

## CICADAS OF BARIO, SARAWAK

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### ABSTRACT

*A total of 12 cicada species from nine genera of two families (Cicadidae and Tibicinidae) is recorded. Of these, all are new species records for Bario, five (Ternopsia near andersoni Distant) sp.n. (to be described as new species), Nabalua mascula (Distant), Tanna bakeri Moulton, Pomponia lactea (Distant) and Scieroptera mark as new records for Sarawak and two (T. sp. n. and S. sp. n.) as new records for Borneo. With these, the previous cicada records increase to present totals of 65 species in 24 genera for Sarawak and 84 species in 24 genera for Borneo. The most abundant species found was Dundubia vaginata (Fabricius), followed by Tosena fasciata (Fabricius). Comparisons of records indicate that Bario harbours a good representation of Sarawak or even Bornean cicada species from the genera Abroma (100%) respectively, Tanna (50%), Platylomia (50%), Ternopsia (33%), Nabalua (33%) and Tosena (50%), T. fasciata, N. mascula and P. lactea (Distant) are relatively rare in Borneo, besides T. sp. n. and S. sp. n. Females N. mascula and T. sp. n. have yet to be discovered.*

### INTRODUCTION

In 1923, Moulton published a monograph on cicadas (Homoptera: Cicadoidea) of Malaysia (now called Malesia). In that monograph, Moulton accounted a total of 55 species in 21 genera for Sarawak, 30 species in 20 genera for Sabah and 75 species in 24 genera for Borneo.

The species records were later increased to 58 species in 21 genera for Sarawak, 31 species in 20 genera for Sabah and 78 species in 24 genera for Borneo. These were when: Overmeer & Duffels (1967) announced Dundubia intermerata Moulton (known from Sarawak but not Sabah) to be a new synonym of Dundubia terpsichore Walker; Duffels (1976) described Dundubia gravesteini Duffels as new species after a male specimen collected from Borneo (most probably Sarawak); and Bregman (1985) identified Chremistica tridentigera (Breddin) from specimens collected in Sabah, Brunei and Sarawak, and described Chremistica minor and Chremistica biloba as new species based on specimens collected in Sarawak.

In 1991, the total species record for Borneo decreased to 77 species in 24 genera. This was when Duffels (1991) announced Champaka harveyi Distant (known from Kalimantan but not Sabah or Sarawak) to be a new synonym of Champaka viridimaculata (Distant).

There has been virtually no report on faunal surveys of cicadas in any locality in Borneo in recent years. In view of that, cicada faunal surveys, locality by locality, were recently programmed. Among the goals of the programme is to provide cicada inventories, ultimately aimed towards the systematic revision of the cicadas of Borneo.

Within the framework of this programme, preliminary faunal surveys of cicadas have been carried out in a number of localities in Sabah (Duffels, 1989; Zaidi & Ruslan, 1995a, b) and Sarawak (Zaidi, 1993). Through these surveys the total species records have increased to 60 species in 21 genera for Sarawak, 42 species in 21 genera for Sabah and 82 species in 24 genera for Borneo (Zaidi & Ruslan, 1995b).

One other chosen locality for cicada survey in Sarawak was Bario. For this locality, a preliminary survey of cicadas was carried out in the forested areas within 7km radius of Bario settlement from 10-16 April 1995. The results obtained are presented here.

## MATERIALS AND METHODS

In this survey, night and day time collections of cicada specimens were carried out. Cicadas which came to the light traps (250-watt mercury vapour lights run by 500-watt portable generators) were collected. Day time collections of cicadas from shrubs, using insect nets, were also carried out.

Identification and species naming of the cicada specimens were made based on standard taxonomic references (Moulton, 1923; Overmeer & Duffels, 1967; Duffels, 1976 & 1991) and counter-checked with identified specimens in the Centre for Insect Systematics Universiti Kebangsaan Malaysia, Bangi. Classification of the cicada species in this report is in accordance to that of Duffels and van der Laan (1985).

The cicada specimens from this survey are presently kept in the museum of the Centre for Insect Systematics, Universiti Kebangsaan Malaysia, Bangi.

## RESULTS AND DISCUSSION

Cicada fauna. Table 1 shows that this survey was able to record a total of 12 species of cicadas, belonging to 9 genera, for the surveyed areas in Bario. According to Duffels and van der Laan (1985), 10 of these 12 species belong to the family Cicadidae and the other two species to the family Tibicinidae.

It is pertinent to point out that during this survey the familiar male calls of the so-called six o'clock cicada, *Pomponia merula* Distant, were commonly heard at dusk. Unfortunately the sampling methods used were unsuccessful in getting either the male or female specimens of this species.

During this survey day time collections were only successful in getting two male specimens of *Tosena fasciata* (Fabricius). The other specimens of this species, like those of the other species listed in Table 1, were obtained through light trappings.

An interesting feature of the results of this survey is that all of these 12 species are new records for Bario. Previously there has been no publication on cicada species from Bario.

