

A Study on Thelytokous Parthenogenesis of *Kurarua rhopalopholoides* HAYASHI (Coleoptera, Cerambycidae)

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クビアカモモプトホソカミキリの雌性単為生殖についての研究

郷 遠

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Abstract: The thelytokous parthenogenesis of *Kurarua rhopalopholoides* HAYASHI is reported. This is the first record of the parthenogenesis in the family Cerambycidae (Coleoptera). The eggs laid by virgin female insects was observed to hatch.

Introduction

The thelytokous parthenogenetic reproduction has been known in some families of Coleoptera, e.g., Chrysomelidae,^{1,2,3)} Curculionidae,^{2,4-18)} Dermestidae,^{2,19)} Tenebrionidae,^{2,20)} Micromalthidae,^{8,21,22)} Ptinidae,⁷⁾ and Scolytidae.^{23,24)} However, this phenomenon has not been reported in the family Cerambycidae.

In previous paper, GOH et al.^{25,26)} observed and reported such interesting facts on the reproduction of *Kurarua rhopalopholoides* HAYASHI in the family Cerambycidae, Coleoptera, as follows: (1) No male pupae have been found yet.^{26,27)} (2) The female adults oviposited eggs without copulation. And recently the author confirmed the hatch of larvae by dissecting dead insects. These facts would suggest the possibility of parthenogenetic reproduction in this species. This expectation in mind, the author pursued a rearing examination of *K. rhopalopholoides*.

Materials and Methods

The branchlets of the host plants (*Ilex rotunda* or *I. pedunculosa*) containing mature larvae under the bark were collected at Mt. Gagyū, Okayama Pref., in 1975. After some period, the presence of pupae in pupal cells in sapwood was observed by peeling off the bark.

The branchlets were cut off in about 7cm long, including the whole pupal cell. Each of them was kept in a plastic cage with a wire netting lid. After the emergence of adult insects, some kinds of flowers (*Spiraea cantoniensis*, *Cornus controversa*, *Viburnum dilatatum*, *Ligustrum japonicum*) were given them as food. In addition to them a piece of dead branchlet of the host plant was also given for their oviposition (Fig. 1).



Fig. 1 Feeding view of the adults in each separate cage.

The branchlets has been collected in late summer season to avoid the intrusion of eggs laid in nature. Shallow cuttings were given by a knife at the bark of the branchlets to make oviposition easier. The cuttings should not reach sapwood, because it had been known in preliminary observations that adults scarcely oviposited in sapwood. The branchlets and the flowers were renewed daily and the rearing cages were exposed to sunlight on fine days.

The branchlets oviposited by the insects were transferred into the other cages and preserved under slightly moist condition.

The hatch of the eggs were observed under a microscope. The eggs obtained from the ovaries of dead or live insects by dissection were used for the same observation. The dissection was done in the air, or in water, or in 0.01% salicylic acid aq. solution. The eggs were kept on moistened paper or absorbent cotton.

Result

Twelve female insects emerged from the branchlets late in April, 1976. After about a month from the emergence, they begin to oviposit.

The eggs were laid in the cuttings mentioned above in the depth of about 3mm. Three insects did not oviposit, although some eggs were found in their ovaries after death (Table I, Adult No. C, D, and I).

The number of eggs laid by each insect or extracted from its ovary were shown in Table I. Seven or less eggs were laid oviposited by an insect reared separately. On the other hand, more than 9 eggs at least were by an insect reared in pairs.

The eggs hatched during 21 to 36 days after the oviposition (Fig. 2, 3).

The hatching rate was about 60% in the case of eggs laid, while it was 20% in the case of eggs obtained from ovaries by dissection (Fig. 4). In the latter case, the hatching rates varied from 0% to 50% according to the treatment of eggs as shown in Table II. For example, the hatching rate was 50% when the eggs were extracted from ovary in water and kept on moistened cotton.

Discussion

The virginity of the female insects used for this study was doubtless, because each of them emerged and was kept in a separated cage into which she had been put in pupal condition. Then the eggs laid by these insects or obtained from the ovaries were doubtlessly unfertilized.

