

## INVERTEBRATES

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### Do ants protect *Korthalsia furtadoana* J. Dransf. against herbivory?

#### Abstract

Many plants are known to host ant colonies for protection against herbivores. *Korthalsia furtadoana* is a common rattan in Borneo that has very simple domatia as ant-housing structures and hosts many different species of ants. This study tested the effectiveness of the resident ants in protecting the host rattan against herbivory and whether this differed between ant species. The time of response of different ant species to two different types of herbivore was measured: the chewer herbivores (e.g. caterpillars) and the sucker herbivores (e.g. scale insects). The time of response and ant activity were compared with the leaf damage and number of herbivores identified in the plant during day and night observations. Our results show that *Korthalsia furtadoana* does not have a mutualistic relationship with the host ants; however some interesting observations in Myrmicinae sp. 2 might suggest a possible mutualistic relationship still in evolutionary progress.

Patricia Dos Santos (Portugal), Royal Botanic Gardens Edinburgh, UK

Edith Sabara, Bogor Agricultural University, Indonesia

2011

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### Ecology of water striders (Family Gerridae) at puddles in Danum Valley Field Centre

#### Abstract

Water strider is the one interesting aquatic insect. They are capable of skating on the water surface, including in puddle habitat. Twenty-eight puddles (large, medium and small puddles) were surveyed in seven days from 18th to 27th October, 2011. This research aims to measure relationship between puddle size and number of Gerridae. It also collects information about behaviour and prey taken by Gerridae. Our results showed a significant relationship between size of puddles and number of Gerridae. Large puddles are important habitats for Gerridae while small puddles may be too short lived to support individuals for long. Gerridae activity types differed significantly from one another. Gerridae use puddles for feeding – largely flies and ants and small insects and even fruit. They also use the puddle habitats for breeding, even though Gerridae also predate on eggs from the same species.

Fauziah Syamsi, Andalas University, Indonesia

Lan Ho Thi Kim, Wildlife At Risk, Vietnam

2011

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### Foraging ants on the forest floor

#### Abstract

Ants are very species rich, especially in the tropics. To be species rich ants have developed coexistence strategies to deal with competition. This study looked at several characteristics that might be able to explain the coexistence of several genera using the same resources. The study was carried out in primary rainforest in Danum Valley Conservation Area in the period 18-25 October 2011. Bait was placed on 30 random plots. For each ant genera arrival time, recruitment time and distance to the nest were measured. A total of five genera of ant were identified in the study. Results showed differences

among the ant genera for arrival time, recruitment time and distance to the nest. Main differences were between Myrmicinae and *Camponotus* with the main difference but none of the variables could clearly explain species coexistence. Observation showed large variation in social organisation and foraging behaviour of the present ant genera. Smaller ants have shorter arrival and recruitment times and distance to the nest compared to larger ants. Larger ants take bait usually immediately after arrival. Larger ants on the other hand are stronger and seem to have a more individualistic social organisation. Species specific social organisation could be a good explanation for explaining scavenging species coexistence.

Nico de Koning, Wageningen University, Netherlands

Thomas Hae Mogensen, Aarhus University, Denmark

2011

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## Foraging and recruitment behaviour of *Camponotus gigas* in a dipterocarp forest in Danum Valley, Sabah, Borneo

### Abstract

Ants represent a large amount of biomass in tropical ecosystems and demonstrate complex foraging and recruitment behaviours. We studied the behavioural and foraging ecology of *Camponotus gigas* at the Danum Field Valley Centre in October 2011. We recorded foraging activity at 14 nests and performed an experiment, where we varied the size of bait and recorded the recruitment behaviour. We also observed 7 nests at dusk and recorded changes in activity within 30 minutes. We found that *Camponotus gigas* mainly forages alone and only rarely in groups. We found no effect of bait size on recruitment. However, even though the results were not significant we observed a trend - that ants recruit more conspecifics when more bait is available. Further, we found a significant increase in foraging activity at dusk. Additionally, we found that Temperature had a positive effect on the numbers of foraging ants at dusk. Our results are consistent with previous studies on the foraging behaviour of *Camponotus gigas* and generated several new interesting observations. Although *C. gigas* is largely known to be a nocturnal species, we found that some workers forage during the day and are able to recruit high numbers of conspecifics, when lots of food is available. The ecological impact of *Camponotus* on the rainforest is thus not solely restricted to night time.

