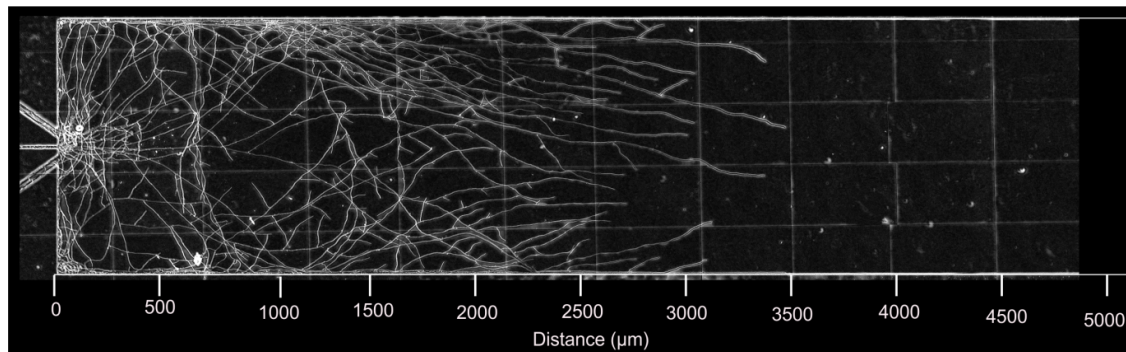
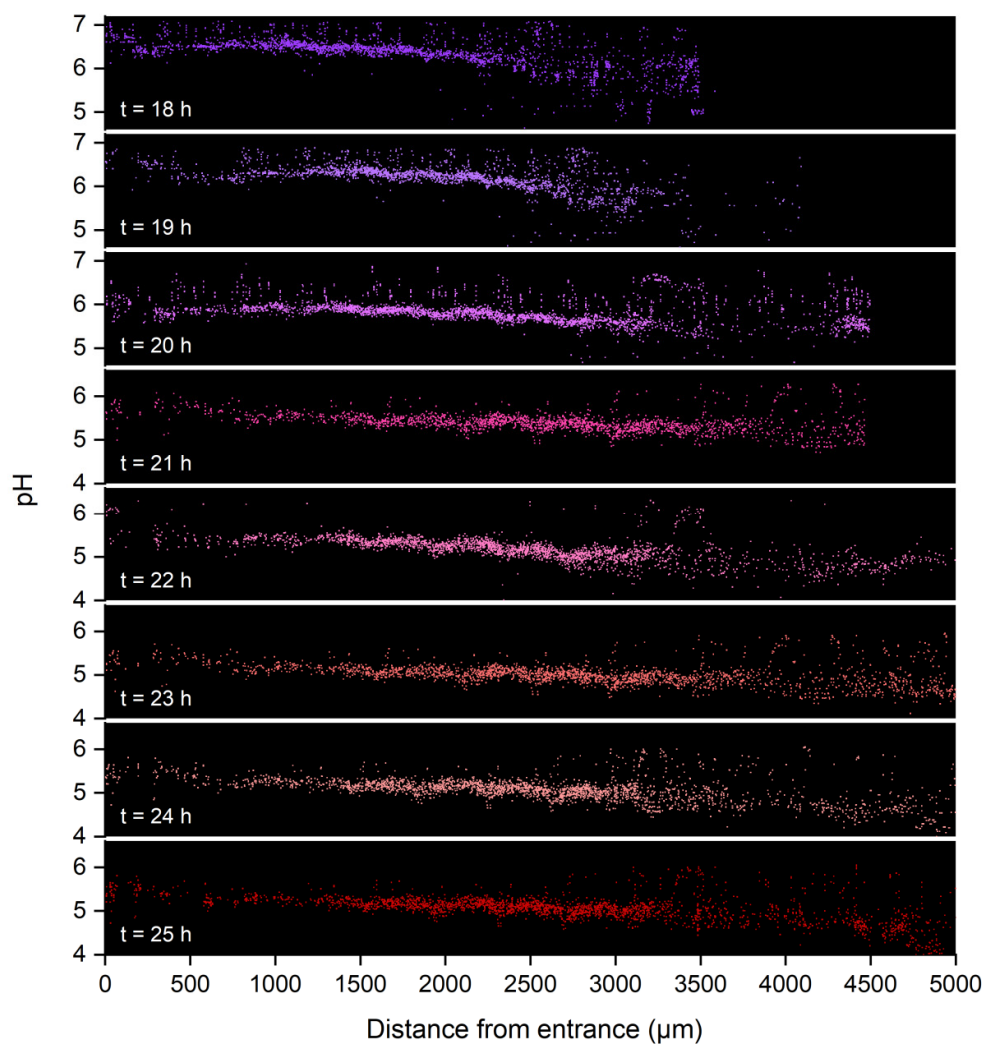


**Table S1.** Water contact angles of mycelial surfaces of *Coprinopsis cinerea* and *Synechocystis* pH bioreporter cells.

