ESTIMATION OF THE PARASITISM BY ANAGRUS NR. FLAVEOLUS WATERHOUSE [HYMENOPTERA, MYMARIDAE]  

BY  

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A method was proposed to estimate the parasitism of Delphacid eggs by the Mymarid Anagrus nr. flaveolus. In calculation of percentage parasitism, apparently normal host eggs with eye spots and yellow eggs containing parasite larvae alone were used. A correction to raw data was done in consideration of the difference in duration between the two categories mentioned.

The eggs of the smaller brown planthopper, Laodelphax striatellus Fallen, a vector of rice stripe virus, are parasitized by a Mymarid, which is identified as Anagrus nr. flaveolus Waterhouse. The parasite attacks also the white-backed planthopper, Sogatella furcifera Horvath, and the brown planthopper, Nilaparvata lugens Stål, which are other Delphacids frequently inhabiting the paddy field (Ōtake, 1967).

In this paper, the writer will try to estimate the parasitism by this Mymarid with a reasonable degree of accuracy.

1. Procedure to obtain data

FIELD RESEARCH.

In July, 1968 and 1969, field research was carried out at the farm of Shikoku Agricultural Experiment Station, Zentariz, Kagawa Prefecture, Japan. Planthopper eggs were investigated three times, the 2nd to 4th, 9th to 11th and 16th to 18th of July in 1968, and twice, the 3rd to 5th and 10th to 12th of July, in 1969. In each of the three successive investigation periods, 45 tillers which were sampled at random in a rice plot selected every year were dissected to determine the number of planthopper eggs within the tissues of midribs or leafsheaths. The eggs were classified into the following five categories:

a: apparently normal egg in the former half of its embryonic development (semi-transparent in appearance or containing a mycelium).
b: apparently normal egg in the latter half of its embryonic development. This was distinguishable from the above category by the existence of red eye-spots.

c: distinctly yellow egg with a half or full matured parasite larva.

d: egg within which a parasite in the pupal stage with compound eyes or an adult parasite near emergence was observed.

e: egg surely dead from any cause other than parasitization (milky white, brownish or moulded).

As already described (Ôtake, 1968), a host egg containing a newly hatched parasite larva become slightly yellow. The colour change, however, is often undistinguishable. The eggs of this sort, therefore, were included into the category a.

No other hymenopterous species parasitic to the eggs of rice-infesting Delphacids was recorded during the present research.

It is difficult to separate the egg of N. lugens from that of L. striatellus. On the contrary, the egg of S. furcifera is characterized by its pointed upper end.

Counting of adult planthoppers was made through random sampling at the same rice plot every day in 1968 or every other day in 1969. In the course of counting, no Delphacid was recorded other than the species mentioned above.

The trend of occurrence of the three Delphacids was also checked by the record of a light trap set near the research plots.

LABORATORY OBSERVATIONS.

The development of both host eggs and parasites was followed at different constant temperatures: 20°, 23°, 26°, 29° and 32 °C. Laodelphax were forced to oviposit, and Anagrus to parasitize, in the laboratory. Parasitized or unparasitized eggs were taken out of wheat seedlings and incubated on a sheet of moistened filter paper. Microscopic observation was carried out for determining the stages of the embryonic development of the host eggs or the preimaginal development of the parasites (Ôtake, 1968).

2. Estimation of parasitism by the available data

It is pointed out by Clausen (1940) that Mymarids normally attack host eggs before an appreciable development of the embryo has taken place. In the case of A. nr. flaveolus, however, the parasite may be forced to oviposit in eggs of S. striatellus, with highly developed embryo, but its development is then slower (Ôtake, 1968). It can therefore be said that age advancement in host is less suitable also for the present species.