Research Note

Crawling movement of larva of *Mayacnephia aguirrei* (Diptera: Simulidae)*

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Abstract: When taken out from stream water together with substrate, larvae of *Mayacnephia aguirrei* crawled downward, making their mouth parts and prolegs alternately fast and released on the wet surface of the substrate. The larvae did not fasten anal disk on the substrate during this movement.

INTRODUCTION

The appearance of larvae of *Simulium ochraceum*, the principal vector of onchocerciasis in Guatemala, in newly flowing streams usually follows that of other black-fly species, of which *Mayacnephia aguirrei* is the first to occur (Takaoka, 1981). Study on the bionomics of *M. aguirrei* may help improving control strategy against *S. ochraceum* larvae in seasonal streams. The present study describes a unique larval movement of *M. aguirrei*.

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Materials and Methods

Observation was made on September 27, 1982 in an intermittent stream situated at 14°23'N, 90°40'W, in Municipality of Palin, Department of Escuintla, Guatemala. Stream discharge was 4.8 l/sec. Pebbles (10-20 cm in diameter) in the stream water were taken out one by one for the search of *M. aguirrei* larvae. One larva on each pebble was chosen for observation. The surface of the pebble was inclined 10-15° from horizontal surface. Strokes of the head of six larvae were counted during 10 seconds with five duplicates.

RESULTS AND DISCUSSION

Crawling movement of larvae on wet rock surface after being taken out from water

When *M. aguirrei* larvae were taken out from water together with the substrate on which they were attached, they showed a peculiar forward movement. During the first 6 to 24 seconds (mean = 14.1, S.D. = 5.7, n = 12), they maintained the original position of their anal disks, casually bending their abdomens. Thereafter, all the larvae began to crawl, making their mouth parts and prolegs alternately fast and released on the wet surface of the substrate. They also their abdomen in an L-shape, and then stretched it gradually in accordance with the progress of the head. Of a total of 30 trips for 10 sec each made by six larvae on slightly inclined rock surface (10-15°), 77% were downward, 20% were horizontal and only 3% were upwards. The mean frequency of the head-proleg action was 1.02 sec⁻¹ (range 0.7-1.20), while that of the body bending was 0.20 sec⁻¹ (range 0.0-0.3); that is, the larvae made one abdomen bending in every five head-proleg action.

Out of the water, the larvae did not make a complete loop between head and anal disk, which is their most common moving pattern in the water. When a larva was placed in a dish with water 2 mm deep, it made a movement with complete looping between the head and anal disk. Mean frequency of this looping was 0.4 sec⁻¹ (range 0.5-0.5),

or intermediate between the head-proleg action and the abdomen bending.

During the head-proleg action, larvae did not anchor themselves on the the substrate with their anal disk. They were easily washed away from the surface of the pebble when I put the substrate rapidly into stream water. However, when I submerged the lowest part of the pebble in the stream water, the larvae kept crawling downward until their heads reached the water surface. They stopped for a few seconds, then made a complete loop to attach their anal disks close to the head, and finally released the head and stretched their body downstream.

The peculiar crawling movement of larvae seems to be an adaptation to unstable hydrologic condition of breeding streams during the rainy season. A larva of *Mayacnephia aguirrei* may be accidentally left out from water either by change of water course, or by movement of the substrate. Crawling seems to be a more suitable way for a larva to move when they are left out from water than the whole body looping. In the crawling movement, larvae could more easily keep their direction, and they might have smaller risk of rolling off from the substrate.

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**References**


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**Abstract**

*Mayacnephia aguirrei* の生態

幼虫葡萄運動と基質への付着について

*M. aguirrei* の幼虫を基質ごと水中から取り出すと、6～24秒停止した後、口器と前腕肢を交互に前方へ進める。基質表面を下方へ移動した。この運動中、頭部が水面に達するまで、腹部末端は基質に固定されなかった。