June 1996.

This is the last sampling month of the study when entering the early phase of tropical monsoon period, the TWINSPAN can still be capable of separating the sites into five major groups. Fig. 8a indicates the TWINSPAN groups A to E. The first level firstly divided the sites into two groups A (n=1) and the other group (n=26), the indicator family is Sialidae (-). On the positive end the sites are further separated at the second level which dividing the sites into two main groups, B plus C (n=17) and D plus E (n=9), at which the indicator families are Hydropsychidae (+) and Tipulidae (+).

On the negative side of the second level which later dividing the sites into two sub-groups B (n=1), C (n=16), the indicator family is Chironomidae (+). On the positive end the sites are splitted into two sub-groups, D (n=6) and E (n=3), Baetidae (-), Ceratopogonidae (-) and Heptageniidae (-).

The grouped sites D and E are less impacted sites while the other sites are very much affected by mainly natural disturbances. Of among all sites, the sites H03 and H04 are greatly abundant with many benthic faunal families while the site H02 has only one taxa discovered-the Sialidae. The site P13 is explored also having only one family inhabiting, the Chaoboridae.

Certain feasible comparisons of the sites due to water physicochemical variations can be made within this investigating month. At first sight, of the TWINSPAN groups A and B, in fact each group consists of only one site, i.e. H02 and P13, respectively. These two sites are well separated by both the TWINSPAN dendrogram (Fig. 8a) and the SSH plot (Fig. 8b). Even they both have far different values of BOD, TDS, DO, nitrate, conductivity, alkalinity, discharge and depth, these two sites however reveal visually impacted in which each of them has only one faunal family dwelling. The site H02 of upstream highlands where the lands nearby have been cleared, thus considerable amount of surface soils being discharged into water bodies. Such fine earth is later partly suspending and its considerable amount passing to downstream. The remaining suspended residues are eventually sinking to the stream bed. This leads to a substantial modification of this habitat and that not suitably for benthic fauna assemblage, even this site has a considerable amount of DO which is as high at 6.53 mg/L. Such high level of DO, however, is in fact largely from the reaeration caused by water current.

The site P13, in contrast, is clearly indicated the impacts which originating from human sources. As this site locates within city boundary and with a very extremely high BOD level, 12.80 mg/L, consequently such this water environment is not providing suitable habitat for most benthic animal larvae. Also as noted earlier that Chaoboridae is more tolerant to high level of conductivity and this appears to be another confirm case that the site P13 in this month show such similar phenomena, i.e. discovering only family Chaoboridae inhabiting and the measured conductivity is at greatly high value.

Possibly six main water chemistry variables can be drawn to compare between the grouped sites C, D and E, these are pH, conductivity, TDS, turbidity, TSS, DO and BOD, Table 6. The most abundant faunal families occurring at the grouped sites D, and these grouped sites have relatively low turbidity and TSS levels when compared to the other two grouped sites. The grouped sites D also have a markedly highest level of DO, 6.95 mg/L, and lowest level of BOD, 1.03 mg/L.

Similarly to the grouped sites D, the grouped sites E also have higher levels of DO and lower level of BOD, Table 6, this grouped sites likewise have higher numbers of faunal families inhibiting. However, the water quality of the grouped sites D are still superior to the grouped sites E, as when they appear with lower levels of turbidity, TSS, conductivity and pH. One special note to the grouped sites C is that they all have higher value of discharge, which is averaging 34.64 cu.m/sec.

Table 6. Average values of selected environmental variables in June 1996.

Environmental variables	Grouped sites				
	A	B	C	D	E
Velocity (m/sec)	0.28	0.12	0.33	0.43	0.56
Depth (m)	0.21	1.20	3.33	1.15	0.71
Discharge (cu.m/sec)	0.25	8.35	34.64	23.41	5.88
pH	8.20	8.60	8.21	7.69	7.95
Alkalinity (mg/L)	36.00	130.00	90.50	92.00	102.67
Conductivity (microS/cm)	62.43	311.20	220.95	167.16	182.94
TDS (mg/L)	41.60	222.13	148.10	111.34	120.08
Turbidity (NTU)	62.00	24.00	118.52	25.17	117.25
TSS (mg/L)	31.50	38.50	94.19	15.33	131.08
Ortho-P (mg/L)	ND	0.40	0.03	0.03	0.03
Nitrate (mg/L)	0.10	1.10	0.42	0.40	0.38
DO (mg/L)	6.53	2.80	6.12	6.95	6.50
BOD (mg/L)	1.23	12.80	2.05	1.03	1.59

ND = non detectable

Velocity ($H = 9.74$, $P<0.05$), depth ($H = 11.94$, $P<0.05$), discharge ($H = 9.64$, $P<0.05$) and TDS ($H = 10.64$, $P<0.05$) are four main variablex significantly related to the TWINSPAN grouped sites as being revealed by the Kruskal-Wallis test.

The SSH plot as shown in Fig. 8b reveals a well-defined grouping of the sites in the space. The sites H02 and P13 are far separated from the rest, they both have a marked impacts occurring but by different sources as mentioned earlier. The most cleaner water quality sites, group D, and being abundantly colonised by most aquatic larvae are extending the right hand side of the plot. Its closet neighbors locating a little northward to the plot is the grouped sites E which have subordinate numbers of faunal families to the grouped sites D. The grouped sites C are locating approaching to the bottom of the plot.

