**FUNCTIONAL MORPHOLOGY OF HYDROZOAN STOLONS. PART 2: STOLONIC GROWTH, CONTRACTILITY, AND HYDROPLASMIC MOVEMENT IN *DYNAMENA PUMILA* (LINNAEUS, 1758)**

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In colonial hydroids the hydrorhiza (system of stolons) performs at least seven crucial functions (see poster by Marfenin, Kozhara), including: 1) colony growth and its 'mobility' over substratum; 2) provision of food to the whole colonial organism and to growth regions in particular. Stolonic growth and hydroplasmic flow along the gastric cavity are enabled by pulsations that alter coenosarc diameter (lateral pulsations, LPs) and cause the apical growing tips of stolons to protrude (growth pulsations, GPs). We compared the characteristics of coenosarc LPs and GPs affecting stolonic growth and transport of hydroplasm, using time-lapse video microscopy of colonies on transparent substratum under controlled conditions. GPs are localized in the apical parts of the coenosarc (zone 1). GPs have a regular period and order of intermediate phases of the growth cycle that depend on environmental parameters (especially temperature) and correlate with the rate of stolonic growth. LPs can be rhythmic, with a period different from GPs. Transverse pulsations occur in all parts of the coenosarc, but pulsation amplitude varies between regions: highest in subapical segments of the coenosarc (zone 4), lowest further away from the growing tip (GT) (3rd, 4th etc. internodes from the GT). Subfrontal pulsations (zone 2) are caused by considerable changes in the thickness of gastrodermis. These pulsations generate forward elongation of GTs inside the perisarc, i.e. stolonic growth. Subapical segments of the coenosarc (zone 4) are the main drivers of hydroplasmic flow. Although transverse contraction of the coenosarc constitutes the active phase of hydroplasmic movement, and expansion is just a response to the inflow of hydroplasm from other parts of the colonial organism, the relaxation phase that precedes expansion plays an important part in determining the direction of hydroplasmic flow. In the state of active growth the LPs of coenosarc segments further away from the GTs have no major bearing on the transport of hydroplasm. However, in a non-growing colony, where GTs disappear and zone 4 segments are not involved in high-amplitude pulsations, the LPs of all stolon internodes increase, and minimal contraction/expansion amplitude is sufficient to push hydroplasm through the narrow lumen of the tubular coenosarc.

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