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HETEROGENITY OF THE GROWTH OF PLUMATELLA FUNGOSA ZOOIDS AND COLONIES IN THE TEMPERATURE GRADIENT

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A phylactolema colony consists of zooids and is an integratian organism. A zooid is a module of the colony, autonomic in its main physiological functions. The development of phylactolema colonies is specific, both in ontogeny of zooids and in astogeny of colonies. Meanwhile, characteristics of budding, growth, and orientation of zooids are controlled by the colony.

The weal known environment-induced variability of the colonies is caused by heterogeneity of the growth of zooids. The influence of temperature, which is a main abiotic environmental factor, on the growth heterogeneity of zooids and colonies of P.fungosa has been investigated for the first time.

In a zooid's ontogeny its growth in length can be divided into the following stages: stage 1 is a linear growth from a bud (on an average, 0.5 mm) to vegetative ripeness (L_{0v}, mm; appearance of the first bud); stage 2 is a linear growth and budding from L_{0v} to a maximum length (L_{max}, mm); stage 3 is decrease of the zooid's length from L_{max} to the definitive length (L_{def}, mm) at the end of the life and the death of the zooid.

Phylactolema colonies grow by external budding. Evagination of a statoblast's asexual reproduction organ results in appearing an autozooid. The subsequent budding of zooids is basal-lateral. Analysis of the length of the first seven zooids at different ontogenic stages, the interval between buddings of each zooid (D_{brgem}, day), and the vegetative ripening duration (D_v, day) allows the following conclusions. A set of autozooids of 7 modules have different parameters just enumerated and is a multimodule of colony. The multimodule is a pattern with different morphological traits that allows the colony to propegate in the three-dimensional space.

The greatest heterogeneity of the multimodule in its ontogeny was observed at the optimal temperature t=27°C, at which L_{0v} and L_{max} were 15% and 24% larger, while D_v and D_{brgem} reduced 2.5 times as compared with these parameters at temperatures of 22 and 32°C. Within the multimodules the greatest heterogeneity was fo-

und in the 3d zooid at 27°C and 32°C. the 4th. 5th. and 6th zooids at 220C.

Each zooids in a multimodule gives its progeny. a clone. The number of zooids in the clones, forming mainly at ontogenic stage 2 is 2 to 4 at 27°C, 1 or 2 at 22°C, and only 1 at 32°C. Just like zooids of sea bryozoan, phylactolema zooids start budding earlier than their development is completed.

Empirical data for P.fungosa colonies allow us to suggest that a leader zooid constitutes a basis of each bifurcation of the colony. The bifurcation ends with a terminal bud. The general control effected by the colony probably regulates and directs the conventionally called colony's growth substance. reinforcing the bifurcation bases by the leader zooids, ensuring their terminal growth. Ageing of the colony starts from the center. At the end of the colony's life peripheral budding is observed during the statoblast formation.

It is very difficult to distinguish the age stages in the colonial astogeny because ontogenies of zooids and clones do not coincide in time. The physiological age of the colony can be determined from analysis of heterogeneity of its constituent zooids. In a P.fungosa colony at the age of 26 days 149 zooids produced 40 floatoblasts. In a colony, aged 33 days. 146 zooids did not produce any statoblasts. In the first colony growing buds constituted 37%, average-sized zooids amounted to 42%, and leader zooids, to 21%. In the second colony the same age groups constituted 40, 42.5, and 17.5%. At day 26, 189 zooids of the 3d colony formed 145 floatobasts, their age groups amounting to 9, 53, and 38%.

Thus, the first two colonies were at a youger astogenic stage as they contained a large percentage of growind buds and the lengths of average-size zooids and leaders were different at different stages. The third colony was closer to the gerontic stage (Cumings, 1904) since it had a few growing buds, a more heterogeneous length series but with a smaller number of peaks that probably carried the main reproductive load, forming floatoblasts.

Further analysis of the astogeny of seven P.fungosa colonies has shown that at the colonies'age of 35 to 40 days zooids started to die intensively. On an average, the colonies produced 224 zooids, 451 floatoblasts, and 17 sessoblasts.