Only two SSH axes, axis1 and axis2, are correlated with several physicochemical factors. Axis1 is significantly related to velocity ($r = 0.42$, $t_{(25)} = 2.27$, $P<0.05$), pH ($r = -0.60$, $t_{(25)} = 2.27$, $P<0.01$), phosphate ($r = -0.42$, $t_{(25)} = 2.26$, $P<0.05$), DO ($r = 0.67$, $t_{(25)} = 4.39$, $P<0.001$), width ($r = -0.49$, $t_{(25)} = 2.73$, $P<0.05$), depth ($r = -0.50$, $t_{(25)} = 2.79$, $P<0.05$) and BOD ($r = -0.44$, $t_{(25)} = 2.39$, $P<0.05$). Axis3 is associated with air temperature ($r = 0.54$, $t_{(25)} = 3.15$, $P<0.01$), water temperature ($r = 0.70$, $t_{(25)} = 4.74$,

P<0.001), width ($r = 0.60$, $t_{(25)} = 3.67$, P<0.01), depth ($r = 0.54$, $t_{(25)} = 3.16$, P<0.01), discharge ($r = 0.66$, $t_{(25)} = 4.25$, P<0.001), conductivity ($r = 0.65$, $t_{(25)} = 4.17$, P<0.001) and TDS ($r = 0.64$, $t_{(25)} = 4.05$, P<0.001).

This month is characterizing as the first month of rainy season of the region and thus leading to almost all physicochemical variables rising up at high levels. Surface run-offs can be observed everywhere, and subsequently contributing to high levels of environmental variables measured in most of the waterways. The SSH axes are then appearing to be significantly correlated with several variables.

Fig. 8c shows the family vectors extending to several directions which in fact relating to the sites in Fig. 8b. It is very apparent that much more numbers of families are directed to the grouped sites D and E. The indicator families forwarded to the grouped sites D are, for examples, Potamantidae (POT), Heptageniidae (HEP), Elmidae (ELM), Leptophlebiidae (LEPT), Calanoceridae (CAL), Corydalidae (COR) and Molannidae (MOL). The second highest abundant family is of group E, where the vectors also indicate a larger numbers of indicator families, these are, for instances, Leptoceridae (LEP), Hydropsychidae (HYD), Caenidae (CAE) and Curculionidae (CUR).

The grouped sites C which are influenced by discharge show a certain types of indicator families which most of them prefer deeper waters. These are, for instances, Econmidae (ECN), Polycentropodidae (POLY) and Potamantidae (POT). Some pollution indicator families are also extending to this end, for examples, Oligochaete (OLI), Ceratopogonidae (CER) and Chironomidae (CHI). The family Chaoboridae (CHA) is obviously pointed forward to the site P13, where the Sialidae (SIA) is lined directly to the site H02.

There are some certain correlations between ordination axes and environmental variables, which some of the variables significantly associating with axis1. There is no significant association between physicochemical parameters with axis2.

The ordination axis1 is very highly positively correlated with DO ($r = 0.65$, $t_{(25)} = 4.26$, P<0.001). This is indeed corresponding to whatever the sites are arranged in the plot, the sites having lower levels of DO are placed on the left hand side of the plot, while the high DO sites located on the opposite end. The pH is strongly negatively associated with Axis1 ($r = -0.60$, $t_{(25)} = 3.71$, P<0.01). The trend of pH is then increasing from the right to the left of the plot along axis1.

Other environmental factors which negatively correlated with axis1 are air temperature ($r = -0.38$, $t_{(25)} = 2.08$, P<0.05), phosphate ($r = -0.41$, $t_{(25)} = 2.26$, P<0.05), width ($r = -0.49$, $t_{(25)} = 2.73$, P<0.05), depth ($r = -0.47$, $t_{(25)} = 2.65$, P<0.05) and BOD ($r = -0.46$, $t_{(25)} = 2.65$, P<0.05), while water velocity is positively associated with axis1 ($r = 0.42$, $t_{(25)} = 2.29$, P<0.05).

The influence of physicochemical variables due on the sites is shown in Fig. 8d. Most of the environmental factors do affect most of the sites where locating at the bottom of the plot. At the upper part of the plot where more numbers of faunal families flourishing, these sites are comparatively less impacted by environmental factors. In other words, the sites at the upper part of the plot have low level (intensity) of environmental variables.

