



ROOT SPACE CHANNEL

ADDITIONAL NUTRIENT REDUCTION IN
SWIMMING-POND WATER BODYS

MICROBES

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

BIOFILM

- in Nature-/Biopool – concentrated in the filter
- on optimized 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 completely
- previously neglected: ROOT SPACE



ROOT SPACE

- Roots in the ground normally - invisible
- 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:

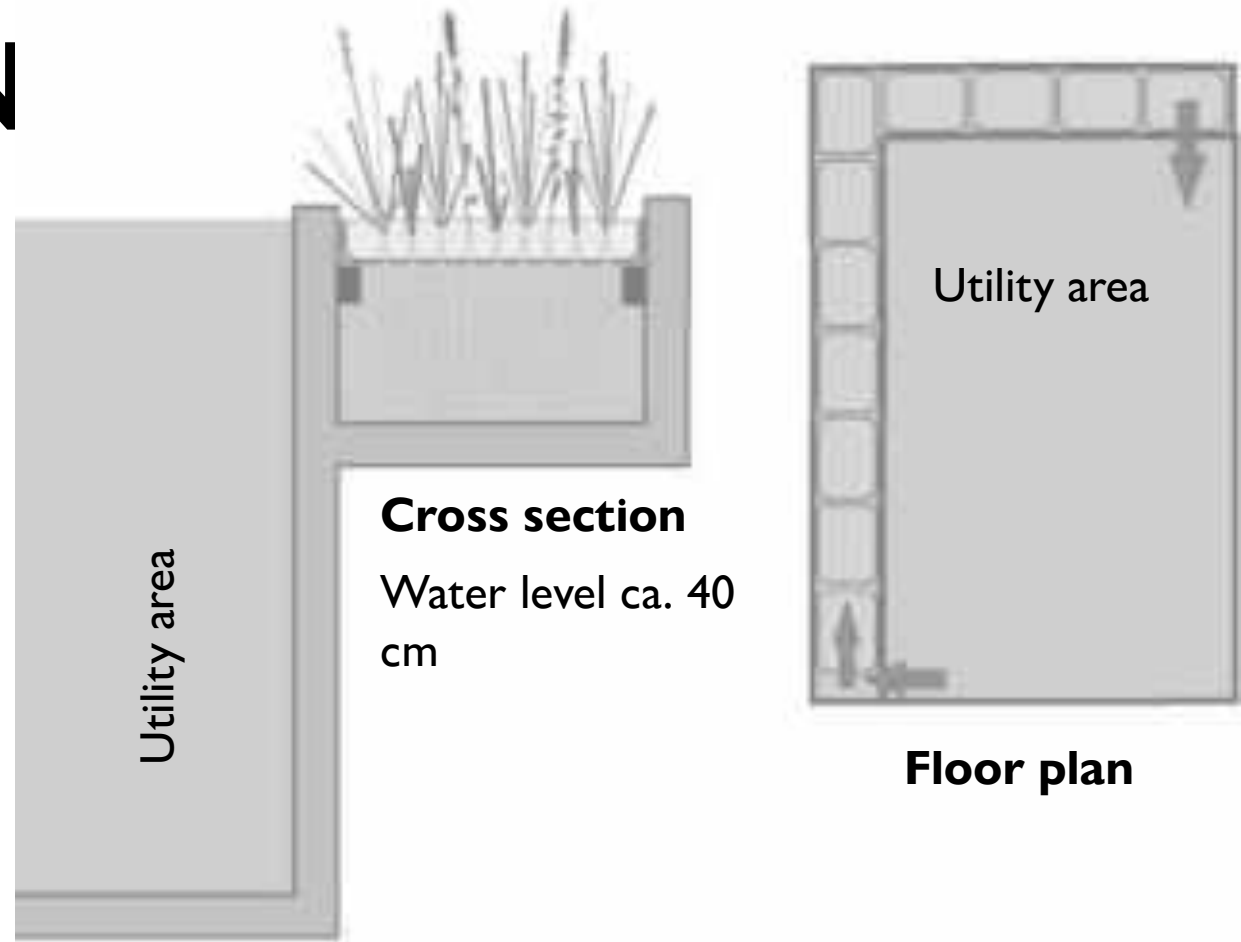
 • optimized nutrient uptake by Biofilm-growth,

