

ON THE BREEDING OF A PERIWINKLE, LITTORIVAGA BREVICULA (PHILIPPI)

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ON THE BREEDING OF A PERIWINKLE, *LITTORIVAGA*
BREVICULA (PHILIPPI)*

By

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(With one figure)

Littorivaga brevicula (Philippi)** is a common periwinkle on the rocky coast in the neighborhood of the Marine Biological Station of Asamushi. Hirase (1927) and Kuroda (1955) described that this species is viviparous and that many juveniles will be found inside the mother shell in the breeding season. However, in the early spring of 1956, the writer found that this species liberates eggs, and thus he found it to be worthy to investigate the breeding of this oviparous species.

Before going further, the writer thanks Dr. Eturô Hirai, Director of the Marine Biological Station of the Tôhoku University at Asamushi, Aomori Prefecture, for his supervision during the course of this investigation. Acknowledgments are due to Dr. Tadashige Habe, Kyôto University, for the identification of this species and information on the breeding of the Littorinidae, and to Dr. Tokubei Kuroda, Kyôto University, for his information on the breeding of this species.

MATERIAL AND METHOD

From February to May in 1956, specimens of *Littorivaga brevicula* (Philippi) were collected from between high to low tide of the rocky coast in the neighborhood of the Marine Biological Station at Asamushi. The materials were cleaned carefully by a brush and five to ten animals were placed in separate glass bottles, each containing 25 cc of normal sea water. After the bottles containing the animals were filled with sea water, liberated eggs were found on their bottoms.

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** The Japanese name is Tamakibigai.

OBSERVATION

In 1956, the copulating animals were observed from February 15th to the end of April in the shallow waters of the coast, but the greatest number of pairs were observed from the end of February to early April. The temperature of the sea water in February was 5.5°C, and that at the end of April 9.6°C. On February 24th, ten pairs of copulating animals were collected and placed in a

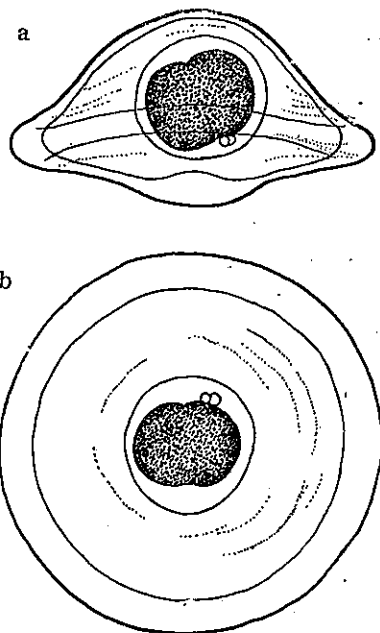


Fig. 1. Egg and its capsule of *Littorivaga brevicula* (Philippi).
a: Viewed from the lateral side.
b: Viewed from the bottom. $\times 160$.

animals in the season from February to April, but not in May. This fact may suggest that the breeding season of this species at Asamushi is in the early spring of the year, from February to April. The young eggs and the spermatozoa were found in the gonads of animals exceeding 6.5 mm in the shell height.

DISCUSSION

Hirase (1927) and Kuroda (1955) described in "Illustrated Encyclopedia of the Fauna of Japan (Nippon Dōbutsu Zukan)", that *Littorina* (*Littorivaga brevicula*) (Philippi) is viviparous, but the writer found that it liberates eggs. The capsule of the egg is helmet-shaped. Tokioka and Habe (1953), and Habe (1956) classified the egg capsules of Littorinidae into three groups, and stated that all of the Japanese types of capsules can be included in group 3. But the shape of the egg capsules

of *Littorivaga brevicula* (Philippi) may be included in group 1, helmet-shaped. The capsule of this species resembles that of *Littorina piniado* (Wood) (Ostergaard, 1950) in shape, but has a more conspicuous peripheral brim than that of *Littorina piniado*. The breeding season of the species of the Littorinidae is as follows: *Littorina saxatilis* (= *L. rudis*) (Lebour, 1937) is throughout the year, *L. littorea* (Moore, 1937) is from November to May, *L. littoralis* (Pelseneer, 1935) is from spring to autumn, and that of *L. neritoides* (Lebour, 1935, Lysaght, 1941) is from September to April. With regard to the breeding season of Littorinidae species in Japan, Abe (1936) observed that the spawning of *Melarhaphé* (*Littorinopsis*) *scabra* (Linnaeus) is in August at Palao, and *Nodilittorina pyramidalis* (Quoy et Gaimard) (= *N. vilis* (Philippi)) and *Peasiella roepstorffiana* Nevill spawn in July and August (Habe, 1955, 1956), *Nodilittorina granularis* (Gray) and *Nodilittorina picta* (Philippi) spawn in July (Habe, 1956), at Shirahama, Wakayama Prefecture. The writer has observed that the spawning of *Nodilittorina granularis* (Gray) is in August at Asamushi. According to the present investigation the breeding season of *Littorivaga brevicula* (Philippi) is from February to April at Asamushi.

The liberated eggs required about eight days to hatch from the capsules at 10°C. Many young eggs and spermatozoa were found in the gonads of the ani-

mals in the season from February to April, but not in May. This fact may suggest that the breeding season of this species at Asamushi is in the early spring of the year, from February to April. The young eggs and the spermatozoa were found in the gonads of animals exceeding 6.5 mm in the shell height.

SUMMARY

The breeding of *Littorivaga brevicula* (Philippi) was investigated in 1956 at Asamushi.

1. This species liberated helmet-shaped eggs with transparent colourless capsule. The structure of the egg and the capsule is described.
2. The larva hatches about eight days after spawning at 10°C through the concave spot at the center of the bottom of the capsule.
3. The breeding continued from February to April while the animals were still living in the area from high to low tide.
4. Nearly matured eggs and spermatozoa were found in the gonads of the animals exceeding 6.5 mm in shell height.

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