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ONTOGENY OF CONCEPTACLES IN *Amphiroa* (CORALLINALES, RHODOPHYTA)

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The development of bi-tetrasporangial, spermatangial and carposporangial conceptacles wer studied in six *Amphiroa* J. V. Lamouroux species: A. *beauvoisii* J. V. Lamouroux, *A. cryptarthrodia* Zanardini, *A. misakiensis* Yendo, *A. rigida* J. V. Lamouroux, *A. valonioides* Yendo and *A. vanbosseae* Me. Lemoine. The development of the tetrasporangial conceptacles was found to be important in delimiting species within the genus. The present study also confirmed the importance of the development of the carposporangial filament in species segregation. Conceptacle senescence is here described and illustrated for the first time with four patterns observed, two for sporangial, one for the spermatangial and one for the carposporangial conceptacles. The complete development of the conceptacles pore is her also firstly described an illustrated. Two stalk cells were observed and illustrated for the first time on the sporangia mother cell of *A. misakiensis*. Based on the location of sporangia on the cavity floor, the number of stalk cells on the sporangia mother cell, and the initial por development, the studied species can be organized in three distinct groups, one including *A. beauvoisii*, a second one including *A. misakiensis* and a third one including *A. rigida*, *A. valonioides* and *A. vanbosseae*. The present results suggest that these groups may represent different genera but further research is required.

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NITRATE UPTAKE AND NITROGEN RESERVES IN THE KELP *Eisenia arborea*

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Eisenia arborea, the kelp with the southern-most distribution in the Northern hemisphere, survives for over two months at its southern limit with low ambient nutrient conditions, whereas nearby populations of kelps die. *E. arborea* tolerance to environmental nitrogen shortage was explored. Two hypotheses were proposed: 1) *E. arborea* can consume nitrate from pulses of cool nutrient-rich water; or 2) *E. arborea* can form internal nitrogen reserves that last for 2 months. The first possibility was explored by measuring nitrate uptake by *E. arborea*, under controlled conditions. In order to explore the second possibility, two nitrogen reserve experiments were performed under nutrient-poor conditions, and their recovery when exposed to weekly fertilizations of nitrate in pulses (200µM; 5 h). Nitrate consumption by *E. arborea* followed a linear tendency for at least 3 hours and did not exhaust the nitrate under any concentration. The nitrogen reserves of *Eisenia* fell to 1%, lasting up to 4 weeks. The nitrogen reserve recovery experiments indicated that with weekly fertilizations, the average %N in *E. arborea* blades remained constant at 1.3%, whereas without continuous fertilizations, it was reduced significantly to less than 1%. We conclude that the reserves of *E. arborea* are not sufficient to allow the kelp to subsist two months without input of nitrogen in the field. The results support the conclusion that *E. arborea* may take advantage of the pulses of nitrate lasting on the order of hours to maintain or fill tissue nitrogen reserves for survival during low ambient nutrient conditions.

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