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# Capacity for Development of Secondary Manubria in *Eutonina indicans* Medusae (Hydrozoa)[1]

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THIS NOTE reports the occurrence of two individuals of the hydromedusa *Eutonina indicans* (Romanes) that developed secondary manubria while being maintained in the laboratory following field collection. The first incidence of secondary manubrium formation occurred in one of 24 medusae collected in Monterey Bay, California, on 5 July 1972. After 1 week in the laboratory at 16°–17° C the bell turned inside out (in much the manner of *Obelia* medusae) and the circular canal and tentacular ring degenerated. Several days later additional manubria appeared. A very comparable sequence of events in a specimen of *Gonionemus vertens* Agassiz has been reported by Hargitt (1899). Following surgical removal of the bell margin the bell evaginated and "At one time, just about the completion of union of the inverted margins, a decided papilla-like bud appeared at the aboral area which presented some resemblance to a second manubrium, but this soon after was absorbed entirely, and was probably only the elevation due to the approximation of the margins preparatory to final union" (Hargitt 1899: 44). In the *Eutonina* medusa the papillalike bud at the aboral area developed into a secondary manubrium. In addition, four other secondary manubria developed along three of the radial canals (Fig. 1*a*). They were all generally cylindrical in shape, lacking the fluted folding characteristic of the original manubrium and were all capable of feeding on brine shrimp nauplii. The animal perished about 20 days after capture.

The second individual to develop an additional manubrium was one of 24 medusae collected in Monterey Bay on 8 August 1972. These medusae were maintained in the laboratory at 15° C. After 1½ weeks one of these medusae developed a growth at the bell margin

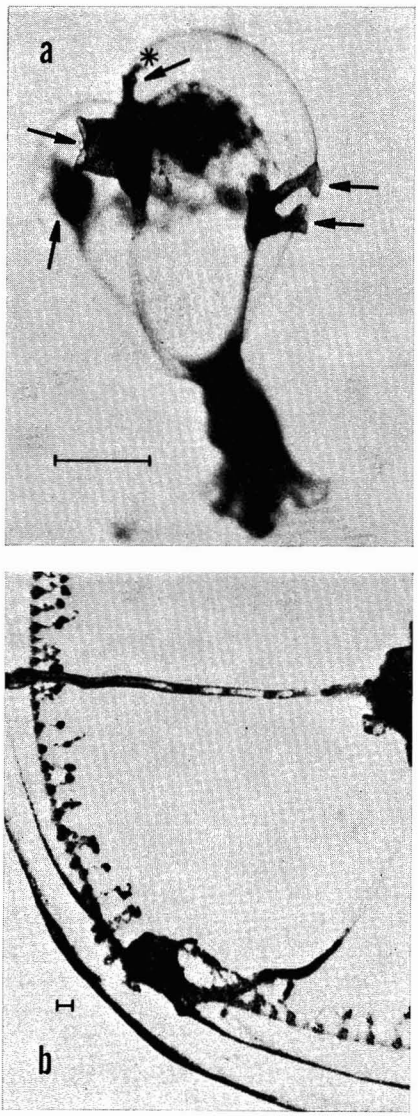


FIG. 1. *Eutonina indicans* medusae with supernumerary manubria. Scale bar is 0.5 mm. *a*, Degenerate medusa with five secondary manubria (asterisk indicates manubrium developed from apical papilla); *b*, intact medusa with manubrium bud (subumbrellar view).

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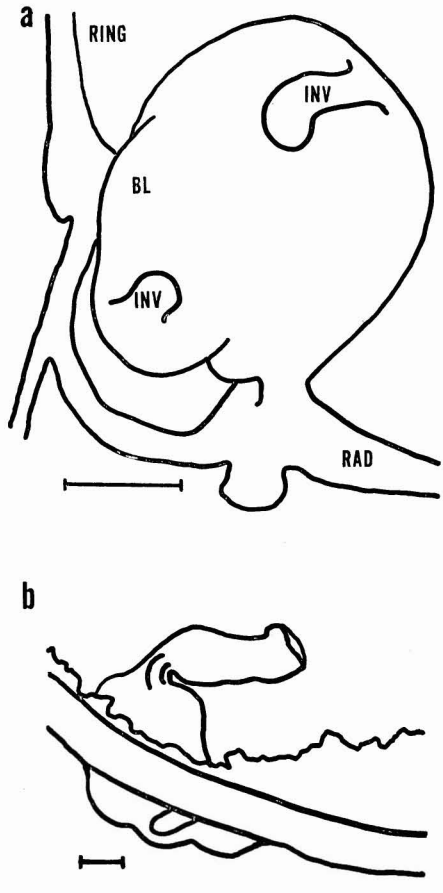


FIG. 2. Development of a manubrium bud. Scale bar is 0.5 mm. *a*, Inflated manubrium bud (subumbrellar view); *b*, completed manubrium (subumbrellar view).
KEY: BL, blister; INV, invagination; RAD, radial canal; RING, ring canal.

(Fig. 1*b*). The initiation of this growth was not preceded by loss of the ring canal and tentacles as in the earlier individual or Hargitt's *Gonionemus*. The marginal growth was connected to a radial canal and the ring canal. Upon addition of brine shrimp nauplii the collapsed growth swelled perceptibly, revealing two invaginations and a central raised blister (Fig. 2*a*). Within 3 days the marginal growth had developed into a secondary manubrium (Fig. 2*b*). The medusa died several days later, approximately 18 days after capture.

The cause of these developmental anomalies is unknown. A closely related species, *Eirene elliceana* (Agassiz & Mayer), buds medusae in nature (Navas 1972). A thermally sensitive switch between asexual medusa-budding and gametogenesis has been reported in *Rathkea octopunctata* (Sars) (Werner 1957) but has not been reported in the normal life cycle of *Eutonina indicans* (Werner 1968).

The *Eutonina* growths more closely resemble manubrium multiplication than medusa-budding. Nevertheless, the conditions which led to this multiplication in the present specimens were apparently not conducive to prolonged gametogenesis as egg production by both *Eutonina* collections stopped after several days in captivity, prior to the initiation of additional manubria. Furthermore, the laboratory maintenance temperatures were several degrees higher than temperatures prevailing at the collection site (U.S. 1967). Whether or not the observed developmental anomalies in these individuals represent an abnormal or vestigial pattern of medusa-budding under thermal stress is unknown, but in any event they do indicate that asexual duplication of complex structures can occur in *Eutonina* medusae.

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