

Life Cycle of *Coryne pusilla* Gaertner, 1774 (Hydroida: Corynidae) in Chakyak Island, Korea

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ABSTRACT

In the life cycle of *Coryne pusilla* Gaertner, a medusa is lacking and the planula larvae represent the only known dispersive stage. The planula larvae crawled on the surface of culture vessel for about 21 hours after release, and settle down and start metamorphosis.

Key words: Life cycle. *Coryne pusilla*. Hydroida. Korea

INTRODUCTION

It is recognized that the alternation a sessile polyp and a planktonic medusa represents the mode of life cycle in Cnidaria (Hydrozoa, Scyphozoa). The polyp is involved in asexual reproduction, whereas the medusa generates planulae by reproducing sexually. Medusa and planula both contribute to species dispersal. In many hydroids, the free swimming medusa has been lost during evolution and planulae are released from sessile gonophore (Sommer, 1992). In this case the larva represents the main dispersive stage. The duration of swimming and any substratum specificity are important of planulae for dispersal.

The experiments were done during May/June, 1982 and 1994. Fertile colonies of *Coryne pusilla* Gaertner, 1774 were collected with hand at low tide at Chakyak Island, the island located near Incheon in the Yellow Sea, and carried back to the laboratory with keeping them cool in an icebox. The specimens were reared in the filtered sea water carried from the place where the specimens collected. Water temperature was kept at about 20°C in growth chamber, which is the annual mean temperature of the sea water surrounding Chakyak Island, known for 17 years (1967-1984).

The corynid colonies were fed sufficiently with newly hatched *Artemia* nauplii once a day and supplied fresh oxygen. The planula released under this condition were transferred to another culture

vessels. After the larvae settled, the sea water was exchanged to fresh sea water once everyday, and new polyps were fed with *Artemia* nauplii.

RESULTS

The life cycle of *Coryne pusilla* was relatively simple. The fertilized eggs developed on the hydranth (Fig. 1B). After its release the planula (Fig. 1C, D; Pl. 1, Fig. B) crawled free for some time, and settled onto the bottom of culture vessel and metamorphosed into a primary polyp (Fig. 1, E; Pl. 1, fig. E, F). The primary polyp gave rise to stolon and colonized the settling sites (Fig. 1, A; Pl. 1, fig. G).

Metamorphosis of larva

The duration from the planulae to primary polyp formation was about 2 days in the laboratory. Before separation from the parent, well developed, round form larvae were kept together (Pl. 1, Fig. A) for a short time. Immediately after separating from the parent, the larvae were mostly round oval types but elongated in a short time. They had cilia on their body surface, and wandered from place to place diligently by the movement of cilia for about 18 hours. Finding the suitable substrates for settlement, they moved slowly for about 3 hours. Their shape also were changed at that time (Pl. 1, Fig. C). The cilia on truncated one side moved actively, but remainders moved slowly. These larvae settled with truncated one side on the surface of culture vessel supplied oxygen sufficiently. After settlement, cilia reduced (Pl. 1, Fig. D) but became elongated. About 10 hours since settlement, the primary two oral tentacles developed (Pl. 1, Fig. E) and in about 16 hours, the mouth opened. The primary polyp (Pl. 1, Fig. F) started to eat newly hatched *Artemia* nauplii. The stolons developed rapidly and from these the new polyps arose and formed a colony.

Description of polyp.

Coryne pusilla has been reported from the Yellow Sea, Cheju Island and East Sea (Rho, 1969; Rho and Chang, 1972, 1974; Park, 1992, 1993). They usually attach to the oyster shells in the rocky shore of the Yellow Sea (Pl. 1, fig. H).

The colonies consist of a number of upright hydroids from hydrorhiza and branches. Hydrorhiza is stolon creeping on hard substrates, such as oyster or other shells and the wall of rock, which give rise to stem with a hydranth distally. The stolons arise very close together, but not forming any definite network, resulting in a rather bushy colony with upright hydroids and branches intertwined. However the height of the colony is not reached more than 5 cm. The stolons are 0.3~0.35 mm thick and enclosed in brown-colored perisarc. The perisarc are smooth or sometimes wrinkled or annulated indistinctly, covered on stem to below hydranth and brown color. Stem is branched irregularly, annulated at least in distal and proximal parts, often becoming irregular and indistinct. The hydranth is spindle- or cylinder-shape, with an oral whorl of 3-4 capitate tentacles. The position of tentacles may be irregular, resulting in a more scattered position. The tentacles are clear white in color, endoderms of hydranth are red, and ectoderm white. Gonophores are developed from slightly above the lowest tentacles to two-third or three-fourth above. They grow a short stalk. The endoderms are

