CHECKLIST OF SPIDERS IN FRASER'S HILL WILDLIFE RESERVE, SELANGOR. MALAYSIA

Chooi, Y.S.[1], Cheong, Y.L.[2] , Tan, P.E.[3] & Lau, W.H.*[1]

[1]Department of Plant Protection, Faculty of Agriculture, University Putra Malaysia.
[2]Department of Forest Management, Faculty of Forestry, University Putra Malaysia.
[3]Division of Biodiversity Conservation, Department of Wildlife and National Parks, Peninsular Malaysia.

**Corresponding author: lauweih@upm.edu.my*

ABSTRACT

A study of the biodiversity of spider was carried out during Biodiversity Inventory Program at Fraser's Hill Wildlife Reserve, Selangor from 26th July to 2nd August 2009. Samples were collected along selected trails and in the area around the base camp. A total of 249 spiders were collected and 13 families of spiders, namely the Family of Agelenidae, Araneidae, Clubionidae, Lycosidae, Oxyopidae, Pholcidae, Pisauridae, Psechridae, Salticidae, Sparassidae, Tetragnathidae, Theraphosidae, and Theridiidae, were recorded. These spiders were found foraging on trees and the ground. Besides the diverse fauna and flora, Fraser's Hill Wildlife Reserve, Selangor is also a famous host to hairy tropical spiders called tarantulas. Throughout this inventory program, two tarantulas were recorded.

Keyword: Spider, Freaser's Hill, Selangor, Tarantulas, Titiwangsa

INTRODUCTION

Fraser's Hill Wildlife Reserve is located in the state of Pahang and Selangor, and is part of the Titiwangsa Mountains (PERHILITAN, 2010). It is divided into two parts, Pahang and Selangor, which adjoin to each other. Fraser's Hill Wildlife Reserve, Selangor was established in 1922 and has an area of 2.979 ha. While the Fraser's Hill Wildlife Reserve, Pahang has been established in 1957 and has an area of 2,000 ha. An inventory that covers the Fraser's Hill Wildlife Reserve, Pahang was carried out in 2008 (PERHILITAN, 2010). At an elevation of 1,219 meters, this area is interesting with its wildlife, especially birds and butterflies. The species of birds are more related with the Himalayan region (PERHILITAN, 2010). The Pahang reserve, including an ecotourism area that borders the Selangor-Pahang boundary located at western part of the area, overlaps the local authority area and parts of it overlaps with forest reserve (Kamaruzaman *et al.*, 2009). It is highly possible that as neighbour of Fraser's Hill Wildlife Reserve, Pahang, Fraser's Hill Wildlife Reserve, Selangor also contains forests with abundant flora and fauna. To our knowledge, no inventory was done in Fraser's Hill Wildlife Reserve, Selangor previously. Hence, a study of the biodiversity of spider was carried out during the Biodiversity Inventory Program at Fraser's Hill Wildlife Reserve, Selangor from 26th July to 2nd August 2009 in order to contribute to the checklist of biodiversity of this highland.

METHODOLOGY

During Biodiversity Inventory Program at Fraser's Hill Wildlife Reserve, Selangor from 26th July to 2nd August 2009, samplings were conducted both on day and night based on visual searches along pre-determined trails and surroundings of the base camp. Based on their accessibility, selected trails were ventured and all spiders found through visual search were collected by hand, plastic containers and/or forceps.

Torch/headlamps were used to have a clear view of burrows and tunnels and for night spotlighting to detect spiders by their eye shine at night. Since spiders may harm each other, collected spiders were kept individually in plastic containers. In order to keep the spider at good condition until further use, water was provided to maintain the spiders. Morphological identification was done using dichotomous key (Deeleman-Reinhold, 2001; Ubick *et al.*, 2005).

RESULTS AND DISCUSSION

Throughout the study period a total of 249 specimens of spiders were obtained. Among them, 13 families of spiders were recorded based on their morphology. The spiders were identified belong to the Families of Agelenidae, Araneidae, Clubionidae, Lycosidae, Oxyopidae, Pholcidae, Pisauridae, Psechridae, Salticidae, Sparassidae, Tetragnathidae, Theraphosidae, and Theridiidae.

