

Notes on the Gregarines in Japan 6,

Two Cephaline Gregarines from *Gryllus yemma* Ohmachi et Matsuura.

By

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In this paper the author wishes to rearrange the description of *Gregarina korogi* and to report on the morphological diagnosis of *Leidyana erratica* (Crawley) Watson which is found from the same host.

The host *Gryllus yemma* Ohmachi et Matsuura (*G. mitratus* Burmeister) is the most common cricket distributed in the western district of Japan. At the beginning of the autumn, 1972, the author collected a lot of individuals of this cricket in the bush at Era in Yamaguchi City and found most of them were infected with two different species of gregarines in their digestive tracts, gastric caeca and stomachs.

From September to November he carried on his investigations on these gregarines. One of them is easily identified with *Gregarina korogi* H. Hoshide, but the other is undoubtedly considered to belong to the genus *Leidyana*.

H. Hoshide (4, 5) had already described several gregarines from the Orthoptera of Japan as shown on the list of the present author's previous paper but H. Hoshide had made no mention of the species of the genus *Leidyana* from Orthoptera.

Most materials used in this study were collected in or in the suburbs of Yamaguchi City but some of them were caught at Iwakuni or Obatake in Yamaguchi Prefecture. The material collected at each place was parasitized with these two species of gregarines mentioned above. In September 1972 the author made a careful examination about 110 hosts captured at Era and 85 of them were infected with *Gregarina korogi* and 42 of them with *Leidyana erratica*. Among them 15 crickets were parasitized with the two species of gregarines, *Gregarina* and *Leidyana*.

Gregarina korogi H. Hoshide 1952

Host : *Gryllus yemma* Ohmachi et Matsuura (Orthoptera)

Habitat : Intestine, gastric caeca

Locality : Hikari, Obatake, Yamaguchi (Yamaguchi Pref.)

I. Sporadin

1. Association

Biassociative

Maximum length of association 400 μ

2. Measurements
- 2—1. Size (unit μ)
Ave. TL 163, LP 41, LD 122, WP 88, WD 75, tl 164,
lp 37, ld 127, wp 69, wd 97
- 2—2. Ratio LP : TL = 1 : 4.0, WP : WD = 1 : 0.9, lp : tl = 1 : 4.4,
wp : wd = 1 : 1.4
3. Shape
(Primate) Ovoidal
4. Protomerite
- 4—1. Shape Broad and short, slightly concaved or flat at apex,
The width two or three times as long as the height,
widest at middle
5. Deutomerite
- 5—1. Shape Ovoidal to short cylindrical, widest at shoulder,
broadly rounded at posterior end
6. Septum conspicuous, deep constriction at septum
7. Nucleus
- 7—1. Shape Spherical, 20μ in diameter
Not visible in dense adult
- 7—2. Position Generally in posterior region of
deutomerite but unfixed,
- 7—3. Nucleolus One
8. Endoplasm
- 8—1. Color Black in transmitted light
- 8—2. Granules Very dense, fine in both deutomerite and protomerite
9. Ectoplasm Thin, clearly fine longitudinal striations on body surface
(Satellite)
- 4'. Protomerite
- 4'—1. Shape Flattened, considerably narrower than that of primate
- 5'. Deutomerite
- 5'—1. Shape Ovoidal
- II. Cyst
1. Structure Spherical, $200-300\mu$ in diameter, outer gelatinous
membrane thick, 30μ in thickness
2. Dehiscence By two to four sporeducts
Sporeduct 800μ in length, discharged spores stuck
in chain
- III. Spore
1. Shape Barrel shape
2. Size $5\mu \times 3\mu$

V. Cephalin

- | | |
|--------------|--|
| 1. Shape | Much slender than adults, elongate cylindrical |
| 2. Structure | Similar to adults |
| 3. Epimerite | Hyaline simple knob-shaped |

Leidyana erratica (Crawley) Watson

Host : *Gryllus yemma* Ohmachi et Matsuura (Orthoptera)

Habitat : Intestine, gastric caeca

Locality : Yamaguchi, Obatake, Iwakuni (Yamaguchi Pref.)