Miranda A. Strubel, University of Leeds, UK

Joel O. Baumann, University of Berne, Switzerland

2011

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## On the prowl: Why do different ant species use floral and extra-floral resources on *Senna alata*?

### Abstract

Previous studies have indicated that male Bornean tree-hole frogs (*Metaphrynella sundana*) change their call frequencies to tune in to the resonant frequency of their cavity under laboratory conditions. We carried out a field study at Danum Valley Field Centre, Sabah, Borneo to investigate the correlation between call frequency and volume of water in natural tree cavities under field conditions. We recorded the calls of 19 frogs before and after adjusting the water volume in steps of 5 and 10 ml in the cavity. We found a significant relationship between the mean call frequency and air column volume. Continuous recording of an individual frog over a 32 minute period, as we added water, also showed an increase in frequency with increasing air column volume. Call frequency in response to changes in volume varied among individual frogs in cavities with different resonance properties. Although the laboratory evidence could not directly be translated into the

field, we demonstrate that tree hole cavities influence the ability of *M. sundana* to vary its call.

Amy Munro-Faure, University of Cambridge, UK

Agnes Dellinger, University of Vienna, Austria

2010

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## Differences in fruit feeding beetle communities through the canopy of a primary lowland forest in Malaysia

### Abstract

Six tree frog species, *Polypedates leucomystax*, *P. macrotis*, *P. otilophus*, *Rhacophorus appendiculatus*, *R. pardalis* and *R. dulitensis* were observed to use the same ponds for breeding in around the Danum Valley Field Centre (Sabah). We investigated whether these six species shared the same ecological niche, or whether different microhabitats could be defined. For one week, the location of every individual encountered around three ponds was recorded every night. We found that the frog species occurred at different heights; *P. leucomystax* was different from all other species by occurring close to the ground at a maximum of 1 m. Seventy percent of all individuals were located within 0.50 meters from the water. *Rhacophorus pardalis* and *R. dulitensis* showed a preference for herbs over trees. All species were distributed randomly around the ponds. *R. dulitensis* was the main species in the temporary pond after heavy rain, which is an indication of a difference in breeding pattern.

Felicia Lasmana, University of Padjadjaran, Indonesia

Jasmine King, University of Nottingham, United Kingdom

2010

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## Ecosystem engineers: Earthworms in tropical forests: A study from Danum Valley, Malaysia

### Abstract

The forest floor of Danum Valley in Sabah, Malaysia, is densely covered with thousands of miniature tower-like soil structures. This study investigated the role of earthworms, which were found to be the creators of these towers, in nutrient retention and soil turnover in tropical forests. Results showed these small earthworms are potentially major ecosystem engineers in tropical forest ecosystems, which turn over and process huge amounts of soil per year (over 88 kg per m<sup>2</sup>). The worm casts were found to have significantly higher levels of nitrate and conductivity than surrounding soils. It is well known that tropical forests are scarce in nutrients, particularly nitrate. This makes the activity of earthworms potentially crucial for retaining nutrients within the ecosystem and preventing loss through leaching. Soil moisture content was found to be an important factor determining the distribution of earthworms. The implications are especially significant for dry degraded forests where our study showed that the presence of earthworms was lower than in primary and intermediate forests.

Sarah Johnson, University of Salford, UK

Arshiya Bose, University of Cambridge (UK), India

2010

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## **Invertebrate drift in the Tambun stream in Danum Valley**

### **Abstract**

The invertebrate drift is the main food source of stream fish, but do the fish eat just the aquatic animals or do they also eat the terrestrial animals that drop down into the water? The drift composition was measured and fish gut contents were examined in the Tambun stream (Danum Valley, Sabah, Borneo). The results show that invertebrate drift in the Tambun Stream accounted for 41 million potential food particles drifting down the Tambun Stream each 24 hours. The numbers of aquatic animals drifting were greatest at night. The reason may be that the animals are minimising risks of being eaten by fish, which are visual predators. Also, the fish guts content showed that the fish prefer terrestrial and aquatic animal to exuviae. The terrestrial animals drop accidentally into the water and flounder. They are not adapted to the water environment and are therefore more vulnerable to predation in water. The aquatic animals are adapted to living and surviving under these conditions through structural and behavioural adaptation. One of those adaptations could be the voluntary drift during the night, when they are not visible to fish. Such controlled drift allows redistribution with minimum risk.

