Research Note

ARCHYTAS MARMORATUS *(TOWNSEND) AND* LESPESIA *SPP. (DIPTERA: TACHINIDAE) PARASITOIDS OF* SPODOPTERA FRUGIPERDA *(J.E. SMITH) (LEPIDOPTERA: NOCTUIDAE) ON* ZEA MAYS *L. IN SOUTHERN PUERTO RICO*[1,2]

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Populations of *Spodoptera frugiperda* (J.E. Smith) larvae, known as fall army worm (FAW), were evaluated in *Zea mays* L. in Juana Díaz and Lajas, Puerto Rico, from 2017 to 2019, when the presence of two parasitoids was observed in the collected populations. The larvae had been collected during the sowing period and were maintained on an artificial diet in the laboratory at room temperature. The larvae were evaluated daily to determine the number of each parasitoid. The pupae of both parasitoids were kept under laboratory conditions until the emergence of an adult insect for the identification of the species. At the end of the three years, based on the total data, it was possible to estimate the percentage of total parasitization. From samples collected in Juana Díaz, the adults of the parasitoids were identified as *Archytas marmoratus* (Townsend), and those collected in Lajas were identified as *Lespesia* spp.; both flies belong to the family Tachinidae (Diptera) (Figures 1A, B). Specimens were identified by Dr. James O'Hara of the Canadian National Collection of Insects, Agriculture and Agri-Food Canada in Ottawa, Ontario, Canada. The genus *Lespesia* could not be identified at the species level because existing taxonomic keys require a re-evaluation of all species (O'Hara James, personal communication).

Both dipterans had been previously identified in Vega Baja, Puerto Rico, on rice plantations and were also found in larvae of *Spodoptera frugiperda* (Pantojas et al.,1985; Pantojas and Fuxa,1992). In addition to Puerto Rico, these two parasitoids have been reported in *Spodoptera frugiperda* in the Americas and Caribbean Basin. *Archytas marmoratus* has been reported in Argentina, Barbados, Brazil, Chile, Cuba, Ecuador, Guadalupe, Haiti, Honduras, Lesser Antilles, México, Nicaragua, Perú, Suriname, Trinidad, and USA, from *S. frugiperda* in *Zea mays*, *Panicum miliaceum* L., *Capsicum annuum* L., *Sorghum bicolor* L., *Cynodon dactylon* L., *Gossypium* spp., and *Medicago sativa* L.

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(Molina-Ochoa et al., 2003). *Lespesia* spp. has been reported in Argentina, Brazil, Colombia, Cuba, Honduras, Nicaragua, USA, Uruguay and Venezuela, from larvae of *S. frugiperda* in *Z. mays* L., *S. bicolor* L. and *Oryza sativa* L. (Molina-Ochoa et al., 2003).

In our studies we found that 147 larvae in Lajas were parasitized by *Lespesia* and 59 larvae in Juana Díaz were parasitized by *A. marmoratus* (Table 1). In Lajas, the total percentage of parasitization fluctuated between 2.28 and 29.03% and in Juana Díaz, between 6.6 and 26.00%. Pantojas and Fuxa (1992) determined a low percentage of parasitization by both tachinids, 0.1% for *A. marmoratus* and 1.2% for *Lespesia* spp. In Colombia, Vargas and Sánchez (1983) reported an *A. marmoratus* parasitization level of 1.7% in *S. frugiperda* in rice, and similar values of *Lespesia* spp. as those reported by Pantojas and Fuxa (1992). Mendesil et al. (2023) carried out a review on *S. frugiperda* and noted a parasitization percentage ranging from 1.60 to 3.40% by *A. marmoratus* in corn cultivation in Mexico. However, in our study the average percentages of parasitization were 15.88% by *A. marmoratus* and 13.29% by *Lespesia* spp. (Table 1). In a study carried out in Cuba, Gómez-Souza et al. (2000) reported a percentage of parasitization similar to our findings. For instance, they observed 16.70% parasitization of *S. frugiperda* in corn by *A. marmoratus* L.; as for *Lespesia* they identified *L. archippivora* Riley at the species level, but with a higher percentage of parasitization, 20.44%. Regarding the same crop in the USA, Mendesil et al. (2023) noted a parasitization percentage of 47.4 to 66.7% by *A. marmoratus*.

