Some Notes on Parasitization of *Blepharomastix ebulealis* (Guenee) (Lepidoptera: Pyralidae) in Oahu Forests[1]

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ABSTRACT

Parasitization of the introduced biocontrol agent *Blepharomastix ebulealis* was studied on Oahu from November 1982 to December 1983. Mean parasitization of larvae was 43.3 ± 6.4%. The parasitoids involved and their frequencies of occurrence are listed.

The pyralid *Blepharomastix ebulealis* Guenee was collected from the melastomataceous plants, *Heterotrichum cymosum* and *Clidemia hirta* (L.) D. Don in Puerto Rico and Trinidad, respectively. It was imported to Hawaii in 1969 in an attempt to control the noxious weed *C. hirta* (Davis 1972). Host specificity tests in Hawaii demonstrated that three weedy Melastomataceae (*C. hirta, Melastoma malabothricum* L., and *Tibouchina urvilleana* (DC.) Cogn.) were suitable hosts (Nakao and Suzukawa 1970). The moth did not attack any economic plants tested and was subsequently released on the islands of Hawaii, Oahu, and Kauai (Julian 1982). Its establishment was confirmed by its recovery from *Clidemia* in 1974 along Kawaiiki trail (Nakao and Funasaki 1976).

Blepharomastix is presently breeding on *Clidemia* but does not seem to be suppressing the weed. Fujii (1977) suggested that parasitization by *Casinaria infesta* Cresson and other parasitoids may be decreasing *B. ebulealis* efficiency. This study was initiated to discover species of parasitoids involved and their relative importance as mortality factors of *B. ebulealis* on *Clidemia* in Hawaiian forests.

MATERIALS AND METHODS

Blepharomastix larvae were sampled monthly in Oahu forest reserves at Palolo (Waiomao stream), and Aiea (loop trail) from November 1982 through December 1983. Pyralid-rolled leaves of *Clidemia* were collected, placed into plastic bags, and brought back to the lab. The larvae were placed into one gallon screen-topped glass jars. Each container was checked for parasitoids and fresh leaf material added every other day. All *B. ebulealis* pupae were removed and individually placed in size 000 gelatin capsules until a moth or parasitoid emerged.

RESULTS AND DISCUSSION

Larvae (N=111) collected yielded a mean parasitization of 43.3 ± 6.4% (±S.E.) (Table 1). Four species of Hymenoptera were reared from *B. ebulealis.*

At Palolo, an average of 43.2 ± 8.5% of *B. ebulealis* larvae (N=92) were parasitized. *Trathala flavoorbitalis* (Cameron) (Ichneumonidae), *Brachymeria obscurata* (Walker) (Chalcididae), *Meteorus laphygmae* Viereck (Braconidae), and *Casinaria infesta* (Cresson) (Ichneumonidae) were reared from *B. ebulealis* from

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this site. *M. laphygmae* occurred more consistently (in 75% of samples) and gave the higher mean percent parasitization for each sample (32.3 ± 10%). *T. flavoorbitalis* occurred in 63.5% of the samples and yielded a mean parasitization of 7.9 ± 2.7%. Single individuals of *D. obscurata* and *C. infesta* were found at this site in one and two samples, respectively.

Trathala flavoorbitalis was the only parasitoid which attacked *B. ebulealis* at the Aiea site. It parasitized a mean of 43.6 ± 6.7% of *B. ebulealis* (N=19) sampled at this site.

Two of these parasitoids were purposely introduced to Hawaii in attempts to control lepidoptera pests: *B. obscurata* from Japan in 1895 to control *Hedylepta accepta* (sugarcane leafroller) and *H. blackburni* (coconut leafroller) (Timberlake 1927), and *M. laphygmae* from Texas in 1942 to control armyworms (Bianchi 1944). The other two parasitoids were accidental introductions. *Trathala flavoorbitalis* was first recorded in Hawaii about 1910. Soon after its introduction *H. accepta* and *H. blackburni* populations declined (Clausen 1978). *Casinaria infesta* was first discovered in Hawaii and reared from leaf-rolling Lepidoptera in 1921 (Swezey 1924).

In addition to these larval parasitoids, two females and one male of the endemic *Trichogramma* sp. near *higai* (determined by E.R. Oatman) were reared from a single *B. ebulealis* egg. This was the only egg found because the sampling plan was designed to collect only larvae.

The effects of parasitoids on *B. ebulealis* were quantified for the larval but not the egg stage. The results demonstrated that larvae were heavily parasitized at these sites from November 1982 through December 1983 and that the eggs experienced an unmeasured degree of mortality from *Trichogramma*. Table 1 shows the degree of parasitization to larvae, however, the combined effect of larval and egg parasitoids

TABLE 1. Numbers of *Blepharomastix ebulealis* and percent parasitization by four species of parasitoids from two sites on Oahu.

Date	Site	N	para. (%)	parasitized (%) by each of four species			
				T	B	M	C
November 24, 1982	Palolo	9	33.3	22.2	11.1	-	-
December 29,1982	Palolo	22	54.5	4.5	4.5	45.4	-
February 1, 1983	Palolo	15	33.3	13.3	-	20.0	-
March 4, 1983	Palolo	13	30.8	15.4	-	7.7	7.7
May 9, 1983	Palolo	5	40.0	-	-	40.0	-
June 10, 1983	Palolo	2	0	-	-	-	-
October 31, 1983	Palolo	14	78.6	-	-	78.6	-
December 21, 1983	Palolo	12	75.0	8.3	-	66.7	-
December 2, 1982	Aiea	6	33.3	33.3	-	-	-
March 2, 1983	Aiea	5	60.0	60.0	-	-	-
May 24, 1983	Aiea	8	37.5	37.5	-	-	-

N = number of *Blepharomastix*. T, B, M, and C are percentage of *Blepharomastix* parasitized by *Trathala flavoorbitalis, Brachymeria obscurata, Meteorus laphygmae,* and *Casinaria infesta,* respectively.

would give higher values. These high levels of parasitization by parasitoids may be a major and at the very least an important factor contributing to the low *B. ebulealis* field populations.

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