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Distinguishing Nymphal Instars of *Mesovelina Mulsanti* (Heteroptera: Mesoveliidae)

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DISTINGUISHING NYMPHAL INSTARS OF *MESOVELIA MULSANTI*
(HETEROPTERA: MESOVELIIDAE)J.E. McPherson and Steven J. Taylor¹

ABSTRACT

The five nymphal instars of *Mesovelia mulsanti* can be separated by the number of rows of setae on the second abdominal tergum. Fifth instars can be separated from younger instars and from each other by the degree of development of the external genitalia.

Life history studies require reliable separation of nymphal instars. In Heteroptera, these instars can often be distinguished by structural characters that change during development, often becoming more complex. For example, pigmentation patterns can change, punctures become more numerous, sclerites increase in size and occasionally fuse, and wing pads progress from a simple arcuate pattern along the posterior margin of the mesonotum to well defined mesonotal pads that extend onto the abdomen in the last instar (metanotal wing pads are almost or quite covered by those on the mesonotum). In addition, the sexes can be determined in the last instar.

Mesovelia mulsanti White shows little change in color pattern during development, and little variation in sclerotization. Hungerford (1917, 1919), in his study of this insect, used lengths of the third and fourth antennal segments and metatibia among several structures he selected to distinguish the nymphal instars. Subsequently, Hoffmann (1932), in his study of this insect, used Hungerford's characters but added length of body.

In 1988, one of us (JEM) reported on the life history of *M. mulsanti* in southern Illinois. Although the various nymphal instars have abdominal sclerites, these structures show almost no progressive change during development. Punctuation is minimal, color is primarily greenish, and markings are absent. Most adults are apterous (less than 1% were macropterous in the above life history study [unpublished data]). Galbreath (1975), in her study of thoracic polymorphism in *M. mulsanti*, found that nymphal wing pads may or may not be present in the fourth and fifth instars. If absent in the fourth (and resulting fifth), adults will be apterous. If present in the fourth, then the wing pads in the resulting fifths vary from well developed to absent. If wing pads in the fifth instar extend to at least the third abdominal tergum, the adults will be macropterous. If they extend only to the second abdominal tergum or are shorter or lacking, the resulting adults will vary from micropterous to apterous. Since the presence of wing pads and their shape cannot be relied upon as diagnostic characters to distinguish nymphal instars in field samples, other diagnostic characters must be used. Nonmacropterous adults are easily sepa-

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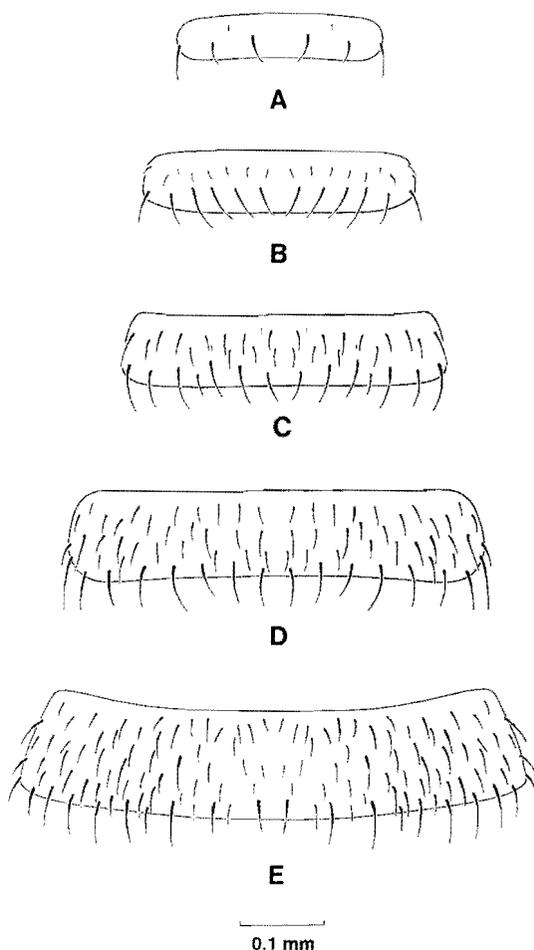


Figure 1A-E. Setal pattern of second abdominal tergum in nymphs of *M. mulsanti*. A, First instar. B, Second instar. C, Third instar. D, Fourth instar. E, Fifth instar.

rated from nymphs by several characters (e.g., adults have two tarsal segments, nymphs have only one).

Of several nymphal characters evaluated in the southern Illinois life history study (unpublished information) and present study, the number of rows of setae on the second abdominal tergum and, in the fifth instar, the presence of well defined external genitalia proved particularly useful as diagnostic characters. The differences in these characters for the various instars, and their reliability, are discussed below.

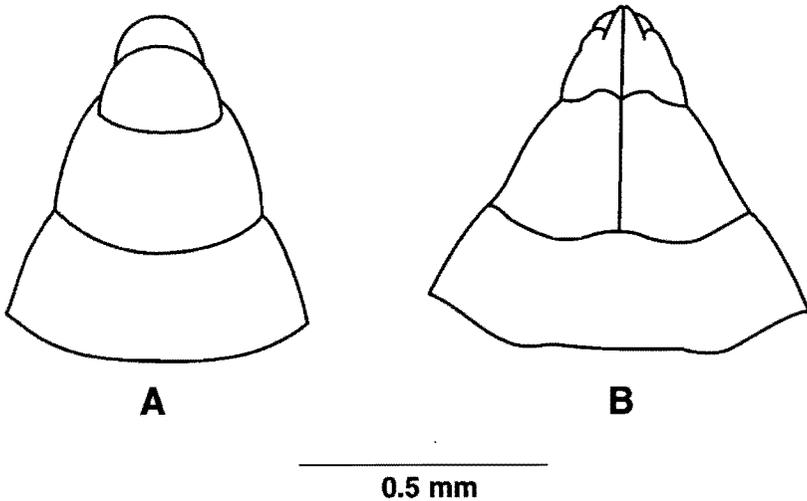


Figure 2A-B. External genitalia of fifth instar of *M. mulsanti*. A, Male. B, Female.

MATERIALS AND METHODS

We collected nymphs from a pond on the Southern Illinois University at Carbondale campus (President's Pond) throughout the active season (ca. April to November) during 1989 and randomly selected 30 of the first four nymphal instars and 60 of the fifth instar (30 of each sex) for comparison; wing pads were not readily apparent in any specimens. All specimens were preserved in 70% alcohol. Illustrations were made with the aid of an ocular grid.

RESULTS AND DISCUSSION

Number of rows of setae on the second abdominal tergum changed during nymphal development and corresponded roughly to the number of the instar (i.e., one row in the first instar, two rows in the second, etc.) (Fig. 1A-E). Setae can sometimes be pale and care must be taken to insure they are not overlooked.

Sexes can be distinguished in fifth instars (Fig. 2A-B); the genitalia are not developed enough in the fourth instar to allow the sexes to be reliably separated. Thus, external genitalia can be used to distinguish fifth instars from younger instars and from each other.

ACKNOWLEDGMENTS

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