

Sex Allocation in Progeny of *Diadegma insulare* (Hymenoptera: Ichneumonidae)¹

A. Sourakov² and E. R. Mitchell³

Department of Entomology and Nematology, University of Florida, Gainesville, FL 32611 USA and Center for Medical, Agricultural and Veterinary Entomology, U.S. Department of Agriculture, Agricultural Research Service, P. O. Box 14565, Gainesville, FL 32604 USA

J. Entomol. Sci. 37(2): 210-211 (April 2002)

Diadegma insulare (Cresson) is an important parasitoid of diamondback moth, *Plutella xylostella* (L.). It is not yet available commercially because its production is labor intensive and expensive, though recent development of a diet-based rearing technique (Mitchell et al., unpubl.) should make rearing more economical and will allow for the first time to mass rear this species inside small containers and without using fresh host plant material.

For augmentative releases, it is obviously advantageous to produce as many parasitoids as possible in relation to the number of available hosts with the highest possible female-to-male ratio. The sex ratio of laboratory-produced *D. insulare* varies greatly depending on a multitude of factors (presence of host plant, age of host larvae, etc.). It was previously shown that highest female ratio is obtained when females used are not older than 7 days (Mitchell et al., unpubl.). The objective of this study was to determine how increasing the number of days during which females are allowed to oviposit would affect the numbers and the sex ratio of the resulting progeny.

Diadegma insulare and diamondback moths used in this study came from laboratory cultures at USDA-ARS in Gainesville, FL. A single female of *D. insulare* was offered 100+ third-instar diamondback larvae raised on wheat germ-based artificial diet (Shelton et al., 1991, J. Entomol. Sci. 26: 17-26.) in 3.78-l clear plastic containers. A streak of honey and fresh collard leaves (*Brassica oleracea* var. *acephala* L.) were placed in the container. Every 24 h, a female was transferred into a new container with a new group of larvae. The previously exposed larvae then were held for parasitoid emergence. Oviposition continued for 4 days. The number of resulting progeny and the percentages of females in it were assessed for each of the 24-h oviposition periods. Due to the labor-intensive nature of the experiment, which requires simultaneous availability of the large numbers of host larvae at the correct stage, fresh collard leaves and fresh parasitoids, the experiment was conducted

¹Received 21 May 2001; accepted for publication 23 July 2001.

²University of Florida.

³U.S. Department of Agriculture and to whom all requests should be addressed (emitchell@gainesville.usda.ufl.edu).

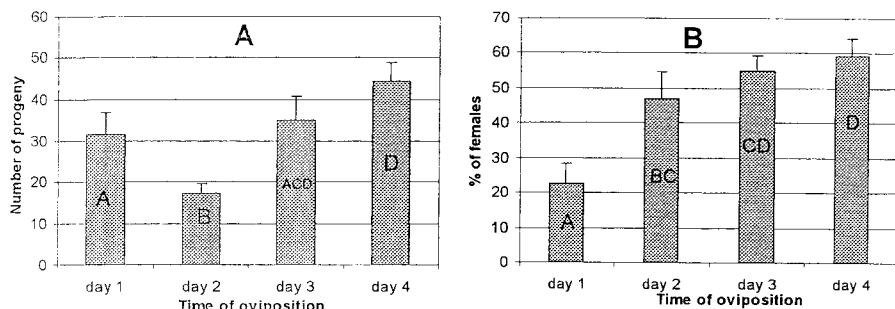


Fig. 1. Increase in number of progeny (A) and in percentage of females (B) resulting from four consecutive days of oviposition by a single *D. insulare* female. Means sharing the same letters are not significantly different ($P < 0.005$).

during a period of 1 yr, with 3 to 4 replications conducted at a time. This experiment was repeated 25 times and was analyzed using ANOVA and *t*-tests ("JMP", SAS Institute, 1995).

As shown in Figure 1, the total number as well as the percentage of female progeny increased from the first to the fourth day of oviposition. The first-day progeny of 31.6 ± 5.3 (SE) wasps increased to 44.4 ± 4.3 wasps on the fourth day ($P < 0.05$). The percentage of female progeny increased from 22.6 ± 5.8 (SE) % on the first day to 59.1 ± 5.0 % on the fourth day ($P < 0.05$). These observations suggest that techniques allowing oviposition for at least 4 days would result in a higher female-to-male ratio and would increase the total numbers of progeny.