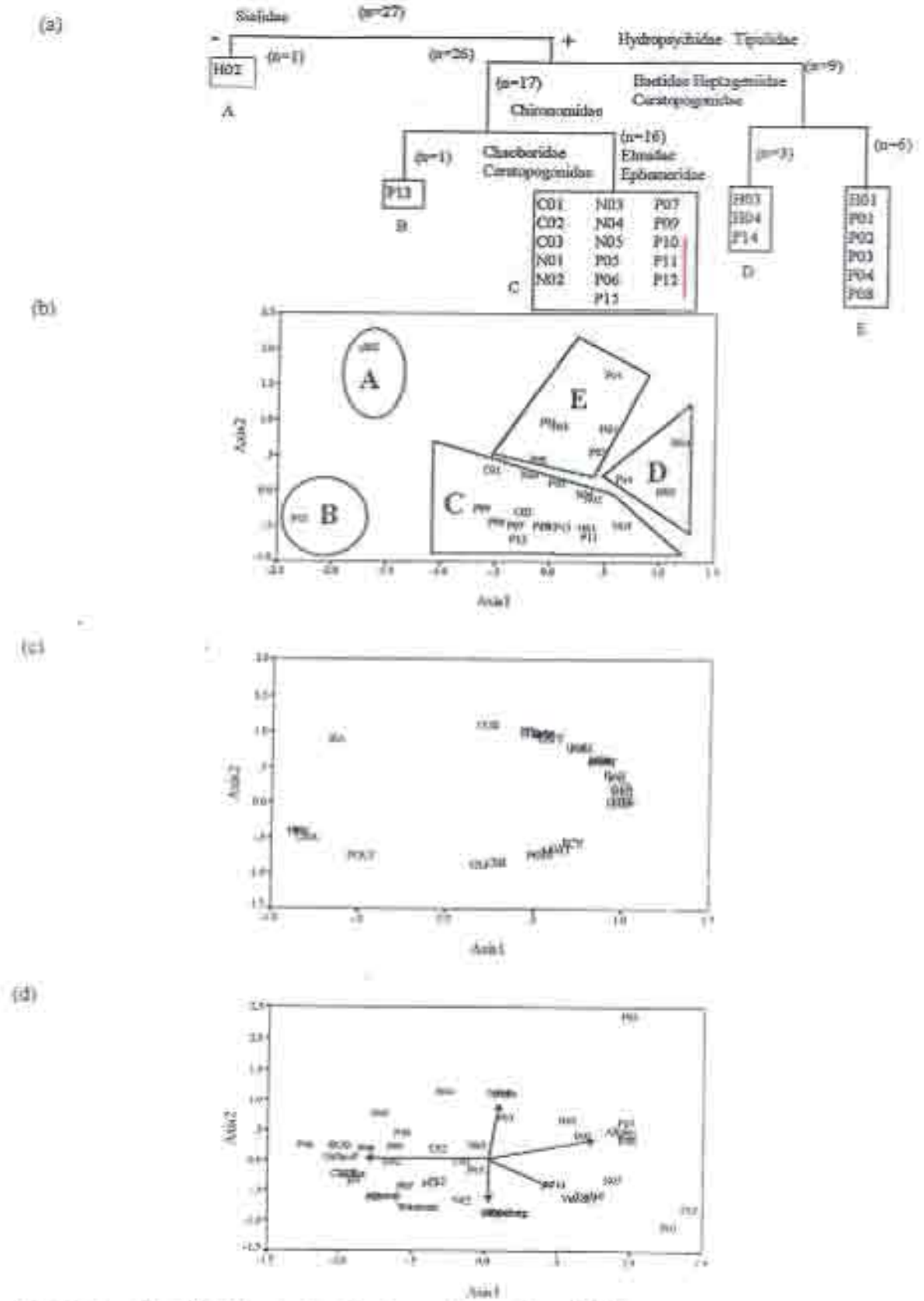

Figure 8 Classification and ordination analyses (June 1996).
(a) Results from TWINSPAN analysis.
(b) Axis2 vs. Axis3 biplot of sampling sites by SSH ordination.
(c) Axis2 vs. Axis3 biplot of macroinvertebrate fauna by SSH ordination.
(d) Axis2 vs. Axis3 biplot of physicochemical variable by SSH ordination

6 Concluding remarks and discussions

6.1 Benthic macroinvertebrate species distribution

Distribution of benthic macroinvertebrate species are varying through various types of landscape in the Pong catchment. The upstream lands have more numbers of benthic species, and becoming less abundance at lowland areas. The two prime factors which determining the existence of benthic species are (1) habitat specification and (2) habitat disturbance.

(1) Habitat specification

Certain benthic species inhabiting at a site is the first issue to be discussed here. This is the case of habitat specification preferential for particular species. For examples, most of the sensitive Ephemeroptera, Trichoptera and Plecoptera taxa are abundant at upstream highlands. The stream reach uplands are relatively shallow with the average minimal depth less than 0.50 m. The water quality of these upland sites are relatively clean with less levels of contaminants. The stream beds of the upstream sites are mixed but mainly underlain by bed rock, boulder and cobble. Also at those sites, along the stream banks, shading is largely provided by the abundant trips of native vegetation. All these habitat characteristics are preferred by certain aquatic macroinvetebrate species.

There are many instances found in correspond to such a habitat specification criterion. These are, for examples, two obvious mayflies groups, Heptageniidae and Leptophlebiidae, discovered them dwelling only in a good environmental places, which including clean waters, cool temperature and rock substrates. Certain trichopteran groups favor to inhabit at such above specific habitat are Psychomyiidae, Goeridae, Leptoceridae, Odontoceridae, Hydroptilidae, and Calamoceratidae. Some dipteran groups discovered which limiting to dwell at such refuge are Rhagionidae and Tipulidae. Coleopteran groups corresponded to such habitat are Gyrinidae, Elmidae and Hydrophilidae. Perlidae is the only one stonefly family discovered in this catchment, its living is also restricted to the upper part of the catchment. Gomphidae is the only odonatan taxa which often found living at highlands. The megalopteran Sialidae is, the only family discovered, existing at the uppermost upstream lands. Unlike others, the hemipteran families are all wide spread throughout the Pong basin.

The more epidemic trichopteran taxa are Hydropsychidae, Philopotamidae, Polycentropodidae and Ecnomidae. These taxa groups are very often found inhabiting in lowland deeper waters. If the waters become clean, some mayflies groups are also widespread throughout the catchment both shallow and deeper stretches, these are Potamanthidae, Caenidae and Ephemeridae. Most abundant dipteran taxa throughout the catchment are Chironomidae and Ceratopogonidae. Odonatan Lebellulidae and Macromiidae groups are found almost everywhere. The Corbiculidae bivalves and viviparidae are also abundant elsewhere.

