

### Survey of rare butterflies in the Mariana Islands

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Three of the species of butterflies recorded from the Mariana Islands are found only in the island chain. These three are *Euploea eleutho*, *Vagrans egistina* and *Hypolimnias octocula mariannensis*. A survey was initiated on Guam, Rota and Saipan to determine whether these butterflies were still present. Historical records had shown *E. eleutho* to be present on Guam, Rota and Saipan. *Vagrans egistina* had been collected in Guam and Rota and *H. octocula mariannensis* had been collected in Guam and Saipan.

Several surveys were initiated in 1995. All adult butterflies seen during surveys were recorded. For *E. eleutho*, for which the host is not known, this was the only survey done. For *V. egistina*, the host plant is recorded to be *Maytenus thompsonii* (luluhut) in the family Celastraceae, a shrub endemic to the Marianas. At each location where these bushes could be found, 10 shrubs were examined (where available). All new leaves were searched, and a scan of the old foliage was done. For *H. octocula*, the recorded host was *Procris pedunculata*. Early in the survey we found that the larvae also fed upon the very similar *Elatostema calcareum* (tupun ayuyu). Both are forest herbs in the family Urticaceae growing on karst limestone. For each site where the plants were found, 200 stems of *Procris* and 200 stems of *Elatostema* were searched (or as many as were available).

*E. eleutho* was not found on any of the islands. It has not been collected on these islands since the 1940's. It may still exist on Alamagan or Anatahan where it was collected in the 1970's. However, a Japanese collecting expedition to these islands a few years ago failed to collect any.

*V. egistina* was found in Rota at one location, on a raised bench above the sea bird sanctuary. *Maytenus* is very abundant in Rota, but surveys of five other locations have failed to note the butterfly. Survey work is continuing. Although on one visit possibly up to seven butterflies (probably all male based on their behavior) were seen along the path near the bird sanctuary, and *Maytenus* was abundant, no eggs or larvae were found on any

of the plants on three separate visits. To date we have been unable to locate any *V. egistina* on Guam. Survey work is continuing, but we are inclined to feel it may be extinct on Guam. The last specimens collected in Guam were taken in the 1970's.

*H. octocula* was not found on Saipan. We were only able to locate *Procris* along the base of the cliff line going around from Suicide cliff to Kalebrera Cave. Several large stands were located. However no sign of adult or larvae could be found. No specimens were found in the fairly extensive collection of butterflies at the Saipan Department of Agriculture. Although no butterflies of this species have ever been collected on Rota, we searched several sites anyhow, as Rota has not been collected as extensively as Guam and Saipan. *Elatostema* was abundant behind the Japanese gun on the way up to the Sabana, and at similar cliff backed sites at that altitude and slightly higher. *Procris* occurred at some of these locations. Although chewing of the plants was noted, this appeared to be caused by the green caterpillar of a Noctuid moth. No evidence of *H. octocula* was found. In Guam, a number of sites along the northern half of Guam have been searched. *Procris* and occasionally *Elatostema* occur on the windward side in patches in limestone forest in a narrow band about 200 ft above sea level. Both *Elatostema* and *Procris* occurred on the leeward side in forests perhaps 100-200 ft. above sea level. At all locations where the host plants were found at least one of the stages of *H. octocula* was also found. The most butterflies seen in one day at a suitable location was six. We found no eggs at most sites, but up to 71 at one site which was undergoing a small outbreak. Eggs and larvae were more abundant on *Elatostema* on the leeward side. Still to be searched are patches of these plants which are thought to occur in patches of limestone forest on the Southern mountains.

One site below the University of Guam was surveyed for one year. Butterflies were most abundant between December and February. Population levels were very low in July and August. Overall mortality of juveniles was high. Out of 445 eggs found, only 45 made it to a first instar larva. Of 47 first instar larvae found, only 5 reached the sixth instar. Eggs tended to be laid on plants which were hanging down from a pinnacle, rather

than more upright plants, most often on the plants at the lower edge of a patch. Larvae remained on the original plant until about fourth instar, but by fifth instar, they generally had to move to another stem to get enough food. Sixth instar larvae are not only large, but leave very visible leaf damage, and tend to use the larger plants at the top of pinnacles. Therefore they tend to be easily found. It is probable that most sixth instar larvae in a patch are seen during a sample. Overall, we found 49 sixth instar larvae during this year long study. Based on the observed mortality rates, this would suggest that some 5000 eggs were laid on our transect plot during the year. Only a few pupae were found, as larvae tended to pupate in rather hidden spots. Out of 16 found, only 3 were eaten or broken off. The rest all emerged. No parasites were reared from pupae. Overall, we found a significant correlation between the presence of adult butterflies (averaged on a one week basis), and the number of eggs found on plants. No correlation with larval numbers was observed. Egg predation, probably by ants, and egg parasitization killed the majority of eggs. Parasitized eggs were brought to the laboratory and reared. Except for two eggs which produced *Ooencyrtus* sp., all the eggs were parasitized by a *Telenomus* sp. In contrast to the Mangilao site, however, eggs recovered from other sites did produce *Ooencyrtus* sp. We expect that this will prove to be the same species which attack *H. anomala* and *H. bolina* eggs, but have not yet sent any off for confirmation. No egg, larval or pupal parasites which are known to have been introduced for biological control purposes were recovered.

