

Coelomomyces fungi in rice field mosquito larvae of Nagasaki,
with notice of a long-overlooked record of this
genus from Japan

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ABSTRACT: Short notes on the *Coelomomyces* which had been recently discovered and described from mosquito larvae in the rice fields of Nagasaki were given, with notice of a long-overlooked record of this genus from Japan.

Fungal pathogens of the genus *Coelomomyces* Keilin, 1921 have been reported from many species of mosquitoes and certain other hosts in various regions. Couch and Umphlett (1963) cover much of the earlier literature.

Despite progressively cumulative records of this genus from Southeast Asia (e.g., Laird, 1959a, 1959b) and the Far East of the U. S. S. R. (e.g., Fedder *et al.*, 1971) there was no recent published report from Japan until Laird *et al.* (1975) described a new species and a new variety of a species known from Europe. Both fungi were found during population studies of larval Culicidae in the rice fields of Nagasaki, where one of us (M. M.) was involved in the discovery of many distinctively rusty to orange-coloured larvae of *Culex tritaeniorhynchus summosus*, a principal vector of Japanese encephalitis in Japan, on

19 July 1973. These died either in the fourth instar or immediately following pupation. Fig. 1-3 show the extent to which their hemocoelae were packed with sporangia. Laird *et al.* (1975) described the organism as *Coelomomyces omorii*, the incidence of which, in 3rd/4th instar from the rice field in question and others nearby, is shown in Table 1. The maximum infection rate was 10.9%. This is perhaps an unusually high peak in a fluctuating incidence, because such conspicuously-coloured larvae have been but rarely noticed in this rice field area although intensive mosquito studies have been conducted there for several years.

A few more parasitized larvae were found three weeks later, but thereafter mosquito density decreased rapidly in accordance with the usual pattern of seasonal prevalence. Laboratory attempts to infect *C. t. summosus* larvae with the organism were unsuccessful. The rice fields concerned lie fallow and mostly dry from late October to late June, and lacking specific information on the life-cycle of *C. omorii*, we can only speculate upon the process of the sudden and short-lived appearance of numerous heavily-infected larvae

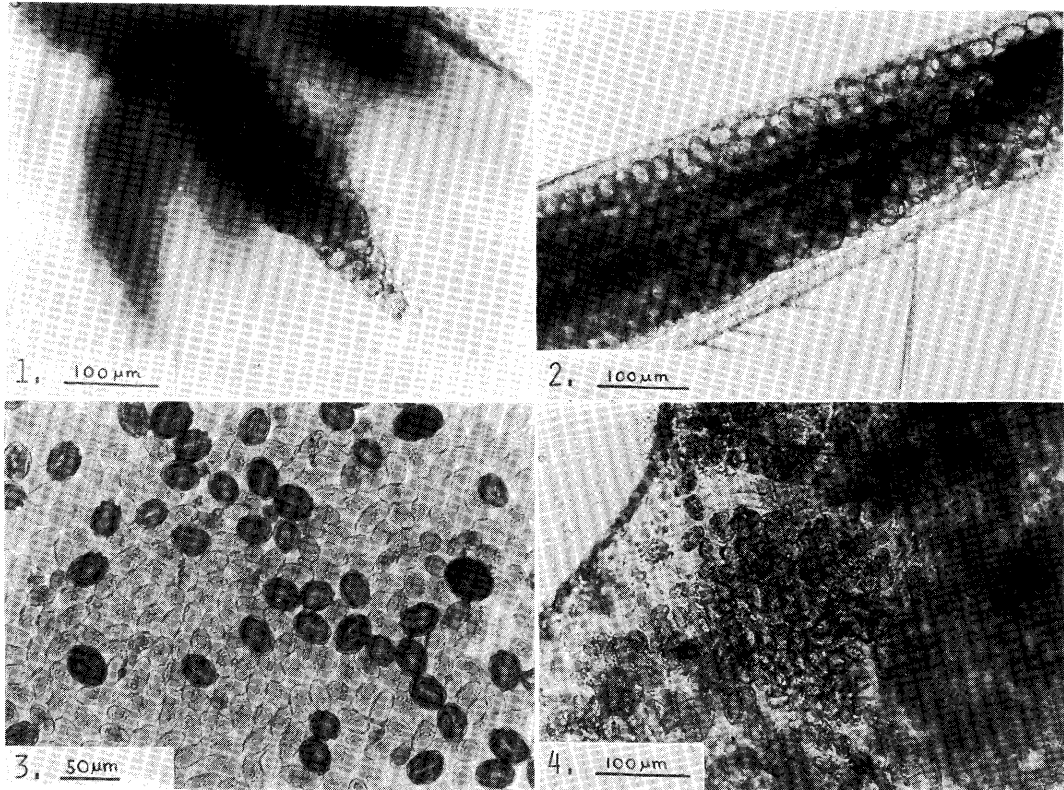


Fig. 1-3 *Coelomomyces omorii* in *Culex tritaeniorhynchus summosus*.

