

PRELIMINARY REPORT ON QUEENLESS REPRODUCTION
IN A PRIMITIVE PONERINE ANT *AMBLYOPONE* SP.
(*RECLINATA* GROUP) IN WEST JAVA, INDONESIA

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Reproductive caste differentiation is essential for insect eusociality. In the vast majority of ants, caste differentiation is associated with morphological differentiation; queens have well developed ovaries and spermathecae, and workers possess reduced reproductive organs. The reproductive apparatus has been completely lost in workers of higher ant species (Hölldobler & Wilson 1990). However, in the subfamily Ponerinae in which morphological specialization is less developed than that in the higher subfamilies, a few species have no morphologically distinct queens (Peeters 1990). Alternatively, some mated workers (=gamergates) lay eggs instead. To date, such queenless species have been known to occur in 7 genera of 3 tribes, Ectatommini, Ponerini and Plathyreini (Peeters 1990).

In Bogor, West Java, Indonesia, I obtained some colonies of *Amblyopone* sp. (*reclinata* group) as the first record of gamergate reproduction in the primitive tribe Amblyoponini. In this paper I give preliminary data concerning the composition of these colonies and reproductive status of workers, leaving precise descriptions for later publication.

Twelve colonies of *Amblyopone* sp. were collected in the Botani Garden of Bogor, West Java, Indonesia, from December 1990 to February 1991. All workers of the colonies were dissected to check absence or presence of sperm in the spermatheca and ovarian condition under a binocular microscope. The ovarian condition of workers was classified into the following 3 developmental classes according to the presence or absence of mature oocytes or chorionated eggs and relative size of oocytes to the following nurse cells:

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class I, all oocytes were smaller than the nurse cells; class II, one or more developed oocytes which were bigger than the nurse cells existed but there were no mature oocytes nor chorionated eggs; class III, chorionated eggs and/or mature oocytes were involved.

The composition of the 12 colonies of *Amblyopone* sp. is shown in table 1. All colonies showed no morphologically distinct queens nor queen pupae. Male pupae were contained in one colony collected in January. The mean number of workers was 89 (\pm 50 SD). All workers had a pair of four ovarioles and a spermatheca. Each colony contained 1 to 18 inseminated workers (Table 2). Most of them had chorionated eggs or mature oocytes in their ovaries and dense accumulations of yellow bodies were observed in basal part of each ovariole. In contrast, all but 6 virgin workers had no mature oocytes or chorionated eggs. Only 6 workers which occupied 0.5% of the virgin workers dissected had one mature oocyte in their ovaries, but their yellow bodies were tiny, suggesting that the egg-laying activity of virgin workers is considerably low. Many virgin workers had a few developed oocytes (ovary class II); however, the shape of these oocytes was abnormally round. This was observably different from the oocytes of gamergates. Detailed observations showed that most of the round oocytes in the ovaries

Table 1. Demographic characteristics of the nests of *Amblyopone* sp. collected in the field.

Colony code	Workers	Cocoons			Larvae	Eggs
		W	M	P		
1203-1	6	0	0	0	0	0
1209-1	35	6	0	2	13	0
1209-2	175	0	0	0	82	23
1210-1	77	0	0	0	17	7
1222-1	55	0	0	0	8	16
0103-1	147	32	0	0	68	47
0104-1	100	13	7	0	30	36
0104-2	80	32	0	0	10	6
0111-1	185	0	0	0	15	18
0121-1	81	21	0	0	14	29
0124-1	97	0	0	38	19	19
0124-2	131	40	0	0	85	13
Mean	89(\pm 50 SD)					

W, worker pupae; M, male pupae; P, prepupae.

Table 2. Reproductive status of workers in 12 colonies of *Amblyopone* sp.

Colony code	mated	Ovarian condition			virgin	Ovarian condition		
		I	II	III		I	II	III
1203-1	3	1	0	2	3	3	0	0
1209-1	18	3	9	6	17	14	3	0
1209-2	1	0	0	1	174	94	76	4
1210-1	15	0	2	13	62	36	26	0
1222-1	2	0	0	2	53	17	36	0
0103-1	2	0	0	2	145	105	40	0
0104-1	2	0	0	2	98	37	59	2
0104-2	3	0	0	3	77	51	26	0
0111-1	7	0	3	4	178	133	45	0
0121-1	3	0	0	3	78	49	29	0
0124-1	9	2	0	7	88	56	32	0
0124-2	10	0	4	6	121	96	25	0

of virgin workers had already degenerated, suggesting that most virgin workers are completely sterile. These results suggest that reproduction is principally performed by gamergates in the colonies of *Amblyopone* sp.

In the species belonging to the tribe Amblyoponini, previous reports show that reproduction is principally performed by morphologically distinct queens. For instance, colonies of *Onychomyrmex* contain an ergatoid queen (Taylor & Brown 1985). It has been reported that winged queens reproduce in the colonies of *Mystrium Myopopone* and *Prionopelta* (Brown 1960, Moffett 1985, Hölldobler & Wilson 1985). In the genus *Amblyopone*, colonies of *A. pallipes*, *A. silvestrii* and *A. pullto* have winged queens who monopolize direct reproduction (Traniello 1982, Masuko 1986, Gotwald & Levieux 1972). Winged queens have been also reported in the other *Amblyopone* species which have been studied only in taxonomy (Brown 1960, Taylor 1978). Gamergate reproduction of *Amblyopone* sp. shown in this study is a unique social structure in the tribe Amblyoponini. The discovery of queenless species in this primitive tribe seems to stress that the disappearance of the queen caste had occurred independently in various phylogenetic lines in the Ponerinae.

SUMMARY

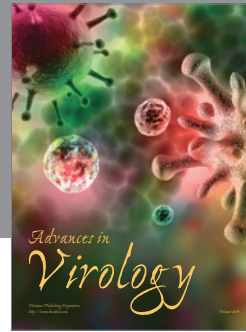
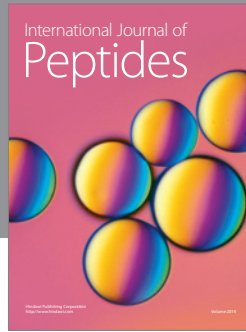
Social organization of *Amblyopone* sp. (*reclinata* group) was studied in Bogor, West Java, Indonesia. The colonies consisted of 89 workers on average. There were no morphologically distinct queens, and between 1 to 18 workers mated and reproduced instead. Most virgin workers were sterile. This is the first report of queenless reproduction in the primitive tribe Amblyoponini.

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