INVERTEBRATES

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

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

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^{th}-23^{rd} October 2009) in different locations which included two ponds (114 m^2, 28.98 m^2) and a wet-grass area (486.3 m^2). 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

A positive relationship between ant biodiversity and predatory function across a disturbance gradient in a SE Asian rain forest

Abstract

Human modification of pristine habitats almost always leads to the local extinction of a subset of the species present. This means that the ecosystem processes carried out by the remaining species may change. It is well documented that particular species of ants carry out important ecosystem processes. However, while much work has been carried out to investigate the link between biodiversity and ecosystem functioning in other taxa, this has received relatively little attention for ant communities. Here we investigate the impacts of anthropogenic disturbance on ant-mediated predation, using bait removal rates as a surrogate measure. We found that although ant species richness, diversity, biomass and rates of bait removal did not change systematically across the disturbance gradient, the rate of bait removal was related to both ant species richness and biomass. Sites with a higher species richness and biomass of ants experienced a faster rate of bait removal. If these results are applicable at larger spatial scales for a wider range of prey items, then loss of ant species could lead to changes in the way that ecosystems function.

Tom M. Fayle *et al.* (class exercise)

2009

The recruitment time of ant species in forested and edge habitats at Danum Valley

Abstract

Ants recruit nestmates to a food source through the use of chemical trails. This study aimed to determine the differences in recruitment times for ant species in two different habitats. A four day study was carried out on the recruitment times and abundances of ants in edge and forested habitats. The abundance of each ant species was recorded every minute over a 30 minute period. Recruitment time is defined as the time difference between the first arriving ant and the arrival time of the second ant of the same species. The abundance in forest ant species was negatively correlated with recruitment time. The same significant relationship was found with edge ant species. However, no significance difference in species diversity, species richness or abundance was found between the two habitat types. Qualitative observations of competitive interactions were also recorded and examined.

Adam D. Earl, University of Sussex, UK

Judy F. Walsh, Trinity College Dublin, Ireland

2009

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

Abstract

Vertical stratification has been shown to have an influence on the communities of insects in the rainforest canopy. Here we studied the community composition of fruit feeding beetles through the rainforest canopy at Danum Valley Conservation Area, Sabah, Malaysia. 42 morphospecies from 7 families were recorded from three different canopy heights: 1 m, 10 m and 20 m. The community was dominated by the family Nitidulidae but there were differences in the canopy layers with more families including Staphylinidae being found at ground level. The species richness and diversity of fruit feeding beetles did not differ between canopy layers. The abundance of beetles however differed significantly; particularly samples from 1 m differed significantly from 10 and 20 m. The complexity of the immediate environment in terms of canopy cover held no relationship with species richness,

diversity or abundance. It is likely that the difference in abundance is related to the high abundance of ripe fruit on the forest floor dropped from the tree and opened by large mammals.

Felicia Lasmana, University of Padjadjaran, Indonesia

Jasmine King, University of Nottingham, United Kingdom

2010

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 m2). 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

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

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