Fig. 1 and 2 respectively, sporangia in the anal papillae and siphon; Fig. 3, thick-walled resting sporangia, outnumbered by immature thin-walled ones.

Fig. 4 *C. raffaelei* var. *parvus* in the hemocoel of *Anopheles sinensis*.

Table 1. Incidence of *Coelomomyces omorii* in *Culex tritaeniorhynchus summorosus* larvae

Designation of rice field	Number of larvae examined	Number of larvae parasitized	Percentage incidence
1	13	0	0
2	25	1	4.0
3	72	0	0
4	4	0	0
5*	193	21	10.9
6	96	5	5.2
7	2	0	0
Total	405	27	6.7

*Rice field 5 was the site where *Coelomomyces*-parasitized larvae were first discovered.

as reported. This might have been due to a preceding bloom of cyclopoid crustaceans, recently demonstrated to be alternate hosts for *Coelomomyces* (Whistler *et al.*, 1974).

Some *Anopheles sinensis* larvae from the same rice fields were infected by *Coelomomyces raffaelei* var. *parvus*¹ (Fig. 4). We wonder whether this fungus is the same as a *Coelomomyces* reported from *A. sinensis* in Okayama, southern Honshu, in a long-overlooked pioneer paper which was written by late Dr. Kobayashi in 1921. This report must now be recognized as the second for the genus, first described from a Malaysian tree-hole aedine earlier in the same year (Keilin, 1921).

Certainly other species of *Coelomomyces* must occur in Japan. We hope that our contributions will help in a small degree to encourage the study of the Japanese flora of *Coelomomyces* which is one of the possible biological control agents against mosquitoes.

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REFERENCES

- 1) Couch, J. N. and Umphlett, C. J. (1963) : *Coelomomyces* infections. In Steinhaus, E. A., Insect Pathology, Vol. 2, 149-188. Academic Press, New York.
- 2) Fedder, M. L., Danilevsky, M. L. and Reznik, E. P. (1971) : On finding of parasitic fungus of the genus *Coelomomyces* (Phycomycetes, Blastocladales) in *Aedes togoi* mosquito in the Primorsky region. Med. Parazit. i. Parazit. Bolezni, 40, 201-204 (Original in Russian).
- 3) Keilin, D. (1921) : On a new type of fungus : *Coelomomyces stegomyiae*, n. g., n. sp., parasitic in the body-cavity of the larva of *Stegomyia scutellaris* Walker (Diptera, Nematocera, Culicidae). Parasitology, 13, 225-234.

1) The varietal name "*parvus*", although correctly presented in the formal description by Laird *et al.* (1975), was inadvertently misspelt "*parvum*" in the paper's title and abstract.

- 4) Kobayashi, H. (1921) : Fungus parasitic on mosquito larvae. *Dobutsu-gaku-Zasshi*, 33, 475 (Original in Japanese)
- 5) Laird, M. (1959a) : Parasites of Singapore mosquitoes, with particular reference to the significance of larval epibionts as an index of habitat pollution. *Ecology*, 40, 206-221.
- 6) Laird, M. (1959b) : Fungal parasites of mosquito larvae from the Oriental and Australian Regions, with a key to the genus *Coelomomyces* (Blastocladales : Coelomomycetaceae). *Can. J. Zool.*, 37, 781-791.
- 7) Laird, M., Nolan, R. A. and Mogi, M. (1975) : *Coelomomyces omorii* sp. n. and *C. raffaelei* Coluzzi and Rioux var. *parvum* var. n. from mosquitoes in Japan. *J. Parasit.*, 61, 539-544.
- 8) Whistler, H. C., Zebold, S. L. and Shemanchuck, J. A. (1974) : Alternate host for mosquito parasite *Coelomomyces*. *Nature*, 251, 715-716.

長崎県の水田で蚊の幼虫から発見された藻菌類の1属 *Coelomomyces* について

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著者等は、最近、長崎県の水田でコガタアカイエカおよびシナハマダラカ幼虫に寄生する藻菌類の1属 *Coelomomyces* を発見し、各々、新種および新変種として別報で記載した。*C. omorii* のコガタアカイエカ幼虫に対する寄生率は、ごく一部の水田で、ごく短期間だけ10%余に達したこともあったが、普通はたいへん低いので、コガタアカイエカ以外にも宿主がいるのかもしれない。シナハマダラカの幼虫に寄生していた *C. raffaelei* var. *parvus* は、小林 (1921) が報告した *Coelomomyces* と同種かもしれない。この報告は世界的に見ても、この属に関する2番目の報告にあたる早いものであったが、それ以後、我国ではこの菌に関する研究はなされなかった。この菌は蚊の総合防除のための手段の一つとして考え得るものなので、今後の研究の進展が望まれる。

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