The more specific taxa dwellers at pollution sites are of mainly dipteran groups, i.e. Chironomidae, Ceratopogonidae, Chaoboridae, and Oligochaete. Some sites with heavy organic pollution, the only living taxa group explored is only of Chironomidae family.

As this study recovers animal samples from river sediments, all of the animals discovered are limited to organisms that living only on river beds. The high requirement oxygen taxa would not expectedly to be found in the deeper water samples with less amount of dissolved oxygen prevailed. The generalization associating with benthic taxa assemblages above is then primarily involved in the findings of what taxa depositing at the river bottom sediments. Such these delineation about benthic larvae groups have never been published elsewhere in Thailand. Thus, the preliminary findings by this study will contribute the significant knowledge of biology of the Thai native macroinvertebrate fauna, which will be available for later references or more specific studies.

Dilemma of cross comparisons between benthic taxa assemblages versus sites?

Species richness is generally recognized as a primary "metrics" that used to characterize the degrees of biological quality of any environment of concern. To compare the species richness across all of the sites without regarding taxa-habitat (site) preferential interaction, therefore this is less relevance. Recent research recommended to the one, who is inevitably going to use this type of "metrics", have to modify that data through some sorts of what is now called "multimetrics" (Lenat and Barbour 1994). This is in fact the late development to date associating with "metrics approached" as its main idea is to combine all of the results from several metrics by forming into wholly one reliable biological result.

However, it is claimed that such "multimetrics" approach is not always valid as being applied to all several habitats throughout the catchment (Norris 1995). Only the habitats with similar physical environments may be largely appropriate to use this type of "multimetrics" analysis, which such alike habitats are recently called "ecoregion".

In summary, all of the metrics being used now, the multimetrics recently supershade the conventional species richness measure and other similar indices. Nevertheless, to use this multimetrics with biological data, there will be a certain limitation by only applying it restricted to each ecoregion and that any comparisons can thereafter be made through similar habitats in that ecoregion.

At this stage, the number of species found by this study is then contributing only to listing the findings of species (or genera) which inhabiting in the Pong catchment region, rather than making a cross comparisoes of among the sites in the catchment. Nevertheless, as this study encounters the time constraint on report due submission, such exercises associated with multimetrics would then be now not succeeded. The high stacks of data collected by this examination will thus be later analyzed by the multimetrics approach in the following years. The multimetric is indeed very much interesting, and it seems to be readiness to further handle by this study when the time span allowed. As this year all of quantitative data set have been timely already systematically stored, additionally most of the times of the first year investigation are for field samplings and specimens identifications.

Descriptions of average number of species assemblages of all sites versus times would be principally sufficient at this stage. The minimal average number of species occurs in April (Table 1), while the maximum is in February. The bi-month taxa recorded by this study indeed implies some facts associating with life cycle of aquatic macroinvetebrate fauna of the region. According to bimonthly sampling, large numbers of

macroinvertebrate larvae are discovered in December and February (the cooler months), while the least numbers found in April (the hottest month). When disregarding environmental impacts to the numbers of taxa, this is generally indicating that most of the aquatic macroinvertebrates at this summer time go on to adult stage.

Cross comparisons by using species numbers, which only being preliminarily analyzed, show some certain facts about differentiation between the similar sub-regional sites. The number of species deposited at the upper Pong and Cheon rivers' sites are not different. This would considerably indicate a common environment that underlying between them, as most of them are locating at upstream highlands. However, the more insightful investigations about species assemblage at each site through time is still needed by this study.

The density of individuals (organisms) is another data set that would be expected to show a certain trends which relating to the organism-site variations. Interestingly, the average density of individuals is rising up at higher level in cooler months (December and February) whereas the hottest month (April) it becomes decreasing (Table 1). This phenomena is indeed corresponding to what is occurring with the species numbers. However, the density of organism values reveals very varying of each month data set.

(2) Habitat disturbance

Some facts revealed by this study are principally about the consequences of habitat disturbances. When considering the benthic species depositing at a site through time, it implies a set of causes that make the habitat not suitable for benthic animal dwelling. The disappearance and reoccurrence regimes may be the case for discussions here. The study results show two main sources of impacts emerged to water dwelling animals, i.e. physical and chemical factors.

Of the upper catchment sites the physical factor is prone to be the major impetus which disturbing the habitat at a site. This is leading to the disappearance of some benthic species which unable to resist that charges, for examples, heavy discharge, high turbidity caused by surface run-offs etc. Thus, all of the fragile larvae are wiped out by the river flow. In contrast, once when the river waters return to normal state, these larvae are then reappearing. This can be obviously seen from most of the sites of the upper Pong catchment.

Another important note about physical effect is that between the sites which lying at the same altitude, some sites have different taxa compositions. Certain examples can be drawn from the study is about the differences between the lower Cheon and the upper Pong sites. The two grouped sites have different physical environments, for examples, water depth, discharge, riparian vegetation and substrates, these factors are mainly thus determining the occurrence of certain benthic species.

Some lower sites of the catchment are also showing such above paradox, i.e. P08, P09 and P11. The three sites here are not only affected by physical source but also from organochemical origin. The first two sites locating at main stream channel, very often that once when the water quality changed due to organic pollution discharged from upstream, certain taxa assemblages become rapidly declining, and finally all disappearing. Whenever the water quality is relatively improved, that taxa begin to increase in

numbers. In this aspect, the chemical factor has a much more impact to animals than the physicals.

The site P11 is of the Pra Kuea river locating nearby the city but a little further upstream before the Pra Kuea reaching the city center. This site is susceptible to organic pollution source from communities. The realm of occurrence of certain species associated with pollution is resemble to the sites P08 and P09.

