SCIENTIFIC NOTES

SEASONAL ABUNDANCE AND PARASITES OF THE IMPORTED CABBAGEWORM, DIAMONDBACK MOTH, AND CABBAGE WEBWORM IN NORTHEAST FLORIDA[1]—(*Note*). Four successive plantings of cabbage were grown near Hastings, FL during 1974-75 to follow cabbage webworm, *Hellula rogatalis* (Hulst), diamondback moth, *Plutella xylostella* (L.), and imported cabbageworm, *Pieris rapae* (L.), populations and parasites as part of an integrated pest management survey. Cabbage webworm numbers (Fig. 1) and damage were high in 1974 and low in 1975. Two larvae could damage the bud so that a head was not formed. No parasites were reared from 513 larvae collected during the period. Diamondback larvae were common from ca. Feb.-June with 4 population peaks noted each year (Fig. 1). Larvae fed on the cabbage buds producing many small holes which enlarged greatly as the leaves grew out. Parasites reared from 1415 diamond-

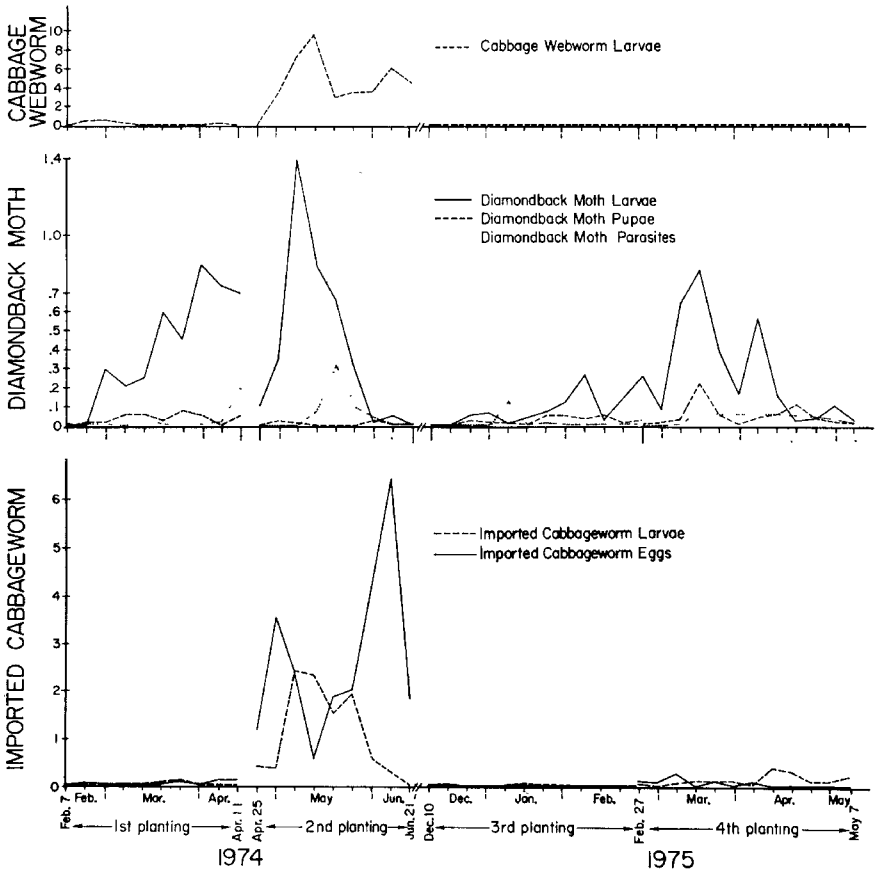

Fig. 1. Average number of cabbage webworms (top), diamondback moth larvae, pupae, and their parasites (center), and imported cabbageworms (bottom) per cabbage plant at Hastings, FL during 1974-75.

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back larvae and 147 pupae included *Diadegma insularis* (Cresson), an ichneumonid, which was reared from 32% of the larvae and pupae examined. The adults were common all season with highest numbers, 30/100 plants, observed in May. An eulophid, *Tetrastichus sokolowskii* Kurdjumov, was reared from 10% of the diamondback pupae. High numbers of imported cabbageworms occurred in 1974 with over 6/plant observed in June (Fig. 1). Numbers were low in 1975. No parasites were found in 3059 eggs taken during the study. Parasites reared from 1391 larvae and pupae included a braconid, *Apanteles glomeratus* (L.), which was reared from ca. 0.015% of the larvae. The parasites developed within the larvae and pupated in yellowish cocoons on the leaves. Two larvae were parasitized by a tachinid, *Lespesia aletiae* (Riley). *Pteromalus puparum* (L.), Pteromalidae, was found throughout the season and was reared from 4% of the pupae. Overall biotic control of all 3 pest insects in northeast Florida in 1974-75 was lower compared to some other areas of the United States although the principal parasites are similar. Limiting factors may include the yearly fluctuation of pest populations, climatic differences and the use of pesticides.—NGUYEN RU AND R. B. WORKMAN, Dept. of Ent. and Nem., Univ. of Florida, Gainesville and Agr. Res. Center, Hastings, FL, respectively.

A METHOD TO DETERMINE WING DIMENSIONS OF INSECTS[1]—(*Note*). Scientists often must determine the length, width, and/or area of insect wings to conduct studies of aerodynamics and kinematics of insect flight, genetic divergence, growth and development, sexual dimorphism, correlations with body weight and wingbeat frequency, and velocity of flight. In the past, wing dimensions have been derived by using light microscopy or photography. Although sophisticated equipment is available that rapidly and accurately determines surface area, the instrument costs several thousand dollars. This note describes a simple method that enables the user to obtain the actual measurements of wing length, width, and area by using a Trisimplex® microprojector to enlarge the wings and a compensating polar planimeter to determine area. The current average cost of the 2 tools are $300 and $150, respectively.

The procedure is demonstrated below using 6 species of lab-reared Tephritidae (Table 1). Flies are killed in ethylacetate vapor. The right wings are excised as near the wing base as possible and dry-mounted on a microscope slide under a glass coverslip. The slide is mounted on the stage of the microprojector, and the magnified wing image is projected downward onto tracing paper where the focused outline is pencil traced. The length of the wing tracing is measured from the point of articulation in the center of the axillary region (Ax) to the farthest point of the remigium (Rm). The width (w) is measured from the widest part of the vannus region (Vn) through the remigium to the costal margin along a line transecting the

[1]Trade names are used in this article solely for the purpose of providing specific information. Mention of a trade name does not constitute a guarantee or warranty of the product by the U.S. Department of Agriculture or an endorsement by the Department over other products not mentioned.