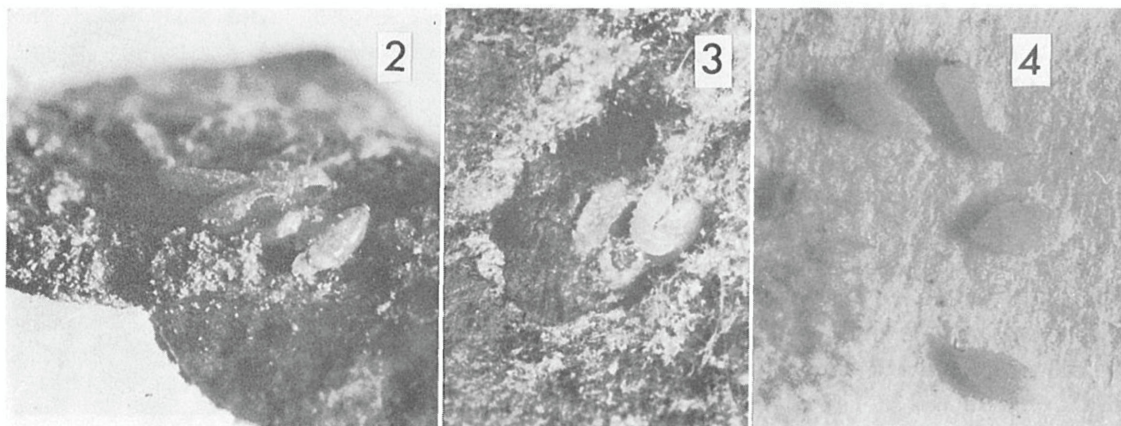


Fig. 2 The larva is hatching from the egg laid.

Fig. 3 The larva hatched from the egg laid.

Fig. 4 The larvae hatched from the eggs obtained from ovaries by dissection.

Table I. The number of the eggs obtained from each insect and of hatching eggs

Adult No.	Eggs laid in cuttings		Eggs extracted from ovaries	
	Number of eggs	Number of hatching eggs	Number of eggs	Number of hatching eggs
A	2	0	3	0
B	1	1	5(a)	—
C	0	0	4	0
D	0	0	4	0
E	7—2(b)	5	6	4
F	3	3	6	1
G	1	1	2(c)	0
H	5	2	7	1
I	0	0	8	1
J	6	4	8	3
K	18(d)	10	1	0
L			11	2

(a) Sacrificed for specimen.

(b) Two eggs were damaged during observation.

(c) Extracted from live adult.

(d) K and L were reared together in one cage.

Table II. The number of the hatching eggs preserved in various conditions

Extracted in	Preserved on	Number of eggs used	Number of hatching eggs
the air	cotton	2	0
	paper	16	2
water	cotton	14	7
	paper	15	2
salicylic acid soln.	cotton	13	1
	paper	—	—

Nevertheless, the hatch of about 60% of the eggs laid and of about 20% of ones extracted from ovaries were observed. Based on these facts, the thelytokous parthenogenesis of *Kurarua rhopalopholoides* would be confirmed.

The relatively high mortality of the eggs obtained from the ovary would be explained by various reasons, for example their immaturity, damages through dissection, etc.

In the previous trials, the author failed to obtain wholly matured eggs, because the rearing period of the adult insects was relatively short. It was also confirmed that it took so long period as more than one month after the emergence, for the female insects to begin oviposition.

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摘 要

クビアカモモフトホソカミキリ *Kurarua rhopalopholoides* HAYASHI について、本種の成虫(原記載以来含は未知)が、羽化越冬して、蛹室内に留っている

期間より、一頭体ずつ分離して飼育を続け、脱出後、各頭体が単独で産卵した卵の孵化を観察し、また、成虫体の卵巣内より摘出した卵の孵化も確認したことより、本種が、カミキリムシ科として初めての、雌性単為生殖を営む種であることを立証することができた。

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