Rates of bacterial protein production at Lake Große Fuchskuhle 2003-2020

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Data origin Data were collected by IGB from 2003-04-08 onwards (Elke Mach).

Data

Sampling site

Lake Große Fuchskuhle (Brandenburg, Germany) is a naturally acidic, residual bog lake, situated in dense pine forests south of the Lake Stechlin area (53°06‘20“N, 12°59‘05“E). The catchment area has a size of 0.25 km^2. With a size of 0.015 km^2, a mean depth of 3.5 m, a maximum depth of 5.5 m and a volume of 53 x 10^3 m^3, the lake belongs to the smaller ones of this area which were formed during the post-glacial period (Krey 1985). Lake Große Fuchskuhle is characterized by low pH and conductivity, high content of humic matter and low nutrient concentrations. There are no inflowing streams and no connection to the ground water (Ginzel and Handke 1995). Initially, the lake was subdivided into two basins (1986), and later (1990) into four experimental compartments of approximately the same size by means of large plastic curtains (Kasprzak et al. 1988; Kasprzak 1993). Because of the division, the interaction between lake and swamp is now mainly restricted to basins in the western part, causing differences in pH and the DOC pools. The water of the two basins adjacent to the bog body are brownish in color indicating input of allochthonous humic matter. In the east-basins, the pH is usually higher (Šimek et al. 1998). Two of these basins, one from the eastern part (Northeast, NE with a contiguous pine forest) and one from the western part (Southwest, SW adjacent to the peat bog), were chosen for this study. The first perch (length of 10–13 cm) were introduced in spring 1993 (Casper 1985, Hehmann et al. 2001).

Time span 2003-2020

Sampling method

Samples were taken monthly in the mixed upper layer in a mixed water sample taken in depths between 0 m and 2 m depending on epilimnion depth. From May to September fortnightly samples have sometimes been taken.

Rates of bacterial protein production (BPP) were determined by incorporation of 14[C]-leucine (14C-Leu, Simon and Azam, 1989). Triplicates and a formalin-killed control were incubated with 14C-Leu (1.15×10^{10} Bq $mmol^{-1}$, Amersham, England) at a final concentration of 50 nmol l^{-1}, which ensured saturation of uptake systems of both free and particle-associated bacteria. Incubation was performed in the dark at in situ temperature (4-25°C) for 1 h. After fixation with 2% formalin, samples were filtered onto 5.0 µm (attached) and 0.2 µm (total isotope incorporation) nitrocellulose filters (Sartorius, Germany) and extracted with ice-cold 5% trichloroacetic acid (TCA) for 5 min. Thereafter, filters were rinsed twice with ice-cold 5% TCA, once with ethanol (96% v/v), and dissolved with ethylacetate for measurement by liquid scintillation counting. Standard deviation of triplicate measurements was usually <15%. BPP of free bacteria was calculated by subtraction of attached BPP from total BPP. The amount of incorporated 14C-Leu was converted into BPP by using an intracellular isotope dilution factor of 2. A conversion factor of 0.86 was used to convert the protein produced into carbon (Simon and Azam, 1989). The protocol was modified after Allgaier et al. 2008 including the separation between free-living and particle-associated bacteria (see above).

Parameters

- `date` – date of measurement [`YYYY-MM-DD`]
- `depth` – depth of measurement [m]
- `leucine` – type of leucine that was used when processing the samples
- `light/dark` – indication whether measurements were performed at light or dark conditions
- `BPP-C_particle_hour` – particle-associated bacterial production [µg $l^{-1}h^{-1}$]
- `BPP-C_particle_day` – particle-associated bacterial production [µg $l^{-1}d^{-1}$]
- `BPP-C_water_hour` – free water bacterial production [µg $l^{-1}h^{-1}$]
- `BPP-C_water_day` – free water bacterial production [µg $l^{-1}d^{-1}$]
- `BPP-C_total_hour` – total bacterial production [µg $l^{-1}h^{-1}$]
- `BPP-C_total_day` – total bacterial production [µg $l^{-1}d^{-1}$]
- `comment_raw` – comments in the raw data by technician
- `comment_dm` – comments by the data manager

References

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Change log

- 2020/2021 Silke R. Schmidt: Data were compiled from raw data files from single measurement dates. Values from beginning until end of 2010 were corrected with factor 0.86, which was not included in the raw data. Negative values were deleted.