Comparison between time of sampling

During this Biodiversity Inventory Program, more spiders were collected in daytime (58%) compared to night (42%) (Figure 1). Due to safety purposes, not all trails were explored at night. Based on trail accessibility, only trail Dingin, entrance to Tapir, and entrance to Base Camp were explored at night. In which, only trail Dingin leads deeper into forest. Thus, the number of spiders collected at night is relatively high taking account that less sampling time and trails were explored at night.

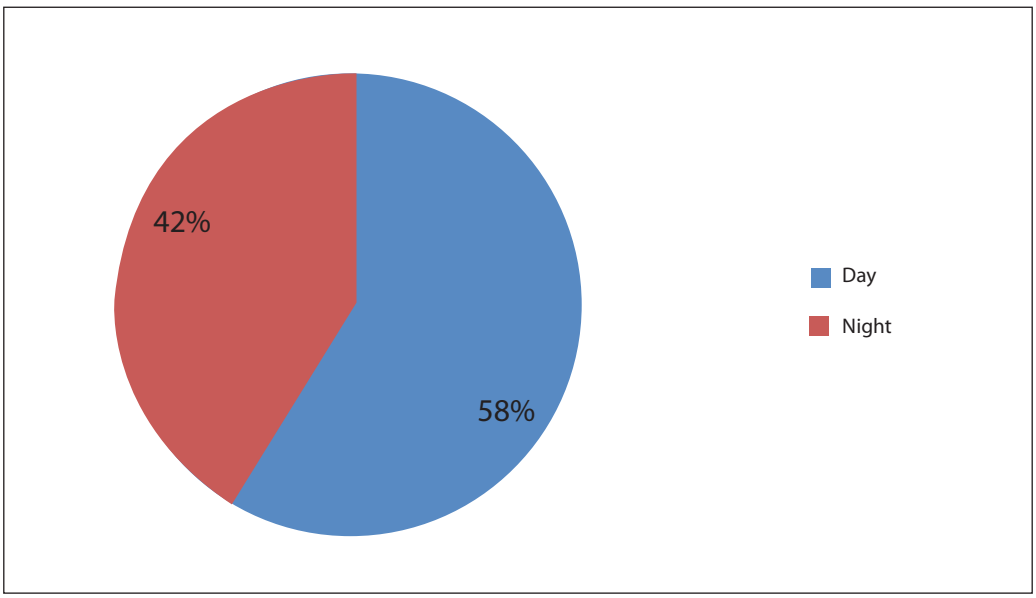

Figure 1. Percentage of spiders found during daytime and at night.

Spider abundance between sampling trails

A total of seven sampling sites were explored (Figure 2). Trail Dingin is the longest trail amongst others and less slopy, thus a total of 49% of spiders were found in this trail. Less sloping trail allows sampling to be carried out at ease while longer trail leads deeper into forest where spiders are usually more abundant. The relatively moist area also provides suitable habitat for spiders. Trail Jengking is

very slopy while Trail Tapir has less flora. Thus, a very low yield of specimens were collected at these sampling sites.