At this stage, according to the two cases mentioned, it can be concluded that as their physical environment at a certain time of the year are quite static, the water pollution point source is then being the cause of species disappearance.

Effects of organic pollution is very apparent when considering a relationship between the sites P12 and P13 and their benthic animal dwellers. These sites locate at almost the center of the city and their physical characteristics are quite constant throughout the year, except at sometimes during raining periods. When excluding the rainy months, all of the remaining times the benthic animal (organism) variation is only limited to the number of chironomid larvae. These sites in fact show a clear gross organic pollution due on the numbers of benthic animal, and where only chironomid taxa is found. Thus, the least number of chironomid organism found can be related to the organic pollution intensity. On the other hand, once when, for example, the BOD reduces in level the numbers of the midge larvae increase.

Another obvious chemical impact is of the Chi river sites, for example, C01. This site during summer months becomes blackish as a result of saline intrusion from underlying rocks. No substantial impact from other chemical sources occurred to this site. Chaoboridae is the only major taxa can dwell in this site in summer months, at when the water bodies become less diluted.

To this end, it can be summarized that the existence of benthic animal is determined by two main factors, i.e. habitat specification and habitat disturbance. The dwelling of a species at a site when without any external impacts both by physical and chemical sources is mainly depending on its habitat preference. The regime of present and absent at a time of the species in a certain site is based on its habitat disturbance. These two approaches can be used to further examine in many several aspects associating with this animal groups.

For examples, the first may be useful for any detailed studies about biology of a certain taxa which being based on what is initially found by this study. The findings of such a species where it only inhabits in a certain site, the site with particular prevailing environment. Species and habitat conservation at that site may be another topic to continue.

The second may pose many hypotheses relating to the theme of present and absent of a species at a site. For examples, it might be profitable to see that to what specific level of BOD that will allow such a species to survive at a site in the natural situation. A certain correlation between that two ends may be found and that lending the results to adjust the ambient BOD standard which can be actually applied to the real situation in Thailand, rather than using overseas standard as presently practiced.

6.2 Faunal diversity and grouping of the sites demonstrated by multivariate analyses

Discussions about the effectiveness of using multivariate methods in quantifying environmental data in Thailand are difficult. Knowledge associating with several multivariate data analysis procedures are very poor, and also their software are not readily accessible from most developing countries. Training to use several multivariate procedures is viewed to be very necessary for the Thai academicians in the future. Training schools towards this type of analysis are largely available in advance western universities.

Prior to elucidating the data results analyzed by the classification method, the TWINSPAN and the ordination, the SSH, by this study, it is worthy to have a short discussions about the uses of both types of data analyses to date.

Multivariate methods have been very much more well known and widely applied since Wright *et al.* (1984) they first explore of using the TWINSPAN analysis incorporated with ordination method, the DECORANA, in classifying the streams in England based upon macroinvertebrate fauna. Later, there are many several shortcoming publications of using these techniques to examine the distribution of benthic fauna and their relationship to physicochemical factors (for examples, Furse *et al.* 1984, Ormerod and Edwards 1987, Rundle and Hidrew 1990, Fledman and Connor 1992, Gower 1994 and Reynoldson *et al.* 1995).

The TWINSPAN is proved to be robust in analyzing species/samples data metrix and finally generating the site groupings based on their faunal composition. In other words, the sampling sites are classified into groups via their animal attributes. Norris (1995), like most other investigators, insisted that the multivariate method is far superior to other types of analysis techniques. As ecological data is multidimensional in nature, this approach is very appropriate to be used in analyzing biological data.

The polythetic divisive type, the TWINSPAN, is rarely use in Thailand, then referencing and discussion cannot be apparently made here. Indeed, few papers appeared of using TWINSPAN analysis, for examples, which recently appears in Rajchapakdee (1992) who was doing her masters research at Chiang Mai University, all of her multivariate data analysis handling aided by the British academicians. This research limits the study areas only within some small forest streams in Doi Suthep, Chiang Mai. Extensive investigation across the catchment, like this study, has never yet been done. Thus, this research is then being the first attempt in Thailand of using this type of analysis for a basin-wide study.

The ordination methods themselves are also proved to be a very useful tool in revealing a certain position of a site in the space plot. Several ordination methods available to date, but have to be extremely caution when use. Some methods of this type of analyses, including TWINSPAN, are applied appearing in Thailand as masters research, but rather genuinely understanding about the theories behind them is very limited. Thus, any conclusions due made may be less valid.

Of among ordination methods Minchin (1987) pointed out from the several tests that some popular ordination methods lack data analysis robustness, particularly DCA (e.g., DECORANA and CANOCO) procedures. It is indeed the problems of linearity (linear? or non-linear? or semi-linear?) responses of biological data. To use any of particular

ordination procedures, i.e. Factor Analysis (FA), Principal Component Analysis (PCA), Principal Coordinates Analysis (PCoA), DEtrended CORrespondence ANAlysis (DECORANA), with biological (community) data have to be extremely careful.

Later, Belbin (1995) found that the best fit ordination analysis procedure to biological data is of the semilinearity type, and thus leading to the creation and the use of Semi-Strong Hybrid Multidimensional Scaling (SSH in this term) in stead of those procedures mentioned. Most recently Norris (1995) reviews and reaffirms the appropriateness of SSH which agreeable to that of Minchin (1987). Thus, the ordination results, by using those former ordination procedures, recently presented by some investigators in Thailand would produce some distortions of the samples/sites in the space biplots. Any interpretations of the former Thai researchers' results aided by lending some former ordination methods are rather not entirely valid.