Anita Bousa, Wildlife Conservation Society, Lao PDR

Chiara De Cesare, University of Innsbruck (Austria), Italy

2010

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## **Leech hide and seek: How leech awareness of hosts changes with environment and moisture levels**

### **Abstract**

Leeches are parasitic organisms that take blood meals, most commonly from warm blooded mammals. A wide range of leech species exist and are widely distributed around the world, however the largest proportion of leech species is found in the tropics. In order to assess changes in leech activity and density across the forest at Danum Valley Field Centre, four habitat types were selected and sampled in two main areas. Samples were taken at different times of day and after different time periods had elapsed since heavy rainfall. Field observations showed no difference in leech density across habitat type or across levels of rainfall, however further experiments in the lab concluded that leech activity and awareness is increased after spending time in a wet environment.

Jenny Mason, University of Liverpool, UK

Sysomphane Sengthavideth, Wildlife Conservation Society, Laos

2010

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## **The acoustic landscape and cicada call patterns in Danum Valley**

### **Abstract**

Cicadas are a dominant feature of the acoustic environment in the tropics and are known to have species-specific calls making them useful subjects for investigating acoustic niches. Cicadas in Sabah, Borneo however, have been relatively poorly studied. This study described the daily acoustic landscape of Danum Valley by measuring sound pressure levels, humidity and temperature along a transect, together with recording the dominant calling animals. The presence/absence of eight „sound species“ of cicadas was scored to investigate potential partitioning in their acoustic behaviour. The acoustic landscape was shown to have a daily cyclical pattern, clearly dominated by cicadas. Cicada calls were found to be partitioned amongst other animal groups as well as between cicada sound species. This partitioning was found to occur temporally and by call frequency and call pattern. Observations also

found spatial location influenced partitioning. Avoidance of interspecific competition seems to be the most likely driver for species occupying different acoustic niches.

Emma Ligtermoet, Charles Darwin University, Australia

Stefanie Weigl, Ludwig Maximilian University, Germany Ana

Filipa Palmeirim, University of Lisbon, Portugal

2009

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### **Blood suckers in our midst: Leech (*Haemadipsidae*) abundance on forest trails and off-trails in the Danum Valley Conservation Area, Sabah, Malaysia**

#### **Abstract**

Danum Valley Conservation Area (DVCA) is exceptionally rich in both flora and fauna. Forming part of this richness, DVCA has two species of terrestrial leeches, the tiger leech (*Haemadipsa picta*) and the brown leech (*Haemadipsa zeylanica*). Our study looked at the composition and abundance of leeches in trails and off-trails in three sites in the forest. We tested the hypothesis that leech abundance would be greater in the trails than off-trails mainly because more animals use trails for foraging. The results showed no significant differences between species composition and abundance of leeches overall. However leeches were more abundant in one trail system when we tested for differences between sites. We also found no significant correlation between the abundance of leeches in relation to temperature and humidity.

Legi Sam, University of Papua New Guinea, Papua New Guinea Dwi

Susanto, Bogor Agricultural University, Indonesia

2009

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### **Diversity and interaction of dragonflies in Danum Valley Field Centre**

#### **Abstract**

This study investigated diversity and interaction of dragonflies around the Danum Valley Field Centre. Six days samplings were conducted (18<sup>th</sup>-23<sup>rd</sup> October 2009) in different locations which included two ponds (114 m<sup>2</sup>, 28.98 m<sup>2</sup>) and a wet-grass area (486.3 m<sup>2</sup>). Twenty two species were recorded in three study sites. Different types of interaction within two particular species of dragonflies were observed during different times of the day. Apart from gathering information on diversity and interaction, data collection on behaviour is also included in this study.

Sithisack Paninhuan, Wildlife Conservation Society (WCS), Lao Program, Lao Kai

Lin Ling, Institute for Tropical Biology & Conservation (ITBC), Borneo, Malaysia

2009

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