

# Natural enemies of the melonworm, *Diaphania hyalinata* L. (Lepidoptera:Pyralidae), in Puerto Rico<sup>1</sup>

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## ABSTRACT

The melonworm *Diaphania hyalinata* L. is the main pest of pumpkins in Puerto Rico. It also attacks other cucurbitaceous crops. Important natural enemies of this insect were recorded and identified from Puerto Rico, two of them for the first time: *Agrypon* sp. and *Eiphosoma* sp. (Hymenoptera: Ichneumonidae); *Apanteles impiger* Muesebeck and *Apanteles* sp. (Hymenoptera: Braconidae); *Spilochalcis* sp. (Hymenoptera: Chalcididae); *Catolaccus* sp. (Hymenoptera: Pteromalidae); *Nemorilla maculosa* Macquart and *Nemorilla* sp. poss. *pyste* (Walker) and *Stomatodexia cothurnatha* (Wiedemann) (Diptera: Tachinidae); and the following predators: *Podissus sagitta* (Fabricius) (Hemiptera: Pentatomidae); *Monomorium destructor* (Jerdon) (Hymenoptera: Formicidae) and *Polistes crinitus* (Felton) (Hymenoptera: Vespidae).

## RESUMEN

Enemigos naturales del gusano del melón, *Diaphania hyalinata* L. (Lepidoptera: Pyralidae), en Puerto Rico

El gusano del melón, *Diaphania hyalinata* L. (Lepidoptera: Pyralidae), es la plaga principal de la calabaza en Puerto Rico. La larva de esta alevilla también ataca otras cucurbitáceas. Los enemigos naturales de *D. hyalinata* criados en el laboratorio y/o recogidos en el campo y/o informados en la bibliografía del gusano del melón en Puerto Rico incluyen en la tabla núm. 1. *Eiphosoma* sp. (Hymenoptera: Ichneumonidae); *Apanteles impiger* Muesebeck y *Apanteles* sp. (Hymenoptera: Braconidae); *Spilochalcis* sp. (Hymenoptera: Chalcididae); *Catolaccus* sp. (Hymenoptera: Pteromalidae); *Nemorilla maculosa* Macquart y *Nemorilla* sp. poss. *pyste* (Walker) y *Stomadexia cothurnatha* (Wiedemann) (Diptera: Tachinidae); y los depredadores: *Podissus sagitta* (Fabricius) (Hemiptera: Pentatomidae); *Monomorium destructor* (Jerdon) (Hymenoptera: Formicidae) y *Polistes crinitus* (Felton) (Hymenoptera: Vespidae).

<sup>1</sup>Manuscript submitted to Editorial Board 6 February 1989. The authors thank Drs. N. E. Woodley, P. M. Marsh, R. W. Carlson, E. E. Grisell from the Biosystematics and Beneficial Insects Institute, U.S.D.A. Agric. Res. Serv. at Beltsville, Maryland for the identification of the parasitoids. Thanks are due to Dr. A. Segarra for his help during the initial phase of this work.

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## INTRODUCTION

The melonworm *Diaphania hyalinata* (Linneaus) is considered the main pest of pumpkins, *Cucurbita moschata* in Puerto Rico. The reported income for this crop for 1985-86 represents \$7,000,000 to the agricultural economy of the island. Farmers, especially on the southern coast of Puerto Rico, have to rely on pesticides for the control of this pest.

The identification of natural enemies of *D. hyalinata* is a must if we are to develop sound long lasting integrated programs for the control of this pest in Puerto Rico and neighboring islands.

This insect was reported for the first time from P. R. by Stahl (5) as *Phacellura immaculalis* Guenée, and as *P. hyalinata* by Möschler (3) and Gundlach (1) respectively. This moth is recognized by having head, thorax, the broad outer margins of both wings and the costal margin of forewing brown. The wings' triangular inner area is semi-transparent silvery white; abdomen white, tipped with a brush of golden and brown scales.

The caterpillar, the injurious stage of this moth, is either yellow, greenish yellow or green in the first stage, resembling the full-grown caterpillar of *D. nitidalis*. The other instars have two white stripes on the dorsomeson, well separated from each other (fig. 1). The head is yellowish-brown, without a pigmented spot on the caudal margin. Full-



FIG. 1.—*Diaphania hyalinata* caterpillars and damage to pumpkin.



