Visualisation of hunting nets formed by algae: a perfect hunting mechanism?

Petrinec, D.[1], Kovačević, G.[1], Tramontana, P.[1], Peharec Štefanić, P.[1] and Špoljar, M.[1]

[1] University of Zagreb, Faculty of Science , Department of Biology, Croatia

Green Hydra (*Hydra viridissima* Pallas, 1776) is a typical example of an endosymbiotic organism. In gastrodermal myoepithelial cells it contains unicellular photoautotrophic algae. Algae and especially microalgae take an important place as the primary producers and food resources in aquatic ecosystem sand are the basis of many food chains.Class Turbellaria is the most primitive group within the phylum Platyhelminthes. Turbellarians generally locomote by coordinated waves of cilia on a secreted mucus trail, though some species can swim by rhythmic muscle contractions.
In this experiment, the interaction between endosimbiotic algae *Desmodesmus subspicatus* (Chlorophyceae) (Chodat) Hegewald and Schmidt isolated from green hydra and predatory turbellarian species *Polycelis felina* (Dalyell, 1814) and *Dugesia gonocephala* (Duges, 1830) was observed at different light and temperature conditions: at 25 °C and exposed to daylight (photperiod 8 hs light, 16 hs dark) and at 13.5 °C in the dark, both separately with starved and fed animals.The results were recorded immediately after the experiment setup,and every 1, 8 and 24 hs after the beginning of the experiment, including the controls. Cladoceran *Daphnia magna* (Straus, 1820) was added to each glass dish as a prey (10 individuals). There were 5 replicas for each experiment, and the controls: altogether 220 dishes and 1540 animals. Hunting nets were visualized by adding the constant amount of algal suspension to each glass dish.For analysis of algae, light and cTEM microscopy were used. In this micro-ecosystem, turbellarians were characterized by phenomenon of mucus network emerging by the interaction with algae. The appearance of mucus and the formation of complex network occurred between 1 and 8 hs after the experiment setup.It was observed that the appearance of the nets was intensive due to the presence of algae this way changing the interactions within fresh water micro-ecosystem.The development of the nets was noticed even when only algae were present. But, in interaction with turbellarians especially with starved *P.felina* at the 13.5 °C this effect was much more intensive. Mostly after 8 hs *Daphnia* specimens were trapped within the nets but some remained alive and some of them managed to escape. After 24 hs within dishes where the nets were formed the highest density of dead *D.magna* was observed. There is a clear correlation between *D. Magna* density, algae and formation of the nets. The interaction of endosimbiotic algae and turbellarians created a mechanism that potentially gives more efficient hunting and stronger predatory role for turbellarians in the fresh water ecosystems. Further microscopic analyses could provide the insight into the complex formations of the hunting nets and food web interactions.