Table 2. The relation between the time of the last issuing of the parasite larvae and that of the breaking of diapause in normal larvae of the borer.

Year	Temperature condition	No. of larvae of the borer arranged on March 12	No. of parasitized larvae of the borer (% parasitism)	The date of the breaking of diapause in normal larvae of the borer attaining 50%	The date of the last issuing of the parasite
1960	at natural at 25°C	400(200 ♀ ♀, 200 ♂ ♂) 250(200 ♀ ♀, 50 ♂ ♂)	7(1.8) 2(0.8)	April 15 April 1	April 16 March 24
1961	at natural at 25°C	400(200 ♀ ♀, 200 ♂ ♂) 400(200 ♀ ♀, 200 ♂ ♂)	11(2.8) 10(2.5)	May 14 April 4	May 11 April 6
1962	at natural at 25°C	400(200 ♀ ♀, 200 ♂ ♂) 400(200 ♀ ♀, 200 ♂ ♂)	2(0.5) 0(0.0)	June 5 April 8	April 27 —

strongly intimates that issuing of *A. chilonis* from the body of its host in diapause is independent of the breaking of diapause or hormonal control of its host borer, as pointed out in the case of *Apanteles glomeratus* L. to its hosts, *Pieris brassicae* L. (GEYSPITZ & KYAO, 1953; ZELENY, 1961) and *Pieris rapae crucivora* BOISDUVAL (HIDAKA, 1962; HIDAKA *et al.*, 1962).

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Inability of *Chilo suppressalis* Larvae (Lepidoptera : Pyralidae) to Utilize Farnesol for Synthesizing Cholesterol¹

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ISHII and HIRANO (1961) have reported that larvae of the rice stem borer, *Chilo suppressalis*

WALKER, can not synthesize cholesterol from some compounds, which were known to be precursors of cholesterol in mammals. Recently farnesol has attracted notice because of its juvenile hormone activity (WIGGLESWORTH, 1961). This open chain terpene alcohol has already been known as a precursor for cholesterol biosynthesis in mammals, the position of farnesol on a chain of intermediate metabolism of cholesterol synthesis being undoubtedly between mevalonic acid and squalene (DITURI, *et al.*, 1956, 1957; POPJAK, *et al.*, 1959~1961; ANDERSON, *et al.*, 1960).

¹ ニカメイガ幼虫はファルネゾールからコレステロールを生合成できない。石井象二郎・平野千里（農林省農業技術研究所）
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Because both mevalonic acid and squalene are inactive for cholesterol synthesis in *Chilo suppressalis* larvae (ISHII and HIRANO, 1961), it seemed to be a matter of course that farnesol is not a precursor. However, there were two reasons for supporting a gleam of hope that farnesol might be utilized as a precursor for cholesterol synthesis in the larva, i. e. (1) squalene had a growth inhibitory effect on the larva, so that it might be impossible to find out its utilization by the larva in our preceding experiment and (2) cholesterol might be synthesized from farnesol through a route other than via squalene.

It was therefore the object of this study to see whether farnesol serves as a precursor for synthesizing cholesterol in *Chilo suppressalis* larvae. The larvae were reared aseptically on synthetic foods containing farnesol, with or without cholesterol, and their growth was recorded from the 30th day from hatching. Composition of the basal food medium used in the present experiment is as follows :

Water	10 ml
Agar	0.1 g
Cellulose, fibrous	0.3
Casein	1.0
Glucose	0.5
Inorganic salts (WESSON'S)	0.06
B-vitamins	
Thiamine hydrochloride	100 μ g
Riboflavin	50
Nicotinic acid	100
Pyridoxin hydrochloride	50
Ca-pantothenate	100
Folic acid	10
Choline chloride	2,000
Inositol	1,000
Biotin	10
p-Aminobenzoic acid	100

All the ingredients were placed in 100-ml Erlenmeyer flask and mixed well. The flask was stoppered with an absorbent cotton plug, and sterilized in a Koch's steam-sterilizer for 30, 30 and 15 minutes during successive three days. The eggs collected from the first generation in Yamagata Prefecture were used. Right before hatching,

Table 1. Growth response of larvae to synthetic food media containing farnesol and/or cholesterol.

Addendum	No. of larvae inoculated	No. of larvae survived	Average weight at 30th day (M. $\pm$ S.E.)
None	107	17	0.2 mg
Cholesterol 10 mg	83	82	41.3 $\pm$ 1.6
Farnesol 10 mg	58	14	1.3
Cholesterol 10 mg plus Farnesol 10 mg	81	63	42.7 $\pm$ 1.9

an egg mass containing about 30 eggs was disinfected by dipping it in 0.1 per cent aqueous solution of mercuric chloride, washed in 70 per cent alcohol, and then inoculated in the flask. The aseptic rearing was carried out in an incubator at 25°C under a dark condition. On the 30th day after hatching, the number of the survived larvae and their weight were recorded.

The result of the rearing experiment is given in Table 1. The larvae failed to grow on the synthetic food containing farnesol, unless cholesterol was added to the food. This indicates that farnesol can not be utilized as a precursor for the cholesterol synthesis in this insect larvae, *in vivo*. Previously ISHII and HIRANO (1961) demonstrated that *Chilo suppressalis* larvae can not develop on cholesterol-free foods even though sterol precursors such as acetic, butyric, isovaleric, glutaric and mevalonic acids and squalene were added to the food, and they supposed this was due to the absence of sterol biosynthesis in the larva. This previous conclusion is evidently confirmed by the result of the present experiment in which the larvae can not utilize farnesol for the cholesterol synthesis. It was additionally found that farnesol has little inhibitory effect on the larval growth when it was added in the food with cholesterol.

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Spread of the Infectious Flacherie in Rearing Tray of Silkworm, *Bombyx mori* L.^{1,2}

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Recently some Japanese workers (YAMAZAKI *et al.*, 1960; AIZAWA and FURUTA, 1962) have studied on infectious flacherie of silkworm, *Bombyx mori* L. According to their works, the pathogen of infectious flacherie is filterable through Seitz E. K. and that the pathogen is found not only in the several tissues of diseased larvae but also in the excrements.

If a number of silkworm larvae were reared in the same rearing tray, as is a routine in the practical sericulture, and if some of the larvae were infected by infectious flacherie, it is expected that the disease would spread by oral infection because larvae fed on mulberry leaves contaminated by the excrements of the infected larvae and by the disintegrated bodies of dead

larvae from the disease.

This paper deals with the incidence of infectious flacherie in a mixed group of health silkworm larvae.

MATERIALS AND METHODS

Two hybrid strains, C124×N124 and N124×C124, of the silkworm, *Bombyx mori* L., were used. They were reared in the summer (July~August) and the fall (September~October) of 1961.

The pathogen was kindly provided by Dr. K. AIZAWA of the Sericultural Experiment Station in May of 1961, and used in this experiment after successive passages through silkworm larvae at our laboratory.

The inocula were prepared from the dead pestled bodies (a 5-gram wet weight sample from dead bodies were triturated into a suspension with 95 ml of sterile distilled water) by centrifuging (3000 r. p. m. for 10 min.) and filtrating through unlipid cotton substrata.

The pathogen was given with mulberry leaves to newly-hatched larvae. When they grew to the end of the second instar or the beginning of

¹ 蚕における伝染性軟化病の蚕座内感染. 石川義文・宮島成寿 (愛知県蚕業試験場)

² Lecture delivered October 27, 1961 at the Meeting of Tokai Branch of Sericulture Society of Japan.

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