CHAPTER 5

Discussion

Water physicochemical parameter

Overall water parameters sampled, air temperature, water temperature, pH, conductivity, total dissolved solid, dissolved oxygen, biochemical oxygen demand, ammonia nitrogen, nitrate nitrogen, ortho-phosphate, width, depth and velocity showed different significantly. From this physicochemical characteristic of geomorphologic in rivers, upstream and downstream reach were separated in Mae Ngat Somboonchol dam.

In upstream sampling sites, the microhabitat represents to good quality and diversity of bottom substrate. Probably because of the upstream sampling sites were watersheds which located in part of Sri Lanna National park and isolated from tourist activities. The small watershed upper from sampling site 1 (SU1) has good quality. Water temperature was below than 25 °C during year because of the stream was surrounded by big trees. The pH value in upstream were 7.0-7.2 (in normal range) while the conductivity value was higher than downstream, that from the geological materials (calcite and ferrous oxide) from Sri Lanna National park. Dissolved oxygen value from upstream was higher than downstream sampling sites because of there were and natural watershed, many riffles and fast current.

In downstream sampling sites, many sites represent to normal quality of microhabitats and bottom substrate such as, gravel, sand, clay and mud which represents low diversity of larvae Trichoptera as well. Mostly of sampling sites were supported for human activities so this situation degrades water physicochemical properties. In addition, the diversity of macroinvertebrates on Mae Ngat Somboonchol dam was reported by Thongdej, 2014.

The pH value in sampling site 3 showed that it was slightly alkaline. Water released from hydro generator was affected from electrochemical and increased pH values range between 7.0 and 8.0.

In addition, water velocities in every sampling site were recorded in this study. In upstream sampling sites, water velocity was highest on August (average 2.3 to 2.7 m/s) because there was rainy season. In SU2, the flash flood was occurred for couple months (November to January) and larvae of Trichoptera were disappeared. In hydroelectric generator, the water velocity could be up to 1.2 m/s which separated into two periods 1) when their generator was stopped for release water and 2) when the generator was opened to release the water at evening in dry season and in rainy season for prevent max capacity load in reservoir. In lateral wetland area, waters were come from many sources such as from the generator or seeping from under the spill way. The small channel was created, the measurement of width and depth was done by this small channel, but in the small lake in the wetland were measured only depth. In SD5 was the most changeable of water flows in studied period because of the degradation from the bank, growth of weeds, channel size fragmentation. Colonization of Trichoptera larvae was disturbed on this sampling site for long period. The channel size was stainable along SD6 to SD7, same as the water velocity. From downstream, the velocity was higher more than 1 m/s on August, February, March and May. According to Bergey *et al*. (2010), this studied were determined grazing pressure of snails and algae in hydroelectric generator area on Mae Ngat Somboonchol dam which regulated rivers flow was effects to algae assemblage when water was released in day time.

Trichoptera composition upstream and downstream

The diversity and abundance of larvae's Trichoptera was highest in upstream sampling sites according to the quality and verities stream's materials, more diverse of physical of rivers structure more diverse of macroinvertebrate. Although, larvae's Trichoptera were less found in some months but this result was according to the weather in that time as well, directly to the depth and flows.

Upstream sampling site 1 (SU1) had the most diversity of Trichoptera larvae especially represent in family Leptoceridae, Hydroptilidae, Hydropsychidae,

Helicopsychidae and Lepidostomatidae, which all members lived in different materials substrate for life history such as, pebbles, sand, twig and leaf pack. This area was suitable for food source, allochthonous materials for stream Trichoptera (Anderson *et al.*, 1975). While in SU2, the diversity of larvae was change. Hydropsychidae, Hydroptilidae and Leptoceridae still the dominant taxa but Helicopsychidae and Lepidostomatidae were strongly decreased population because lacked of leaf pack zone for Lepidostomatidae and lacked of pebbles for Helicopsychidae. Meanwhile, Odontoceridae populations were increased in this sampling site.

In sampling site 3 (SD3), Hydropsychidae and Leptoceridae were found only on August, water flows from this area was always regulated by human, hydroelectric generator, this condition made any Trichoptera larvae cannot establish in this area. In sampling site 4 (SD4), wetland area, there was covered with floating plant and the bottom substrate was clay, sometime become to lentic ecosystem. Only six families of Trichoptera were found and the most numbers of individuals was on January. Sampling site 5 (SD5) was the most changed environment by human activities, in physical of river bank, bottom substrate and water flows. Hydropsychidae were found mostly because theirs was a net-spinner and free living Trichoptera groups which can live in sand and pebbles. This sampling site was stable in term of living organism or food source, because of the range from the generator was stable and decreased of water flows. Hydropsychidae larvae were increase the population in this area. In SD7, the water velocity was decreased and flows to the Ping River. Hydroptilidae was the most found family in this site because the bottom substrate was pebbles, sand and algae, which a purse maker groups prefers to lived.

Trichoptera identification

More than 50,000 of adult Trichoptera individuals were trapped and most of sorted specimens were female. Adult male of Trichoptera were identified into species level except female, which lacked of sex morphological to unidentified. The record of diversity and abundance in this study would be useful for a Trichoptera database in Thailand, the anothers area was newly survey such as a man-made freshwater ecosystem. The frequency of any Trichoptera's appearance in area would be occasional to promote them to be endemic species or common species.

After field survey, the classification and identification methods were preceded. In generally, mostly Trichopterist use the main character of Trichoptera specimens to identify in genus or species level such as appearance of ocelli, number of maxillary palp segments, wing pattern, wing venation, and spurs formula. To confirm species of Trichoptera should be done by examine characters of genitalia from both sex of specimens, but in female Trichoptera was poorly to make a preparation because of indistinct characters. Recently, taxonomic studied can identified some female Trichoptera species or even use DNA barcoding molecular method for species identification.

From the data of abundance of caddisflies larvae were showed in this study especially in flooded time on November 2013 to February 2014 on site 2, the number of caddisflies larvae observed was found only one individual, with an empty case. This observance mention for others studies on larvae Trichoptera, how surely they had count the case of Trichoptera for alive or an empty case. This point should be considered by researchers to estimate the population from that period or seasons.

In the results, it is difficult to compare Trichoptera assemblages that have been collected in different methods and in and different stages. The light pan traps were used for collect the adults in all sampling area but some area was interrupted by the light from other source, site 3 the hydro-generator for example. Dispersal ability of adult Trichoptera could be decrease or unclear in the ratio by individuals emerging from the nearby aquatic habitat if use only one or qualitative method. A quantitative method should be used to the study as well such as an emergence trap. The emergence trap should be solving the problems of light interruption and a distance of nearby aquatic habitats (Schmera, 2003). Dispersal pattern of adult Trichoptera were argued from many Trichopterist about the range of dispersal and arrange the species into low dispersal species and high dispersal species, for the influence of the habitats on close to the traps area could be determined for the better result as well (Malicky, 1981 and 1987; Sode and Wiberg-Larsen, 1993 and Svensson, 1972 and 1974). By the way, day-flier species was recorded by Chichton, (1976) as well but theirs were very low catchability of Trichoptera and had a small species group as well.