The classification type-the TWINSPAN, on the other hand, is still effective in classifying community data to date. However, the use of this procedure is also needed very much critical consideration. As the TWINSPAN applied the Chi-squared distance to generate the results which emphasizing the rare species by disregarding the total abundance of a species. Predetermination design about the data input into the TWINSPAN program then have to be initially carefully made. If not, the outputs as the grouped of sites/samples and species are to be not effectively valid. The bivariate family data (present and absent) by this study is then free from that limitation, and that expected to contribute a critical logical results.

Discussions made here about the TWINSPAN and SSH results analyzed by this study will be falling into three main aspects, firstly grouping of the sites based on these two methods will be disputed, secondly key macroinvertebrate species assemblages at each grouped sites are briefly discussed, and lastly, any relationships between the grouped sites and environmental variables are necessarily fundamentally concluded.

6.3 Clusters of the sites

(1) Reference sites

As can be seen from Figs. 4 to 8, there have been a considerable shifting of the sites between the TWINSPAN groups through bimonthly variation. Attractively, the sites H01, H03, P02, P03 and P04 have always been attached to the same end of the TWINSPAN dendrogram in every sampling occasion. These sites locate relatively at upstream highlands. The sites H01 and H03 are situated at higher altitude of about 600 M.S.L., whereas the sites P02, P03 and P04 are markedly at lower locations with altitude of about 200 M.S.L.

It appears that these sites can be classified as reference sites of the Pong catchment, the sites that with the relative pristine conditions can be later used for comparison by other sites of concern. The SSH biplots also show a well separation of these sites, may named "reference sites", in concordance with the TWINSPAN results. Thus, it is promising that these sites are well characterizing a certain environmental state in which through the year maintaining a condition attributable to aquatic macroinvertebrate dwelling.

Mayflies Heptageniidae, Leptophlebiidae and riffle beetle Elmidae are the common faunal taxa that can be found throughout the year at these reference sites. It is very much well known about the heptageniid and leptophlebiid taxa that they all require quiet pristine clean waters. The biological working party scores (BMWP), which arbitrarily grouping the taxa according to their tolerant values to environmental stress, assigned these two taxa, like most other sensitive taxa, at highest score (10) (Spellerberg 1991).

Elmidae is another taxa group which is often found in those reference sites. Many European researchers state that the elmid taxa is quite common everywhere in European continent, but this is rather much different as in Asian environment here. What is found by this study is agreed to Jäch and Kodada (1995) who recognize that the elmid riffle beetle can be used as indicators of water quality, and also featuring a condition of endangered habitats in this part of the world. They note that these taxa most frequently discover dwelling at fast flowing high saturated forest streams. The elmids thus like to dwell in the relatively clean water habitat. European score applied for the elmid, 5, which implying its moderate tolerant to pollution, is therefore not likely to be used with Asian tropical environment.

However, there may be some genera of Elmidae that may follow the European case as by this study some elmids are found inhabiting downstream. This might be the case of species specific. Biology of this taxa group in Thailand will still be needed as to fulfill a more understanding of this family. Another important observation likely to note here is that we very often find the elmids gradually recover when the water environment become improved, but they disappear rapidly once if the waters begin to degrade.

It is not always the case that the heptageniids can only be discovered at highland cool streams, but in some particular reaches of lowland river we still find them dwelling as when the water quality are considerably improved. To this end, the present of this taxa can also be used as another indicator species. However, it is true that most abundance of these taxa are at highland cool streams. Possible interesting hypothesis may pose here that whether the genera and species of heptageniids are the same in those lowland and highland habitats. Taxonomic studies about this species is thus further needed. Another point of concern may be that of what additional factors other than water quality which conditioning such a taxa to live.

(2) Temporal translocation of the sites

There have been certain ten sites that transferring from one to another of between two TWINSPAN sides by the first level split, these are C02, N03, N04, P06, P07, P08, P09, P10, P11 and P14. These moving about sites are needed more clarifications here.

In October, even most of the sites at lowlands are extensive affected by high river flows, there are still three sites that a certain numbers of families had been explored, C02, N04 and P10. The faunal groups that determine these sites shifting to be included in the better environmental quality sites of this month, groups A and B as in Fig. 4a, these are Elmidae, Caenidae and Ephemeridae. These faunal groups are common taxa that living in these grouped sites.

The more subtle split between the better environment grouped sites A and B is by using the absence of indicator families, Baetidae and Leptophlebiidae. Special attention would then place on the absence of Leptophlebiidae where this taxa has been never found at

lowlands. Baetidae is however able to be discovered almost every site in the catchment. As stated earlier that the leptophlebiids are typed as good environment dwellers. The grouped site A is thus characterizing a much better environmental quality than any other grouped sites.

On the other end of the TWINSPAN result in October, Oligochaete and Ceratopogonidae are the taxa indicating the groups C and D. The sites P01, N01, N02, N03 and N05 of the upper catchment are placed in these groups which rather much impaired groups. The determining factors forcing translocating those sites which revealed by correlating environmental factors with TWINSPAN groups and SSH axes are physical factors, i.e. discharge, river morphology and turbidity. These sites at this time of the year are very much affected by physical disturbances and thus driving them to be grouped with most of the lowland impacted sites. Fig. 4d also confirms the effects of particular physical factors across these sites.