I. Sporadin

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|-------------------------|--|
| 1. Association | Solitary |
| 2. Measurements | |
| 2—1. Size (unit μ) | |
| Maximum | TL 480, LP 80, LD 400, WP 125, WD 140 |
| Average | TL 368, LP 62, LD 306, WP 79, WD 102 |
| 2—2. Ratio | LP : TL=1 : 5.9, WP : WD=1 : 1.3 |
| 3. Shape | Elongate ovoidal to cylindrical
All sporadins lose their epimerite |
| 4. Protomerite | |
| 4—1. Shape | Broadly cone-shaped, dilated just above septum,
always more wide than high |
| 5. Deutomerite | |
| 5—1. Shape | Elongate ovoidal to cylindrical, widest at anterior
portion of deutomerite or about in middle, bluntly
rounded posterior extremity |
| 6. Septum | Conspicuous, deep constriction at septum |
| 7. Nucleus | |
| 7—1. Shape | Spherical, average 30 μ in diameter |
| 7—2. Position | Generally in middle of deutomerite, but unfixed, hard-
ly discernible its outline in dense adult's cytoplasm |
| 7—3. Nucleolus | One to three |
| 8. Endoplasm | |
| 8—1. Color | Dark brown in deutomerite and slightly lighter in
protomerite than in deutomerite, anterior half of
protomerite almost transparent |
| 8—2. Granules | Fine, dense in deutomerite, comparatively large in
protomerite |
| 9. Ectoplasm | Thin but distinctly visible throughout body, except
anterior part of protomerite and near septum where |

- very thick
- II. Cyst
1. Structure Spherical, average 260 μ in diameter, two covering membranes, outer one gelatinous, thick, 40 μ in thickness, inner one thin, transparent 3~4 μ in thickness
 2. Dehiscence By 5—7 sporeducts
Sporeduct very long, 1.2mm in length, stretching out from limited part of cyst's surface
Discharged spores from sporeducts lie in chain
- III. Spore
1. Shape Barrel shape
 2. Size 4 μ ×2.5 μ
- IV. Movement Not active, gliding and bending
- V. Cephalin (Characteristic of a small cephalin, 85 μ in length is shown below)
1. Shape Ellipsoidal
Measurements TL 85, LP 22, LD 63, WP 27, WD 30 (unit μ)
 2. Structure Rather large, coarse granules in both deutomerite and protomerite
 3. Epimerite Spherical, 15 μ in diameter, sessile body

Remarks :

This species has some trifling differences in the size of cyst and spores in comparison with *Leidyana erratica* (Crawley) Watson (1, 2, 3, 5, 14, 15). The author can not divide these two as the different members of *Leidyana* because the two have many distinctive features : maximum size of sporadin, ratio of LP : TL, WP : WD, number of sporeducts, and length of sporeducts.

Then he reports here that *Leidyana erratica* (Crawley) Watson lives upon the Japanese cricket : *Gryllus yemma* Ohomachi et Matsuura.

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Explanation of Plate

Plate I.

Leidyana erratica (Crawley) Watson

- Fig. 1. Young cephalin with epimerite.
- Fig. 2. Slender sporadin.
- Fig. 3. Fairly grown sporadin.
- Fig. 4. Well grown sporadin.
- Fig. 5. Well grown sporadin, rather obese type.
- Fig. 6. Cyst.
- Fig. 7. Matured cyst, outer and inner membranes are clearly shown.
- Fig. 8. Cyst with six long sporeducts.
- Fig. 9. Enlarged view of a sporeduct, extruding spores in chain.
- Fig. 10. Three ripe spores.

Plate II.

Leidyana erratica (Crawley) Watson

- Fig. 1. Well grown sporadin, fixed and stained with Lugol's sol.
- Fig. 2. Fairly grown sporadin.
- Fig. 3. Cephalin.
- Fig. 4. Small cephalin with epimerite.
- Fig. 5. Sporadin of different slender type.

Gregarina korogi H. Hoshide

- Fig. 6. Mature association.

Plate III.

Leidyana erratica (Crawley) Watson

Fig. 1. Cyst, the septum between two individuals is noticed in it.

Fig. 2. Mature cyst.

Fig. 3. Cyst with six long sporeducts.

Fig. 4. A part of the cyst shown in Fig.3 is enlarged to show the basal part of sporeducts.

Fig. 5. Many spores extruded from sporeducts lie in a row.