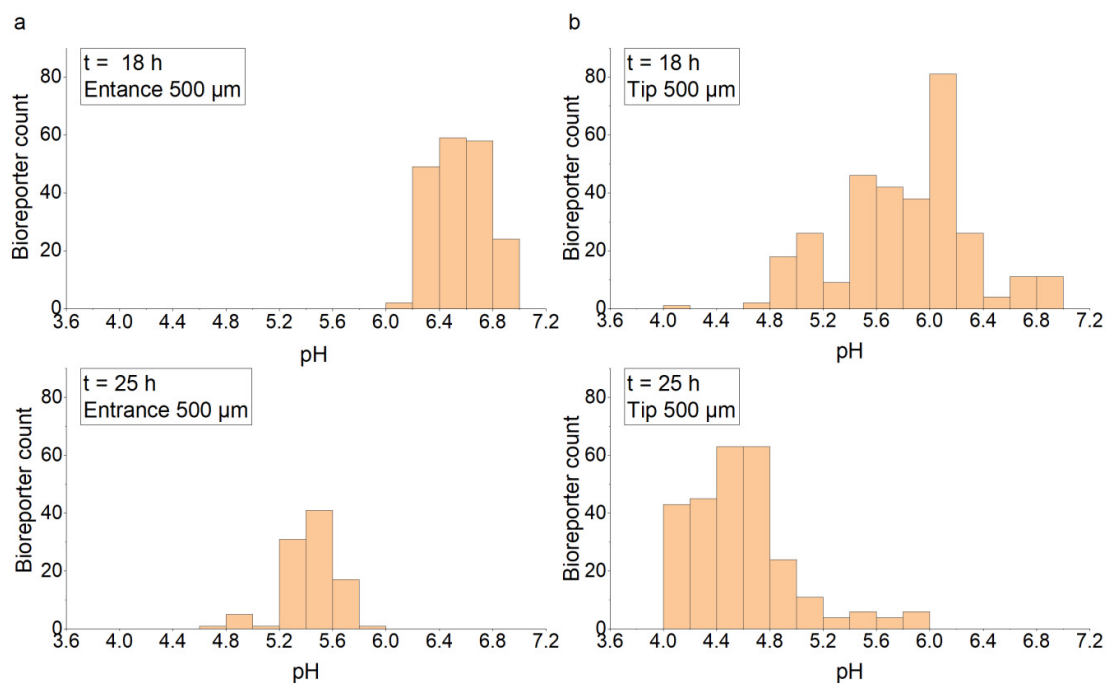
Organism	Water contact angle (degree)
<i>C. cinerea</i>	128 ± 2
<i>Synechocystis</i> sp. PCC6803_peripHlu	32 ± 2



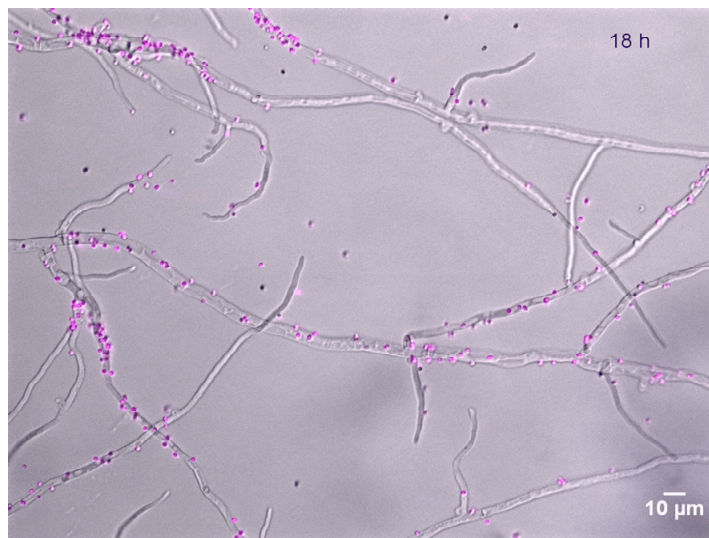
**Figure S1. Inverted brightfield micrograph of *Coprinopsis cinerea* hyphal monolayer in the observation chamber before loading of pH bioreporter cells to the microfluidic system.** For better visibility of *C. cinerea* hyphae, contrast and brightness of the micrograph were adjusted using ImageJ.



**Figure S2. Longitudinal distribution of pH sensed by *Synechocystis* sp. PCC6803 bioreporter cells attached to *C. cinerea* hyphae.** The x-axis reflects the distance from the entrance to the observation chamber, i.e., where the hyphal tips first enter. pH bioreporter cells reflect a temporally changing and longitudinal pH gradient ( $\approx 0.8$  pH) along the growing *C. cinerea* hyphae.



**Figure S3. Histogram of distribution of surface pH of (more mature) hyphae near the entrance of the observation chamber and at the hyphal tips of *C. cinerea*.** a) pH distribution on hyphal surfaces at 0-500  $\mu\text{m}$  from the start of the observation chamber at t = 18 and 25 h, resp.. b) pH distribution on hyphal surfaces at a distance 500  $\mu\text{m}$  away from the hyphal tips at t = 18 and 25 h, resp.



pH Bioreporters distribution on *C. cinerea* hyphae over time

(Please double click the image to play)

**Figure S4.** Movement and dispersal of pH bioreporter *Synechocystis* sp. PCC6803\_peripHlu cells along *C. cinerea* hyphae.