When considering all of the sites in terms of biodiversity, the grouped sites A have far greatest diverse numbers of faunal families, Fig. 4e, while the grouped sites D have the least. The maximum diversity site is H04 (Tad Mok) with 14 families while the minimal is 2 families of P01 (Na Noi). In fact, the waters at Tad Mok is temporally available, it will be eventually dried up in February and April. However, the substratum of this site is bed rock and well protected by a dense riparian vegetation. While, the site P01 characterizes a fast turbulent flows during October as this site receives the waters flushing steeply from the Phu Kradueng National Park where the Pong river originated.

However, it can be concluded at this stage that the findings associating with biodiversity at a site by this study is in fact very essential as we can quantify the degrees of biodiversity of the lands (sites) across the catchment at a certain time of the year.

In December, one obvious site, P09, of the lowlands is included in the better environmental quality grouped sites. The site P09 is discovered a large numbers of faunal families deposited when at this time of the year the waters at this site restore to normal condition. Leptophlebiidae is still being an important faunal species indicating the first TWINSPAN splitted level. All of the lower sites of the Cheon river are well separated and grouped into the impacted grouped sites.

Besides the physical factors, e.g. discharge, which conditioning the faunal assemblage at a site, in this month the other prime conditioners are DO and nutrients. All of those lower Cheon sites have been greatly affected by nutrient intensity, Fig. 5d. Even the DO vector in Fig. 5d does not show a clear association about the influence of DO (as a limitation of the selected axes to be plotted), but the DO is very highly significantly related to axis1. This means that in this month the DO values have a great influence on discrimination of the site groupings.

The topmost faunal diversity is H03 which 26 families found, while the least is P13 with only 2 families. According to Fig. 5c, the much more degrees of biodiversity sites are the sites located at the bottom of the plot, i.e. the grouped sites A. It can easily notice that the site P01, formerly including in the impacted sites in October, then at this month, returns to normal state by having 8 faunal families discovered. Moreover, the most striking fact is about its faunal family contents between the two months, October versus December, thus only two families occurred in October, Chironomidae and Ceratopogonidae, but in December found eight families. Further, the site P01 with eight

families discovered, four outstanding sensitive families also appear, these are Heptageniidae, Phryganeidae, Leptophlebiidae and Perlidae, and thus resulting in the site P01 characterizing good environmental quality, and with higher faunal diversity in this month.

The site P13 which belongs to group C (the highest level BOD and lowest DO group-Table 3) has only two families dwelling, Chironomidae and Oligochaete. These two families are very much well known from overseas that they imply an occurrence of water pollution, and the result explored here is also agreed to that-the pollution indicator species.

In this instance, it can be summarized that the high DO level (Table 3) is being the first enhanced factor that leading to the high aquatic benthic animal diversity, as clearly seen at site H03. The second is physical factor, e.g. discharge, velocity and depth, which very much revealed affecting faunal community variation. But when those physical factors decrease their intensity, the water becomes calm and once again it is able to mediate more faunal groups assemblages, as apparently shown in the case of site P01.

In February, the lower sites of the Cheon river (N01 to N05) are still being included in the impacted sites of the TWINSPAN groups, Fig. 6a. Two of the lower sites, P06 and P08, are translocated to be included in the less impacted upstream sites. There are two obvious components that made these two sites encompassed in group B, the first is the number of faunal families increased and the second is the indicator families. Both of them have more numbers of families, similarly ten families. Potamantidae is one of the most sensitive forms which found at site P08.

The most diverse faunal families are of P02 and H03, both have the same numbers as 20 families. In this instance, the site P02 may be used as the reference site for comparison with any sites with the same plain (200 M.S.L.), while the site H03 is used to distinguish faunal diversity of among the higher altitude sites (600 M.S.L).

However, as the fact that even the above two sites have greater family numbers but when considering the sensitive families occupying at a site of the same altitude, the site P03 is discovered more number of sensitive families dwelling than P02. For examples, the site P03 is explored dwelling by Perlidae and Leptophlebiidae whereas none of these taxa found at P02. This case is also the same when comparing between the sites H01 and H03.

A certain fact which revealed by the results of TWINSPAN groupings from all bimonthly investigation that these sites (P02, P03, H01 and H03) are always binding together. Therefore, we wish to recommend here that it would be more appropriate to assign such that grouped sites firstly to be reference sites rather than using only a single site. Further, such reference grouped sites can then be divided into sub-groups with different altitudes and other physical environments. This second divisive groups of each is then to be compared by any sites of interest, the test sites which having similar environmental attributes to that sub-group sites. All of the reference sites firstly constructed are derived from the classification by the TWINSPAN procedure and further reconfirmed by the ordination SSH method.

The site P13 in February is virtually polluted. Both BOD and nutrients are at highest values in this month. There is only one faunal family dwelling in this site, i.e. the

pollution indicator Chironomidae. Consequently, the site P13 is far well excluded locating beyond any other groups by the SSH biplot, Fig. 6b. The faunal diversity positions obviously reveal, Fig. 6c, lining towards groups A, B and D. Most of the faunal families are extended to groups A and B. Such this instance, the sites in groups A and B can be assigned as reference sites. These is indeed a well mixture of highland and lowland sites which can be determined for later comparison with other sites at this time of the year.

In the hottest month, April, the number of faunal family begins to reduce in most sites. Interestingly, the site H01 is now becoming the site having the maximum number of taxa, 16 families. Most of the remaining sites are affected by several environmental factors as shown by their high correlation to the SSH axes. Abundant faunal families of the lowland sites are markedly decreased.