It is also important to point out that, because of logistical constraints, this survey was unable to cover Mt. Murud. So far, the recorded cicadas for this nearby mountain were *Pomponia rajah* Moulton and *Kalabita operculata* Moulton (Moulton, 1923). The species records of this and other surveys in Sarawak and Sabah (Duffels, 1989; Zaidi & Ruslan, 1995a, b) seem to support the status of these two cicada species being endemic to Mt. Murud (Moulton, 1923).

Tables 1. *Cicada* specimens obtained during the survey in Bario, Sarawak

No.	Taxa	No. of specimens		
		Male	Female	Total
	<b>CICADIDAE</b>			
1.	<i>Ternopsia</i> (near <i>andersoni</i> ) sp. N#*	1	0	1
2.	<i>Nabula mascula</i> (Distant) #	2	0	2
3.	<i>Tanna bakeri</i> Moulton #	1	0	1
4.	<i>Dundubia rufivena</i> Walker	0	1	1
5.	<i>Dundubia vaginata</i> (Fabricius)	10	8	18
6.	<i>Platylomia spinosa</i> (Fabricius)	2	1	3
7.	<i>Tosena fasciata</i> (Fabricius) @	4	1	5
8.	<i>Pomponia decem</i> (Walker)	1	0	1
9.	<i>Pomponia lactea</i> (Distant)#	1	0	1
10.	<i>Pomponia merula</i> Distant (+)	(+)	0	(+)
	<b>TIBICINIDAE</b>			
11.	<i>Scieroptera</i> (near <i>crocea</i> ) sp. N. #*	2	1	3
12.	<i>Abraoma maculicollis</i> (Guerin)	0	1	1
	<b>Total no. of specimens</b>	<b>24</b>	<b>13</b>	<b>37</b>
	<b>Total no. of species</b>	<b>9</b>	<b>6</b>	<b>11</b>
	<b>Total no. of genera</b>	<b>8</b>	<b>5</b>	<b>9</b>

Note: (+) *Species which the familiar mating calls of its males heard but the sampling methods used were unsuccessful in getting either its male or female specimens;*  
 @ *Species which its male specimens caught in both day and night collections;*  
 # *Species which mark as new record for Sarawak.*  
 \* *species which mark as new record for Borneo.*

Comparison of records (Moulton, 1923; Overmeer & Duffels, 1967; Duffels, 1976, 1989, 1991; Bregman, 1985; Zaidi, 1993; Zaidi & Ruslan, 1995a, b) shows that of the 12 species recorded in this survey five *Ternopsia* (near *andersoni* Distant) sp. n. (to be described as new species), *Nabalua mascula* (Distant), *Tanna bakeri* Moulton, *Pomponia lactea* (Distant) and *Scieroptera* (near *crocea* Guerin sp. n. (also to be described as new species) mark as new records for Sarawak and two (*T. sp. n.* and *S. sp. n.*) as new records for Borneo (Table 1). It is also interesting to note that, for Sarawak, this survey also provide the first time record of species belonging to the genera *Ternopsia*, *Nabalua* and *Tanna*. Thus, this survey has increased the recently updated species records of 60 species in 21 genera for Sarawak and 82 species in 24 genera for Borneo (Zaidi &

Ruslan 1995b) to present total of 65 species in 24 genera for Sarawak and 84 species in 24 genera for Borneo (Table 2).

**Species richness and composition.** The results of this preliminary survey seem to indicate that Sarawak or even Bornean cicadas are fairly well represented within the surveyed areas in Bario. It is not so much in terms of species in toto, (which are around 18% and 13%, respectively) but more in terms of species belonging to certain genera, e.g. *Abroma* (100% and 100%, respectively), *Tanna* (100% and 50%, respectively), *Platylomia* (100% and 50%, respectively), *Ternopsia* (100% and 33%, respectively) and *Tosena* (50% and 50%, respectively) (Table 2).

The cicadas obtained in this survey (12 species in 9 genera) (Table 1) were relatively more diverse than those obtained in the Tawau Hills Park, Sabah (12 species in 5 genera) (Zaidi & Ruslan 1995b) or Bintulu township area, Sarawak (12 species in 7 genera) (Zaidi, 1993). They were, however, relatively less diverse than those obtained in the Sayap sector of Kinabalu Park, Sabah (16 Species in 9 genera) (Zaidi & Ruslan, 1995a). Compared to this survey, the surveys carried out in Bintulu and Sayap were equivalently short while that conducted in Tawau Hills Park were relatively longer. However, in terms of sampling coverage, the surveys carried in Sayap and Tawau Hills Park were relatively less extensive while that conducted in Bintulu was equivalently as extensive as Compared to that of this survey In terms of seasonality this survey (in April) and those in Bintulu and Tawau Hills Park (both in March) were carried out more or less around similar time, in relatively earlier calendar time that conducted in Sayap (June). These

Table 2. Number (and percentages) of species representation for the families and genera of Sarawak and Bornean cicadas in Bario.