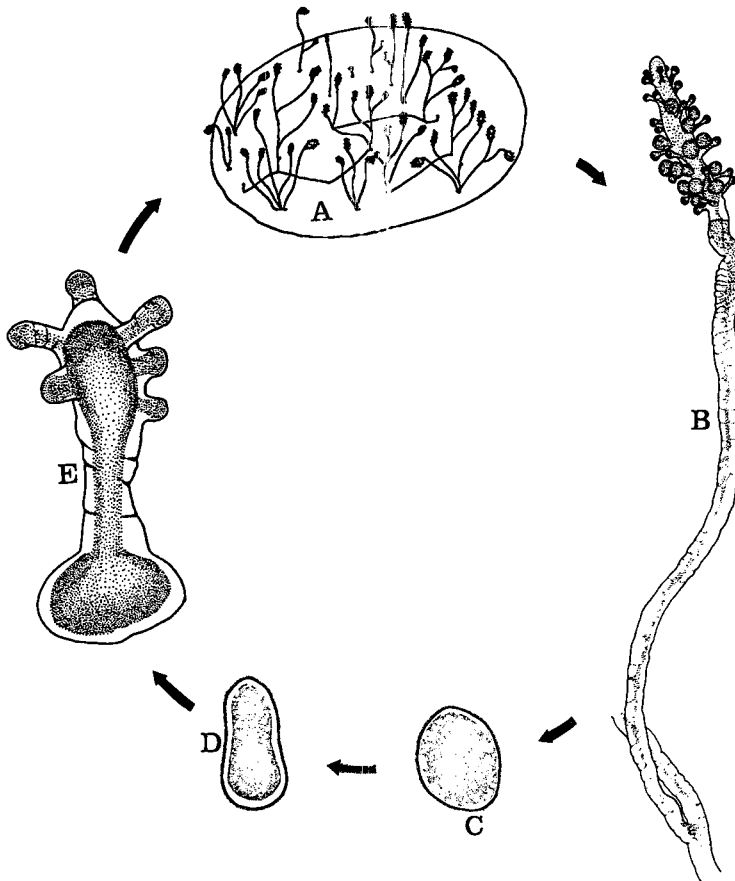


Fig. 1. Life cycle of *Coryne pusilla* Gaertner. A, colony; B, polyp with gonophores containing fertilized eggs; C, free planulae; D, primary polyp.

red and ectoderms right brown.

DISCUSSION

The hydroids comprise two different types of life cycle, depending on species. The first type includes a larval stage, the planula, as strategy of dispersion, most of which are capable of swimming or creeping for a few hours or days before settlement. The hydroids of this type consist no medusa stage during life cycle. The other type has a planktonic medusa stage for dispersal, besides the planula stage.

Coryne pusilla, the type species of the genus, widely distributed in the world, showed the former type of life cycle. The hydroid life cycle is known for 29 species (Sommer, 1992), of which 12 species containing no medusa stage as the case of *Coryne pusilla*. It is noted that according to Sommer (1992), *C. muscoides*, the only species in the genus *Coryne* formerly known of life cycle,

Table 1. Maximum and minimum times found to elapse between release of eggs or planulae and settlement in Hydroida (after Sommer, 1992).

Species	Medusa liberated	Duration of free embryonic and/or larval stage	
		Minimum	Maximum
<i>Turritopsis nutricula</i>	yes	48 h	60 h
<i>Amphinema dinema</i>	yes	48 h	—
<i>Podocoryne carnea</i>	yes	2 d	3 d
<i>Bougainvillia muscoides</i>	yes	10 d	—
<i>Nemopsis dofleini</i>	yes	2 d	6 d
<i>Sarsia eximia</i>	yes	> 4 d	—
<i>Staurocladia portmanni</i>	yes	> 10 d	> 20 d
<i>Laodicea indica</i>	yes	48 h	—
<i>Eucheilota maculata</i>	yes	4 d	10 d
<i>Eutonina indicans</i>	yes	3 d	—
<i>Clytia hemisphaerica</i>	yes	4 d	6 d
<i>Obelia</i> sp.	yes	5d	21 d
<i>Mitrocomella polydiademata</i>	yes	3 d	5 d
<i>Gonionemus vertens</i>	yes	ca. 6 d	—
<i>Limnocoñida tanganyicae</i>	yes	42 h	60 h
<i>Probosciodactyla flavicirrata</i>	yes	72 h	—
<i>Clava squamata</i>	no	90 h	13 d
<i>Cordylophora caspia</i>	no	< 12 h	24 h
<i>Corydendrium parasiticum</i>	no	24 h	12 d
<i>Hydractinia echinata</i>	no	48 h	21 d
<i>Eudendrium racemosum</i>	no	2.5 h	3 d
<i>Coryne muscoides</i>	no	5 h	—
<i>Halocordyle tiarella</i>	yes	24 h	5 d
<i>Opercularella lacerata</i>	no	< 1 h (?)	7 d
<i>Gonothyrea loveni</i>	no	6 h	12 h
<i>Sertularella polyzonias</i>	no	24 h	—
<i>Aglaophenia heller</i>	no	ca. 24 h	—
<i>Aglaophenia pluma</i>	no	12 h	24 h
<i>Nemertesia antennina</i>	no	12 h	24 h

contains medusa stage, unlike *C. pusilla*, although both species are congeneric.

The hydroid species known of their duration of the free embryonic and/or larval stage are showed in Table 1 (after Sommer, 1992). Each minimum or maximum times possibly reflect the necessity for them to find their ways to specific substrates. In the laboratory, the duration of larval stage of *Coryne pusilla* is ca. 21 hours. This value is similar to those in other hydroids from Table 1.

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작약도産 곤봉히드라(히드라충목, 곤봉히드라과)의 생활사

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요 약

실험실내에서 곤봉히드라의 생활사를 조사하였다. 히드라는 생활사 중에 플라눌라 유생 단계와 해파리 단계가 있으나, 곤봉히드라의 생활사에는 해파리 단계가 없고 플라눌라 유생 단계만 나타났다. 수정란으로부터 부화한 플라눌라 유생은 약 21 시간 동안 부착하는데 적합한 저질(substratum)을 찾아 배양기 바닥을 기어다니다가 고착한 다음, 폴립을 형성하였다.

Explanation of Plate

Plate 1. Larvae and adults of *Coryne pusilla* Gaertner. A, planula larvae immediately before separate from parent; B, planula larva after separate from parent; C, planula larva before settle down; D, primary polyp without tentacles; E, primary polyp with two tentacles, ca. 31 hours old; F, primary polyp with several tentacles, ca. 48 hours old; G, colony showing the stolon creeping on surface of culture vessel, ca. 14 days old; H, colony on oyster shells in rocky shore, Chakyak Island.

PLATE 1