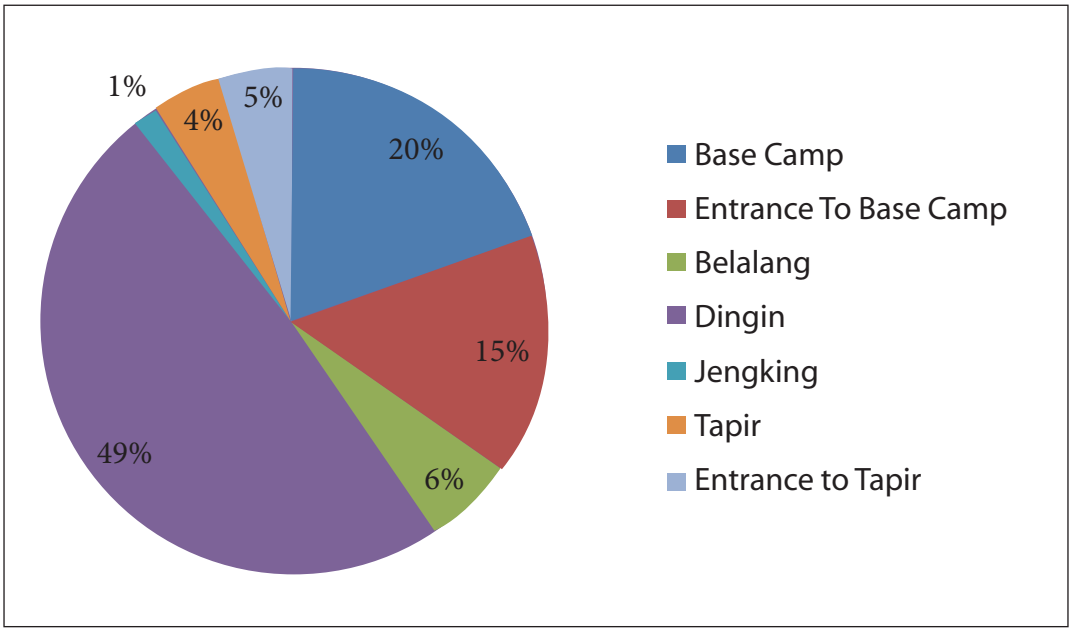

Figure 2. Percentage of spiders found in each trails during Biodiversity Inventory Program at Fraser's Hill Wildlife Reserve, Selangor from 26th July to 2nd August 2009.

Spider abundance between families

Among all the spiders collected, spiders from Family Sparassidae yielded the highest number of individuals (59) (Figure 3). Other families of spiders with number of specimens collected above 20 were Araneidae, Pisauridae and Lycosidae. The rest of the spider families, namely the family of Tetragnathidae, Agelenidae, Oxyopidae, Salticidae, Clubionidae, Psechridae, Pholcidae, Theraphosidae, and Theridiidae have less than 20 specimens collected.

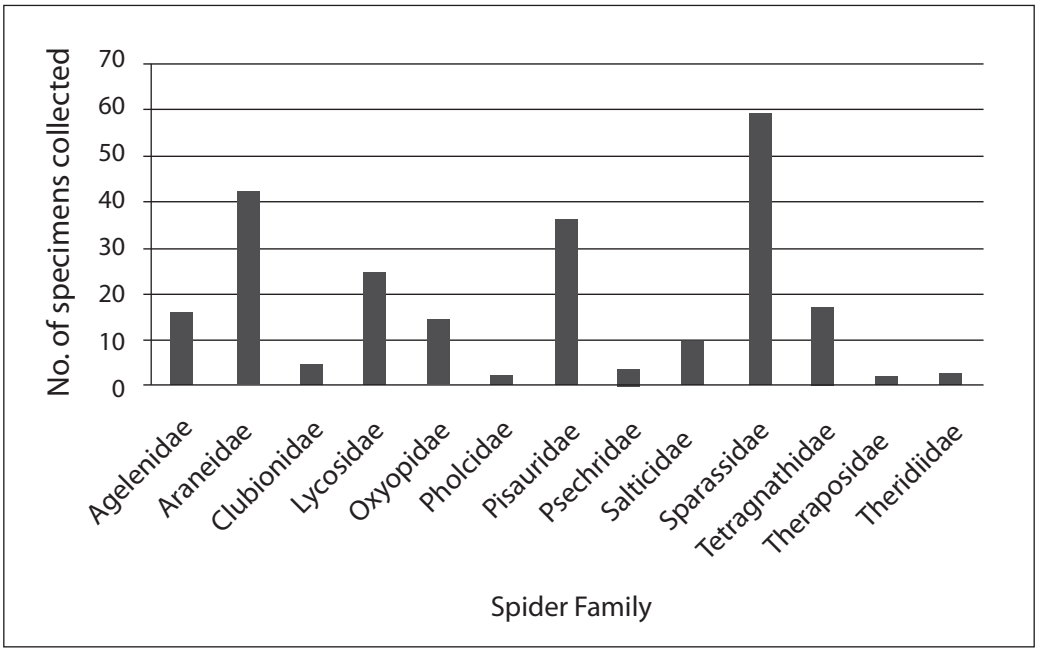

Figure 3. Specimens collected for each spider family.