These two genera of the Family Tachinidae belong to different subfamilies; *Archytas marmoratus* belongs to the Subfamily Tachininae, Tribe Tachinini, and *Lespesia* spp. to the Subfamily Exoristinae, Tribe Eryciini (O'Hara and Wood, 2004; Arnaud, 1978). The

TABLE 1.—*Parasitoids and percentage of parasitization of Spodoptera frugiperda larvae (FAW) on corn crops in Lajas and Juana Díaz, Puerto Rico.*

Site	# FAW[1]	Number parasitized larvae	Parasitoids	Total % parasitization
Lajas	196	19	*Lespesia* spp.	9.69 a
	155	45	*Lespesia* spp.	29.03 ab
	263	6	*Lespesia* spp.	2.28 a
	30	5	*Lespesia* spp.	16.67 b
	30	5	*Lespesia* spp.	16.67 b
	360	45	*Lespesia* spp.	12.50 a
	360	22	*Lespesia* spp.	6.11 a
Avg. % parasitization				13.29
Juana Díaz	120	15	*Archytas marmoratus*	12.50 a
	50	8	*Archytas marmoratus*	16.00 a
	40	5	*Archytas marmoratus*	10.00 a
	50	10	*Archytas marmoratus*	20.00 a
	30	2	*Archytas marmoratus*	6.66 a
	50	13	*Archytas marmoratus*	26.00 a
	30	6	*Archytas marmoratus*	20.00 a
Avg. % parasitization				15.88

[1]Total number of fall army worm (FAW)= *Spodoptera frugiperda*.

[2]Total percentages parasitization not followed by the same letter are significantly different ($p > 0.05$; GLM, LSD test).

general morphological characteristics of our *A. marmoratus* specimens were the following: golden-yellow head, pronotum subshining black, and the abdomen subshining reddish-brown with abdominal terga pollinose, the tergum 3 with median marginal bristles, but usually absent (Figure 1A). While our specimens of *Lespesia* spp. have a white pearl head, pronotum gray with four black stripes, abdomen black in ground color, sternite predominantly gray pollinose, without bare red areas except for small red spots laterally on tergum 3 (Figure 1B).

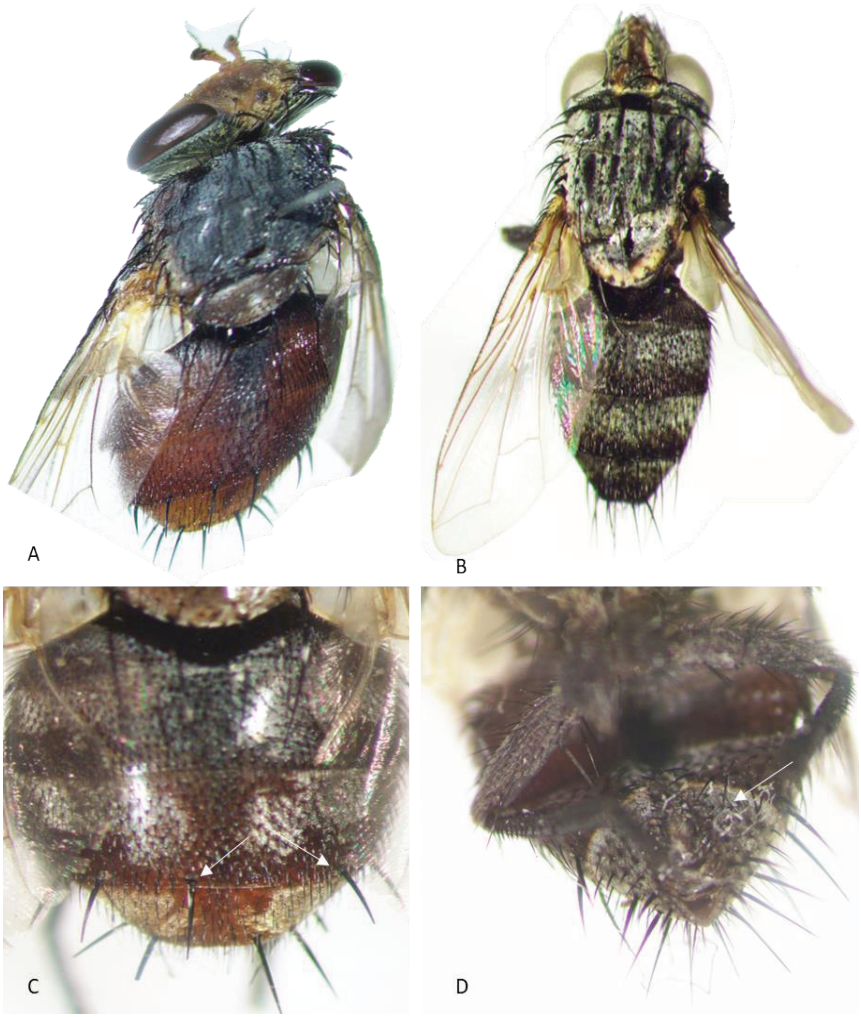

FIGURE 1. Tachinidae parasitoids of *Spodoptera frugiperda*. A) adult of *Archyta marmoratus*, B) adult of *Lespesia* spp., C) abdomen reddish with marginal bristles on tergum 3, D) abdomen sternite with gray pollinose.

Because of the importance of knowing about the natural enemies of *Spodoptera frugiperda* and other lepidopteran species in Puerto Rico, we recommend future research on both tachinids. The objective would be to determine which genus and species of these tachinids are present by region or locality, and determine the percentage of parasitization of *S. frugiperda* or other lepidopteran species in different crops. Researchers should evaluate whether the percentage of parasitization varies among the different crops where the insect pest and these parasitoids are found.

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