 • optimized nutrient uptake by plant roots

CONCLUSION

WURZELRAUM – STRÖMUNGSKANAL

Root space stream
channel



ROOT SPACE CHANNEL PLANTS

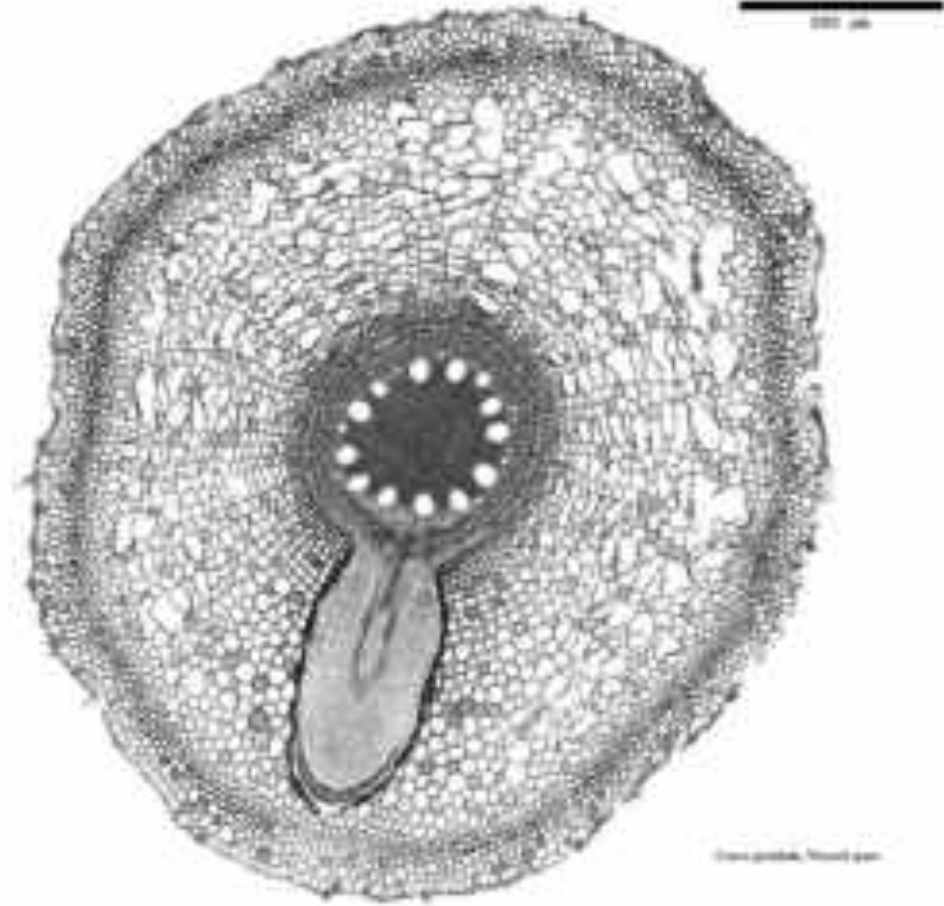
- CAREX sp.
- IRIS pseudacorus
- JUNCUS effusus
- LYTHRUM salicaria
- etc...

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 < 35 μ g**) , 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
aerenchyma.
Oxygen promotes
deposition 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

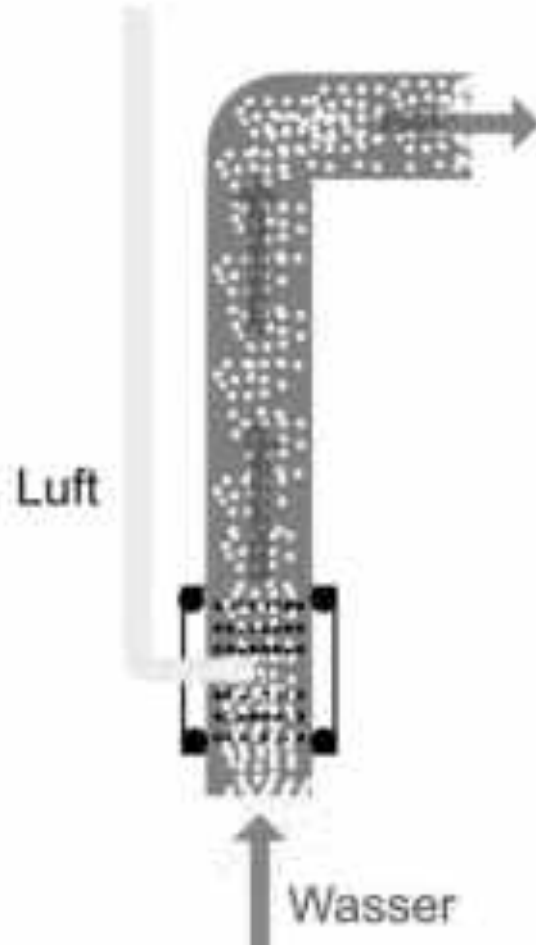
Wurzelraumkanal

Nutzbereich

CIRCULATION with AIR JACK



SCHEMA LUFTHEBER



AIR COMPRESSOR
49 W – 30m² H₂O







Tiefe 1,5m

Regenerationsbereich

April

Strömung

Aus Nutzbereich

A black and white photograph of an outdoor swimming pool. In the foreground on the left, a wooden deck with a metal handrail leads into the pool. The pool water is dark, and a diving board is visible in the background. The pool is surrounded by a concrete or stone border. The background shows some vegetation and a hillside.

Nutzbereich, Tiefe 2,1m

April

A black and white photograph of a garden area. In the foreground, there is a large, light-colored, irregularly shaped rock. The ground is covered with dense, low-growing vegetation. In the background, there are wooden borders or raised beds, some of which are filled with tall grasses or reeds. The overall scene suggests a naturalistic or wild garden style.

Regenerationsbereich

Juli

A black and white photograph of a rectangular pond. On the left, a wooden deck features a curved metal handrail. A small waterfall flows from the left side of the pond. The water surface is calm, reflecting the surrounding dense foliage and trees. A concrete or stone border runs along the right and back edges of the pond. The overall scene is a peaceful garden or park setting.

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** (2m³ water body, 3 CC-boxes with plants).
- Component without **root space channel** (2m³ 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:

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