FIG. 2.—*Diaphania hyalinata* caterpillar feeding on leaves.



FIG. 3.—Pumpkin plot defoliated by the feeding of *Diaphania hyalinata*.

grown caterpillars measure 25-30 mm. The caterpillar is mainly a leaf-feeder (fig. 2,3) defoliating whole stands if control measures are not taken. Late generations of caterpillars may penetrate the fruit, causing severe damage and losses (fig. 1,4). The caterpillars feed for about 2 weeks, then pupate generally in a leaf-fold. The larval stage lasts an average of 19 days. The pupal stage lasts about 7-10 days.

Identification of the host plants of this pest is also important in an integrated pest control program. Martorell (2) listed the following species as hosts of *D. hyalinata* in Puerto Rico: "melón," *Cucumis melo*; cucumber, *Cucumis sativus*; wild cucumber, *Cucumis anguria*; watermelon, *Citrullus lanatus*; chayote, *Sechium edule*; and pumpkin, *Cucurbita moschata*.

#### MATERIALS AND METHODS

Last instar caterpillars and pupae of *D. hyalinata* were observed and collected mainly at Fortuna Substation. A total of 343 specimens of *D. hyalinata* late instars and pupae were collected at Fortuna and Isabela Substations. Specimens collected in these two places were brought to the laboratory and placed in plastic jars with moist sterile sand in the bottom for rearing. Specimens were observed daily for the presence of parasites. Predators were observed in the field attacking, sucking or eating caterpillars of *D. hyalinata*. Specimens were collected for identification; they were properly mounted, preserved and deposited in the insect collection of the Department of Crop Protection, Agricultural Experiment Station, Río Piedras. A voucher accession number and other pertinent data were assigned to all the preserved specimens.

#### RESULTS

Of 343 specimens (caterpillars and pupae) of *D. hyalinata* collected from pumpkin leaves at plantings at the Isabela and Fortuna substations and reared in the laboratory, 23.6% were found to be parasitized.

Nine parasites and three larval predators were identified as natural enemies of *D. hyalinata* in Puerto Rico (table 1). The parasites collected were the following:

#### HYMENOPTERA

*Agryon* sp. prob. new (Hymenoptera: Ichneumonidae). This species was reared from melonworm, *D. hyalinata* last instar caterpillar doing damage to pumpkin plants, collected at Fortuna 15 Aug. 1985; S. Medina Gaud and F. Gallardo; voucher specimen P. R. Accession Number 118-85. This is a new record for Puerto Rico.

*Eiphosoma* sp. (Hym.-Ichneumonidae). Specimens reared from the pupae of *D. hyalinata* caterpillars feeding on pumpkin leaves at Fortuna 15 Aug. 1985; S. Medina-Gaud and F. Gallardo; voucher specimens P. R.

Accession Number 110-85. According to R. W. Carlson, entomologist at the Systematic Entomology Laboratory, BBII, USDA, *Eiphosoma insulare* Cresson has been reared from *D. hyalinata* from P. R.; no other record of locality is available. This species differs markedly from *E. insulare*.

*Apanteles impiger* Muesebeck (Hym: Braconidae). Described by Muesebeck (4) from 8 females and 7 males (Type USNM 63064), collected at Mayagüez, reared from caterpillars of the melonworm, *D. hyalinata*, 10 Nov. 1943; H. K. Plank. Also recorded from Fortuna, from caterpillars of the melonworm, *D. hyalinata*, on pumpkin; 17 June 1986; S. Medina-Gaud and A. Segarra; voucher specimens accession number 318-86.

*Apanteles* sp. (Hym.: Braconidae). Recorded from undetermined species collected and reared from cocoons collected on pumpkin leaves infested with *D. hyalinata* at Isabela Aug. 1985; S. Medina-Gaud and E. Abreu; voucher specimens accession number 119-85.

*Spilochalcis* sp. (Hym: Chalcididae). From parasites of the pupae of *Diaphania hyalinata*; caterpillars feeding on pumpkin leaves; collected at Fortuna 16 June 1986; S. Medina-Gaud & A. Segarra; voucher specimens accession number 309-86.

