Oktober

ROOT SPACE CHANNEL MAINTENANCE

- **Parts of plants:** cutting at october, clippings removed
- **Roots:** cutting at october, clippings removed.

ROOT SPACE CHANNEL EXPERIMENTAL PLANT

- Component **with root space channel** (2m^3 water body, 3 CC-boxes with plants).
- Component without **root space channel**(2m^3 water body, control part).
- Since 6/2025 measurement of essential water values.
- Water burdened with **nutrient supply and PÄP - burden** (Personenäquivalent Phosphor – milk/apple juice).
- Runtime study till end of 2026 – publication.


Kontrollkanal
ohne Pflanzen
Wurzelraum-
kanal

ROOT SPACE CHANNEL EXPERIMENTAL PLANT

Preliminary results:

- Runtime: **24h/d, 5l/min**

- **Phosphor** reduction in RSChannel in 1 week: **13 µg/l auf 9 µg/l**
- **Phosphor** reduction in control channel in 1 week: **13 µg/l auf 13 µg/l**

- **Ammonium** reduction in RSChannel in 1 week: **0,32 mg/l auf <0,1 µg/l**
- **Ammonium** reduction in control channel in 1 week: **0,32 mg/l auf 0,28 mg/l**

- **Nitrit** reduction in RSChannel in 1 week: **0,015 mg/l auf 0,02 mg/l**
- **Nitrit** reduction in control channel in 1 week: **0,015 mg/l auf 0,08mg/l**

Climate friendly-measures from yourself– you will see no experiencable personal success.

Species protection measures – you will see success immidiately by increasing life.

Appeal:
Let us build many, countless swimming ponds allover the world!

QUESTIONS TO ROOT SPACE CHANNEL:

Verband Österreichischer Schwimmteich- & Naturpoolbau – Bildung

Fa. NATURGARTEN – M. MIKULITSCH Landschaftsbau KG

E office@naturgarten.at E bildung@schwimmteich.co.at

T +43 664 4065384

Angelika PETSCHARNIG-KLIMBACHER

GMst Martin MIKULITSCH