Spider Habitat

Spiders can be found in various habitats. During this sampling trip, spiders were discovered between branches and shrubs, bushes, grassy areas, on or underneath the leaves or leaf litters, between dead ferns, between trees, rock surface, rocky area with grass, and tree trunk.

Spiders that were mostly found building webs between branches are the spiders of family Araneidae. In fact, most Araneidae spiders build orb-webs which are in corresponding with their common names orb-web spiders or orb-weavers spiders (Koh, 1989). They were also found on orb web built between shrubs and among bushes. During this sampling trip, one of the species identified as *Argiope versicolor* and another juvenile *Argiope* were found on web built between shrubs. *Argiope versicolor* is also commonly named as Multi-Coloured Argiope (Hillyard, 2006). As its common name suggested, colourful yellow, brown, white bands and a silvery carapace was observed on this spider. The juvenile *Argiope* is less colourful but was found with disc-shaped decorations on its web as described in Bruce & Herberstein (2005). In addition, a spider identified as *Gasteracantha arcuata*, was found on a larger web built between two trees. This spider has an abdomen with two remarkably long curved black 'horns' similar to the one described in Hillyard (2006). The pattern on the abdomen is orange with black spots while the carapace and legs are brownish to dark brown. Beside Araneidae, spiders from the family Tetragnathidae were also found on web built between branches, between shrubs, and among bushes. According to Koh (1989), Tetragnathidae are orb-web weavers that weave fine orb-webs with open hubs. Just like Araneidae, they were observed mostly hanging on the centre of its orb-webs built between supporting structures.

A few spiders from family Theridiidae and Pholcidae were also found on web built between branches and between shrubs. Theridiidae is commonly named as comb-footed or cobweb spiders (Agnarsson, 2006; Arnedo *et al.*, 2004). The species collected have a triangular shape abdomen with its spinnerets pointing downwards. The brown abdomen is full with glittering red, gold, and white spot.

Pholcidae are commonly called daddy long-legs spider due to their long, slender legs and an elongated abdomen (Koh, 1989). The species collected possess all the features mentioned with a black spot at the joints of each leg. The spiders were found vibrating vigorously when disturbed. According to Hillyard (2006), they vibrate to distract intruders. Hence, they are sometimes known as vibrating spider.

Some spiders were found in horizontal webs built between dead ferns at shady area under the roots of tree. They were identified as members of the family Psechridae. Their webs were found equipped with a retreat which leads deeper into the tree roots. With very minor disturbance on the web they were alerted and escaped rapidly into the retreat.

Other than the orb weavers, some hunting spiders, namely the Lycosidae, Oxyopidae, and Salticidae spiders were also found roaming among the bushes. Lycosidae spiders are commonly named as Wolf Spiders (Hillyard, 2006). They are robust and agile hunters with good eyesight which are able to run and hop around rapidly. They were also found on or underneath the leaf litters and at grassy areas. Unlike other members of Lycosidae which have less striking body colour, *Venonia coruscans* was identified with a shiningly black body. A white dot was found on the hind end of the abdomen which contributes to the common name "White-Dotted Wolf Spider".

Like Lycosidae spiders, members of Oxyopidae were also found at grassy areas. But they were not found on or underneath the leaf litters. Some of them have green based colour which blends well with the surrounding areas that they were found but some have orange carapace and abdomen with white, orange, and black patterns. In common, they have long and spiny legs, with six of their eyes arranged in a hexagon shape.

Besides among bushes, members of Salticidae were also found on leaves looking attentively for prey. Just like those mentioned in Hillyard (2006), their two large eyes at the front and other eyes widely spaced grant them very good and wide vision. These allow them to detect prey and become aware of any threats around them. One of them was identified as *Myrmarachne sp.* with its jaws enlarged and projected in front. The spider was found together with some ants on the kitchen table in the base camp. This spider has elongated and constricted cephalothorax and abdomen each with red and black colour which makes it looked very similar to the ants found around it.