Mortality of eggs is pictured in figure 1. Mortality of larvae was as follows  
Eggs. 445 eggs- 71 hatched, 25 of the larvae disappeared immediately never found. (4 additional accidentally removed to laboratory day before hatching). Duration of egg stage 6 days.

1st instar. 47 found. 21 reached 2nd instar. Duration of 1st instar  $2.4 \pm 0.6$  days

2nd instar. 37 found. 21 reached 3rd instar. Duration of 2nd instar  $2.0 \pm 0.7$  days

3rd instar. 36 found. 32 reached 4th instar. Duration of 3rd instar  $2.5 \pm 0.8$  days

4th instar. 46 found. 30 reached 5th instar. Duration of 4th instar  $2.9 \pm 0.8$  days

5th instar. 46 found. 33 reached 6th instar. Duration of 5th instar  $3.7 \pm 1.0$  days

6th instar. 51 found. 15 found as pupae. Duration of 6th instar  $6.1 \pm 1.5$  days. This was actually bimodal with 2 out of 7 larvae requiring 4 days and 5 out of 7 requiring 7 days. (7 larvae was the number found both at 5th instar and at pupal stage). Perhaps there is a sexual dimorphism or else food quality greatly affect the duration of the last stage.

Among the 34 which disappeared, 13 disappeared during the first three days, but the majority disappeared after 4 or more days. Many may have moved to pupation sites and not been found again. Among the younger larvae, the disappearances were greatest the first day and diminished on subsequent days. Thus mortality did not appear to be greatest on the days they molted, but on the days in between molts. Causes of mortality could not generally be determined. A couple of first instar larvae appeared to have drowned in drops of water during rainy weather. Ants were ubiquitous on the plants, and were probably the major cause of mortality. No larval parasites were found (nor have they been found for *H. bolina* or *anomala* in previous studies.).

Chart1

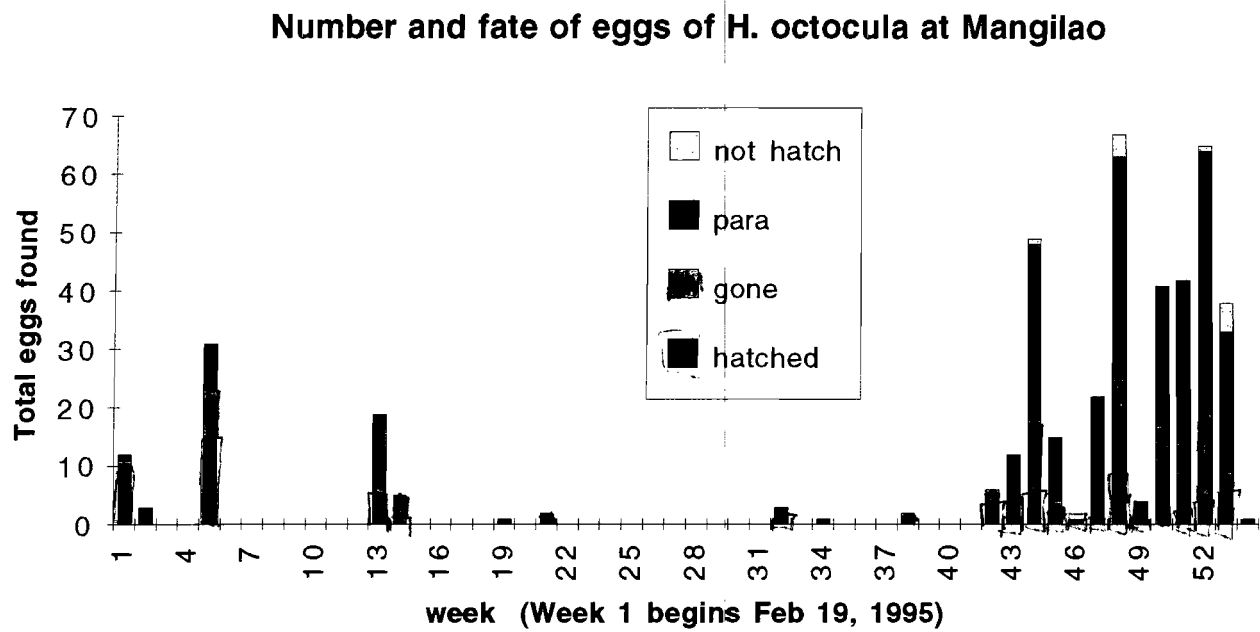
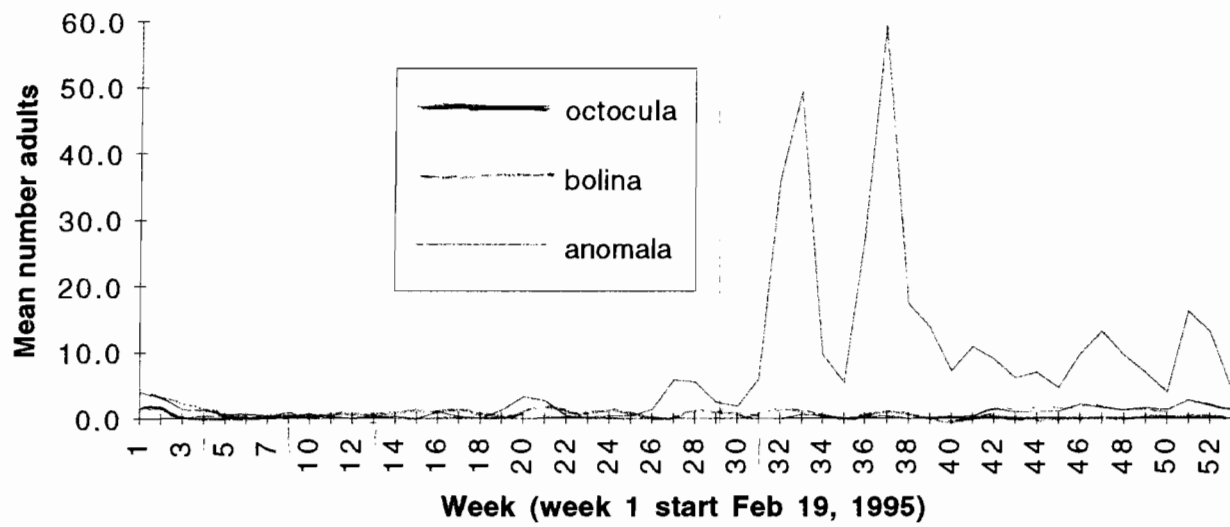


