Seasonal Changes in Mayfly Communities and Abundance in Relation to Water Physicochemistry in Two Rivers at Different Elevations in Northern Peninsular Malaysia

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Abstract: A field study was performed at rivers in Gunung Jerai forest reserve (Kedah, Malaysia) to assess seasonal changes in mayfly community structure and abundance in relation to altitude and water physicochemistry. Rivers at lower (Batu Hampar River) and higher (Teroi River) elevations were visited through dry and wet seasons in September 2007 to August 2008. Monthly visits were made to 20 sites on each river, and water and aquatic insects were sampled using D-pond aquatic nets. Water was warmer, more acid, and more turbid in Teroi River during wet season. Ammonia was the only nutrient exhibiting significant seasonal variations (greater during wet season). Chemical oxygen demand content was higher in Teroi River where biochemical oxygen demand content was low during wet season. Species richness was higher in Batu Hampar River, but displayed seasonal variations only in Teroi River. Among the eight families encountered, Baetidae was the commonest. Baetid abundance was usually high during wet season, and those belonging to the dominant genus (*Baetis*) were more abundant in Teroi River. Heptageniidae was the second commonest family; its predominant genus, *Thalerospyrus* was more abundant in Teroi River during dry season. Caenidae, Leptophlebiidae and Oligoneuriidae were only found in Batu Hampar River where their abundances peaked during dry season, i.e., *Habrophlebiodes* sp. and *Isonychia* sp. Ephemerellidae and Teloganodidae occurred only in Teroi River, with the first found only during dry season. Mayflies were recorded under very distinct physicochemical conditions, illustrating their potential usefulness for assessing water quality. Caenids, leptophlebids, oligoneurids ephemerellids and teloganodids seem to be particularly sensitive to temperature, acidity, turbidity, chemical oxygen demand and biochemical oxygen demand, parameters that varied with river altitude.

Keywords: river; ephemeroptera; abundance; altitude; season; physicochemistry

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1 Intrduction

Rivers represent a vital resource of both economic and ecological importance worldwide (Dudgeon, 2008). Rather than being solely economically important, they are perceived as sites of waste disposal, absorbing the detritus of millions of people within their watershed. A great deal of attention has focused on toxic waste because of its potential detrimental effects on river inhabitants (Gopal, 2005). Contamination with toxic products can directly or indirectly affect the communities that inhabit rivers (Chen and White, 2004; Kosmehl *et al*, 2008).

Rivers have diverse fauna, including benthic macroinvertebrates (Dudgeon, 2008), which form

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