Famili	Genus	No. of species in		No. (and %) repretation in Bario* of	
		Sarawak*	Borneo	Sarawak cicadas	Bornean cicadas
Cicadidae	1. <i>Platyleura</i>	2	2	0 (0%)	(0%)
	2. <i>Tacua</i>	1	1	0 (0%)	(0%)
	3. <i>Chremistica</i>	7	7	0 (0%)	(0%)
	4. <i>Cryptotympana</i>	2	3	0 (0%)	(0%)
	5. <i>Terpnosia</i>	1	3	1 (100%)	(33%)
	6. <i>Purana</i>	4	5	0 (0%)	(0%)
	7. <i>Nabalua</i>	1	3	1 (100%)	(33%)
	8. <i>Tanna</i>	1	2	1 (100%)	(50%)
	9. <i>Maua</i>	4	5	0 (0%)	(0%)
	10. <i>Kalabita</i>	1	1	0 (0%)	(0%)
	11. <i>Champaka</i>	1	1	0 (0%)	(0%)
	12. <i>Dundubia</i>	5	5	0 (0%)	(40%)
	13. <i>Orientopsaltria</i>	9	11	2 (40%)	(0%)
	14. <i>Platylomia</i>	1	2	0 (0%)	(50%)
	15. <i>Ayesha</i>	2	2	1 (0%)	(0%)
	16. <i>Tosena</i>	2	2	1 (50%)	(50%)
	17. <i>Mogannia</i>	7	10	3 (44%)	(30%)
	18. <i>Mogannia</i>	3	4	0 (0%)	(0%)

	<b>Total species</b>	<b>54</b>	<b>69</b>	<b>10 (19%)</b>	<b>(14%)</b>
	<b>Total genera</b>	<b>18</b>	<b>18</b>	<b>7(39%)</b>	<b>(39%)</b>
Tibicinidae	<i>19. Huechys</i>	4	6	0 (0%)	(0%)
	<i>20. Scieroptera</i>	3	3	1 (33%)	(33%)
	<i>21. Abroma</i>	1	1	1 (100%)	(100%)
	<i>22. Lemuriana</i>	2	2	0 (0%)	(0%)
	<i>23. Nelcyndana</i>	1	1	0 (0%)	(0%)
	<i>24. Muda</i>	0	2	0(0%)	(0%)
	<b>Total species</b>	<b>11</b>	<b>15</b>	<b>2 (18%)</b>	<b>(13%)</b>
<b>Total genera</b>	<b>6</b>	<b>6</b>	<b>2 (33%)</b>	<b>(33%)</b>	
<b>TOTAL SPECIES</b>		<b>65</b>	<b>84</b>	<b>12(18%)</b>	<b>(13%)</b>
<b>TOTAL GENERA</b>		<b>24</b>	<b>24</b>	<b>9(38%)</b>	<b>(38%)</b>

Note: Sources for #; +:

Moulton (1923), Overmeer & Duffels (1967), Duffels (1976, 1989, 1991), Bregman (1985), Zaidi (1993), Zaidi & Ruslan (1995a, b) with new records (5 for # and 2 for +) found in this study

\* this study

seem to indicate that the primary forest in the Sayap sector of Kinabalu Park harbours relatively greater diversity of cicadas than the primary forest of the recreational area of Tawau Hills Park, the riparian forest plus recreational forest within around Bario. It could also be that, in Borneo, the cicada diversity is better manifested in June (Sayap sector of Kinabalu Park) than in March (Tawau Hills Park and Bintulu Township area) or April (Bario).

**Relative commonness and abundance.** Comparison of species records of this survey and those carried out in Bintulu Township area (Zaidi, 1993), the Sayap sector of Kinabalu Park (Zaidi & Ruslan, 1995a) and Tawau Hills Park (Zaidi & Ruslan, 1995b) indicate that, in Borneo *Dundubia rufivena* Walker and *Dundubia vaginata* (Fabricius) are most common. These are followed by *P. merula*, *Platylomia spinosa* (Fabricius), *Pomponia decem* (Walker), and *Abroma maculicollis* Guerin. The other species such as *T. fasciata*, *N. mascula* and *Pomponia lactea* (Distant) are relatively rare in Borneo, besides *T. sp. n.*, *S. sp. n.*

For Bario, the most abundant species recorded was *D. vaginata*. This was followed by *T. fasciata*, *P. spinosa* and *S. sp. n.* and *N. mascula* (Table 1). Such order of relative abundance of cicada species is, however, not absolute, and is known to vary between locations/ localities (Zaidi, 1993; Zaidi & Ruslan, 1994, 1995a, b) and occasions (Zaidi et al., 1990).

**Sex abundance.** Generally, like moths, more males are attracted to light and hence generally more male specimens were obtained in this survey (Table 1). Comparison of records indicates that females *N. mascula* and *T. sp. n.* have yet to be discovered.

## CONCLUSION

This survey has provided some interesting baseline information and it should be continued over a

longer period of time. If such is possible, the present faunal list is most likely to be extended. It is also believed that additional information, such as population periodism, is also likely to be obtained if the survey is able to be conducted over more and varied occasions.

It would also be interesting if future surveys were to cover the nearby Mt. Murud. One reason is that such surveys would be very useful in appraising the previous recorded status of *P. rajah* and *K. operculata* being endemic to this mountain.

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