Chart3

**Mean number adult butterflies seen per week at Mangilao**



# H.octocula survey

Sample sites/H. octocula													
date	site	host	# stem	egg	1st	2nd	3rd	4th	5th	6th	pupa	notes	
4/30/95	Fadian cove	Procris	80								1	old par	
2/5/95	Hilaan	Elatosema	285				2		1		1	2 thirds	
2/5/95	Hilaan	Procris	200								1	also 1/	
1/13/95	Mangilao golf	Procris	35										
6/22/95	Mangilao golf	Procris	200								1		
6/29/95	Orote	Elatostem	200						1	3		1 6th r	
8/2/95	Pagat	Procris	200	71			3	2	7	4		40 egg	
8/2/95	Pagat	Elatostem	26	2				1	2	1			
5/31/95	wildlife refuge	Procris	2										
7/24/95	tweeds Cave	Procris	200	10								1 empt	
7/24/95	tweeds Cave	Elatostem	200	30	1	1		2				3 eggs	

## butterfly adults

adult butterfly survey					Hypolimnna									
date	site	minu	Euploea	Papilio	anomal	bolina	octocula	Eurema	Catopsilia	Badamia	Zizina	Melanitis	Danaus	Vagrans
Guam														
6/29/95	Orote. Spanish	120	91	75	11	4	3			1	3			
6/21/95	Nimitz Hill	50	36	18	1	1		41	15			1		
6/12/95	Agana Hts	20	8	6	3			15	13					
6/12/95	Fonte Valley	30	33	15	2			21	2					
7/3/95	Barrigada Hts	40	3	45	1	7		29	5					
7/10/95	Pagat upper fie	50	16	19	8	1		18						
7/20/95	NW field	70	56	22	2	5		84	2		80			
7/20/95	Refuge Rd.	35	41	47	0	3		69	1					
7/24/95	Tweeds Cave	145	123	180	12	12	2	91						
7/27/95	Laguas R. Mout	55	11	15	1			2	3			1		
8/2/95	Pagat(lower)	180	15	57	5	4	1	47						
8/10/95	Talofofo Caves	135	9	37	4	1		10				1		
Rota														
8/7/95	Coconut Village	30		4		2								
8/7/95	Swimming hole	90		6	10	5		1					1	
8/7/95	Bird sanctuary ?			4	3	3								2
11/24/95	Japanese Gun	60			3									
11/24/95	Cliff under saba	60			5									
11/24/95	Sabana	15		1	2	1								
11/24/95	rd to sabana (I	35		3										
11/24/95	bird Sanctuary	120		14	19	4		3						3
1/26/95	Taisacan ranch	120		2	6	1								
1/26/95	dump road	60		25	60	5								
1/26/95	Bird Sanctuary	75		13	6	10		1						5
Saipan														
8/15/95	Kagman	60	1	1	2			6	14		6			
8/15/95	Santa Lourdes	30		1				6						
8/15/95	Coyu Country C	15				5		6	5					
8/15/95	Mt Tapochau	45	3		2	2			4			1		
8/15/95	Garapan Park	20				1		1	1		51			



butterfly adults

8/15/95	Suicide cliff	70	5			8								
8/15/95	Above Bird Roc	60	1			6								
9/15/95	Kalebera cave	15	20		3	33		20						
9/15/95	Suicide cliff	40	4		1	3		1	1		5			
9/15/95	to bird rock	25	12			13		2						
9/15/95	to Kalebera cav	55	2			9								

*Hypolimnus octoculatus*