*Catolaccus* sp. (Hym.: Pteromalidae). From specimens reared from pupae of *Diaphania hyalinata*; caterpillars feeding on pumpkin leaves; collected at Fortuna 19 June 1986; S. Medina-Gaud & A. Segarra; voucher specimens P. R. Accession No. 311-86. This is a new record for Puerto Rico.

#### DIPTERA

*Nemorilla maculosa* Macquart (Diptera: Tachinidae). Recorded by Wolcott (7) and from specimens reared from the pupae of the melonworm, *D. hyalinata* at Río Piedras, by E. G. Smyth.

*Nemorilla* sp. poss. *pyste* (Walker) (Diptera: Tachinidae). Recorded from specimens reared from pupae of the melonworm caterpillars found feeding on pumpkin leaves at Isabela 5 and 26 Aug. 1985; S. Medina Gaud & Edwin Abreu, voucher specimens Accession number P.R. Accession No. 112-85 and 120-85. According to Wolcott (9), J. M. Aldrich considered this species as *Exorista pyste* (Walker), a synonym of *Nemorilla maculosa*. N. E. Woodley from the Biosystematics and Beneficial Insects Institute, USDA, Agric. Res. Serv., at Beltsville, Maryland (personal communication) stated that *Nemorilla pyste* never has been recorded from the West Indies and that the specimens from P. R. could be that species or an undescribed one.

*Stomatodexia cothurnata* (Wiedemann) (Tachinidae). It was the first recorded by Van Zwaluwenburg (6) as *Leskia analis*, reared from *D. hyalinata* as *Margaronia hyalinata*. Listed by Wolcott (7) as *L. analis*, who later (8,9) listed it as *Stomatodexia cothurnata* (Wiedemann).



FIG. 4—Damage to pumpkin by *Diaphania hyalinata* caterpillar.

TABLE 1.—List of parasites and predators of *Diaphania hyalinata* (L.) observed in Puerto Rico

Order	Family	Species
Predators		
Hemiptera	Pentatomidae	<i>Podissus sagitta</i> (F.)
Hymenoptera	Formicidae	<i>Monomorium destructor</i> (Jerdon)
	Vespidae	<i>Polistes crinitus</i> (Felton)
Parasites		
	Ichneumonidae	<i>Agrypon</i> sp. <sup>1</sup>
	Ichneumonidae	<i>Eiphosoma</i> sp.
	Braconidae	<i>Apanteles impiger</i> Muesebeck
	Braconidae	<i>Apanteles</i> sp.
	Chalcididae	<i>Spilochalcis</i> sp.
	Pteromalidae	<i>Catolaccus</i> sp. <sup>1</sup>
Diptera	Tachinidae	<i>Nemorilla maculosa</i> Macquart
		<i>Nemorilla</i> sp. poss. <i>pyste</i> (Walker)
		<i>Stomatodexia cothurnata</i> Wiedemann

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### Predators

*Podissus sagitta* (Fabricius) (Hemiptera: Pentatomidae). Nymphs as well as adults of this stink bug were observed and collected sucking larvae of *Diaphania hyalinta* attacking pumpkin Fortuna, 16 June 1986; S. Medina-Gaud and A. Segarra; voucher specimens accession number 303-86.

*Monomorium destructor* (Jerdon) (Hymenoptera: Formicidae). This ant was observed and specimens collected feeding on larvae and pupae of *D. hyalinata* on infested pumpkin plants at Fortuna 15 Aug. 1985; S. Medina-Gaud and F. Gallardo; voucher specimens P.R. Accession No. 106-85. Also at same place, same data, attacking larvae, except 16 June 1986, S. Medina Gaud & A. Segarra.

*Polistes crinitus* (Felton) (Hymenoptera: Vespidae). This was observed and collected feeding on *D. hyalinata* caterpillars at Fortuna and Isabela Agricultural Experiment Substations 15 and 26 Aug. 1985; S. Medina-Gaud and F. Gallardo; and S. Medina-Gaud and E. Abreu, respectively. This wasp is commonly seen flying around and close to pumpkin plants. They move above and under the leaves hovering and walking around looking for the caterpillars of the melonworm.

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