

Study on the larval settlement of spionid polychaetes in the oxygen-deficient region of coastal waters.

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In the present study, larval settlement of the 4 dominant spionid polychaetes, *Polydora cornuta*, *Pseudopolydora kempfi*, *Prionospio pulchra* and *Paraprionospio* sp. typeA, were examined, was based on population dynamics of the pelagic and benthic stages, which were collected from a oxygen-deficient region of coastal waters. A comparison was made on the distribution pattern of each species, in relation to the oxygen saturation of bottom water.

The study area was a semi-closed waters of Fukuyama harbor located in the east part of Hiroshima Prefecture. The harbor bottom was more eutrophicated in the inner part than in the mouth part. In summer, oxygen-deficient water was formed at the bottom layer, especially in the inner part.

The density of macrobenthos increased from the mouth to the inner parts in this harbor, and the spionid polychaetes accounted for 30~50% of the total density of macrobenthos. Especially, *Polydora cornuta*, *Pseudopolydora kempfi*, *Prionospio pulchra* and *Paraprionospio* sp. typeA dominated in both of pelagic larvae and benthic individuals.

1. *Polydora cornuta*

Benthic individuals of *Polydora cornuta* distributed only in the inner part, while the pelagic larvae occurred at all stations. Their densities and distribution varied seasonally with the ambient oxygen saturation. The larvae in the inner part migrated step by step to the central part with decreasing oxygen saturation in summer. During this period, the density level of larvae was maintained, and the distribution hardly expanded to the mouth. Thus, the larvae delayed the settlement and survived at the area of higher oxygen saturation (more than 10%) for about 3 months. It was considered that the larvae could settle again in the inner part by the tidal current, when anoxic condition disappeared.

2. *Pseudopolydora kempfi*

Most of *Pseudopolydora kempfi* distributed in the inner part. From spring to summer, both of benthic individuals and pelagic larvae migrated offward. It was considered that this migration was caused by frequent settlement of the pelagic larvae avoiding the decrease of oxygen saturation.

3. *Prionospio pulchra*

Both of benthic individuals and pelagic larvae of *Prionospio pulchra* distributed in the central part. Benthic individuals appeared all the year round, and increased the juveniles in late summer, while pelagic larvae aggregated at the summer water of about 15% oxygen saturation. Therefore, the larvae did not migrate offward to avoid the oxygen deficiency, but grew slightly there. Thus, it was considered in late summer that increase of the smaller benthic individuals was due to sequential settlement of the larvae which reacted immediately to the recovery from oxygen

deficiency.

4. *Paraprionospio* sp. typeA

Both of benthic individuals and pelagic larvae of *Paraprionospio* sp. typeA appeared abundantly from the central to the mouth parts. However, the former was present all the year round, and the latter appeared intensively in summer when oxygen saturation was below 20%. The summer population of pelagic larvae, spawned from the temporarily extinct population of benthic individuals, delayed the settlement with gradual growth.

These results indicate that the survival for the 4 spionid polychaetes inhabiting the eutrophicated soft sediment was markedly influenced by the larval settlement due to their response to the change in oxygen- deficient water.

Key words: larval settlement, survival, oxygen-deficient water, spionid polychaetes, distribution pattern