Besides Lycosidae, members of Agelenidae and Sparassidae were found on or underneath the leaf litters. Agelenidae are spiders that have high agility and are able to move very fast. During sampling of these spiders, they ran rapidly and attempted to hide under the leaf litters when disturbed. The species collected is dark brown in colour with white stripes on the legs, carapace, and abdomen.

Sparassidae were found mostly on the ground covered with leaf litters. Based on observation, they usually hide themselves underneath the leaf litters or stay still to camouflage into its surrounding. They were seen running rapidly when provoked or chasing the prey. Nevertheless, some of them were found on tree trunk and shrubs while one of them was found in a bamboo hole. They are nocturnal spiders that emerge from its hiding place to search for prey at night (Hillyard, 2006).

There were also some spiders that were discovered on rock along the river. They hide near the bottom part of the rock under shade. These spiders were identified as members of family Pisauridae. Their body is light brown in colour. They have elongated abdomen and their first, second, and fourth legs are relatively much longer than the third ones.

Clubionidae spiders were found wandering on rocky areas with grass. They were found together with some black ants. *Castianeira* sp. was identified with body black in colour that looked like the black ants. The carapace has a vertical grey stripe while the abdomen has several horizontal grey stripes. According to Koh (1989), they imitate ants, either to protect themselves or to prey on them.

Two juvenile Theraphosidae spiders were found during this inventory. They are commonly named as Hairy Mygalomorph Spiders (Koh, 1989) or more notably known as the Tarantulas. These spiders were found hiding in tunnels built into latenite slope. One of their highly distinctive features is that their fangs, paralleled to each other, directed barkwards instead of pointing each other as in most spiders.

CONCLUSION

The results show that Fraser's Hill Wildlife Reserve, Selangor hold diverse species of spiders. Furthermore, this set of samples does not represent the complete inventory of Fraser's Hill Wildlife Reserve, Selangor due to limited time of sampling and the incomplete area covered throughout the sampling. Judging from the numbers and species diversity obtained so far under such limiting condition, it is apparent that more diverse species could be expected with prolonged surveys and larger sampling area covered.

REFERENCES

Agnarsson, I. (2006). Asymmetric female genitalia and other remarkable morphology in a new genus of cobweb spiders (Theridiidae, Araneae) from Madagascar. *Biological Journal of the Linnean Society*, **87**: 211-232.

Arnedo, M.A., Coddington, J., Agnarsson, I. & Gillespie, R.G. (2004). From a comb to a tree: phylogenetic relationships of the comb-footed spiders (Araneae, Theridiidae) inferred from nuclear and mitochondrial genes. *Molecular Phylogenetics & Evolution,* **31**: 225-245.

Bruce, M.J. & Herberstein, Marie E. (2005). Web decoration polymorphism in Argiope Audouin, 1826 (Araneidae) spiders: ontogenetic and interspecific variation. *Journal of Natural History*, **44**: 3833-3845.

Deeleman-Reinhold, C.L. (2001). Forest Spiders of South East Asia: With a revision of the sac and ground spiders (Araneae: Clubionidae, Corinnidae, Liocranidae, Gnaphosidae, Prodidomidae and Trochanterriidae). Netherland: Brill Academic Publishers.

Hillyard, P. (2006). Spiders*:* From the deadliest to the biggest on earth. HarperCollins Publishers Ltd., London.

Kamaruzaman, J., Pakhriazad, H.Z., Mohd. Hasmadi, I. & Aida, H.M.K. (2009). Historical and current legislations of Taman Negara National Park Peninsular Malaysia. *Journal of Politics & Law,* **2(1)**: 44-49.

Koh, K.H. (1989). A guide to common Singapore spiders. Singapore Science Centre, Singapore.

Ubick, D., Paquin, P., Cushing, P.E. & Roth, V. (2005). Spiders of North America: an identification manual. American Arachnological Society.