The grouped sites A illustrate the maximum diversity of faunal family as clearly indicated by their positions in Fig. 7c. The sites P01 to P03 of the upper catchment are tied to this grouped sites. At this time of the year, the site P04 of lowland area of the upper catchment is included in this grouped sites. At the site N01, the environment is well improved and subsequently made the site having more number of families, thus binding it to this group.

The site H03 which is used to have the most diverse faunal families, it now becomes the site which well separated from the faunal topmost grouped sites. However, it is still countable to be included in the less impacted sites when compared to the other sites, Fig. 7a. As the sites H03 and H01 line on the same altitude, but each of them has far unequal amount of forest covers, the site H01 has more than ninety percent forest cover while the site H03 has less than ten percent, this consequently leads to different degrees of capacity in nourishing forest-water related animals.

Additional example is of the site H02, which is on the same plain as H01 and H03. In April, this site is now becoming stagnant with less amount of waters available. On one side of the stream bank the lands have been extensively cleared for corn fields and thus varnishing almost all of the trees, during summer this site becomes stagnant. The site has comparatively the least faunal family numbers discovered when sampling, i.e. only two families.

According to the above evidences, it can be concluded that the degrees of forest abundance can play a major role in supporting aquatic animal communities. This is exactly right as in our tropical environment, and it is becoming obviously critical situation particularly during summer month.

To this end, however, we currently still do not know the fact of detailed life cycles of our native aquatic macroinvertebrates. What we found by this study now it is just merely being the beginning step of exploring the variations of structure and abundance of our native aquatic macroinvertebrates through time and space. There are yet to be several thousand topics needed to be further investigated, e.g. biology of each faunal groups, detailed sensitivity of each species to environmental changes and so many on.

In June, the early rainy month, larger amount of waters become available at the driest site, H04, and it becomes wet with much waters available. Macroinvertebrate fauna increase in numbers in a certain sites, particularly the sites where locating at uppermost

catchment, i.e. H03 and H04. These two sites have 10 and 0 (no waters available) family numbers in April, in June contradictorily they have 18 and 21 families respectively. The site H04 now becomes restoration with rather healthy ecosystems after it had gone through an abrupt harsh environment for almost four months. In this month, the site H04 occupies the highest family number when compared to any other sites. Four sensitive families, Heptageniidae, Elmidae, Molannidae and Leptophlebiidae, are discovered abundantly at this site.

The number of faunal family is also increasing at site H03, 18 families. The sensitive Potamantidae which once appeared in April also being discovered in June. The sites H03, H04 and P14 are bound to be the only one grouped sites in this month that characterizing the most diverse faunal family assemblages. Fig. 8c clearly illustrates the highest diverse families extending to the grouped sites D.

Two main extremely polluted sites in June are H02 and P13, and clearly being separated from the remaining sites, Fig. 8b. Faunal diversity at these two sites are comparatively at lowest numbers, Fig. 8c. H02 receives a considerable first storm effect which subsequently wiping out all of depositing animals. While in the lowland areas, the sites are just about to be affected by this event. Their waters are not yet receiving much disturbance by storms like the uppermost sites where the water dilution very much prevailed. Thus the site P13 yet, for example, reveals a severe degree of water pollution impact, its BOD level rising up to 12.80 mg/L. There is only Chaoboridae faunal family discovered inhabiting at this site.

The site P14 (Ta Hin) of the lowlands in June is included in the most diverse faunal family sites H03 and H04. Of among faunal families inhabiting in this site, the sensitive form Elmidae is also discovered. The site P08 is also bound to group E which is also relatively less impacted. The TWINSPAN groups D and E in this month are less impacted and indicating much abundant faunal families inhabiting, Fig. 8c. These less polluted sites clearly have been minimal impacted from discharge, width and depth, Fig. 8d. The DO value is the highest influential factor that conditioning the positions of the sites in the SSH plot, Fig. 8b. These three sites, H03, H04 and P14 in Fig. 8b are clearly shown such high DO levels which relating to axis1.

It appears that, in June, both the TWINSPAN and SSH are highly sensitive which being capable of differentiating the sites, particularly the extreme sites, such as H02 and P13, which characterizing severe water pollution occurred and also the least faunal families dwelling.

6.4 Overall synopsis

Indeed, even this study intends to reveal a certain results that have been discovered only limited to the first year of investigation. But, the authors in fact found that very much critical efforts have been spent on this research prior to attaining the overall research objectives set forth so far. Several points that have been raised on the way through this report so far, and that may need thousands of studies to be furnish in order to achieve well understanding about our native macroinvertebrate fauna. This is as a result of the lack of critical research done associating with these faunal groups in Thailand for decades.

However, important findings according to this study can be shortly summarized as followings.

(1) Macroinvertebrate taxa distribution across the catchment are very much diverse. The environmental factors that determining them assemblages at a site are both from physical and chemical sources. These two main determinants are originated from both human and natural induces.

(2) The occurrence of benthic fauna are being conditioned by two main intrinsic modes, namely, habitat specification and habitat disturbance. The former implies the favor of a macroinvertebrate species likely to dwell at a certain site at which that site has a unique environment appropriated to such a species. While the latter reveals the consequence of habitat modification that made the habitat not suitable for macroinvertebrate species assemblages.

(3) Taxa abundance and community composition are both well clearly related to environmental changes both by time and space. Disturbances from both human and natural sources can be characterized by macroinvertebrate taxa variations.

(4) The less impacted sites reveal having the more degree diversity of macroinvertebrate taxa than that of the impacted sites.

(5) Macroinvertebrate community at a catchment wide scale can be successfully classified and ordinated to form different groups of sites by multivariate analyses methods, thus enabling us to spatially and temporally compare among all of the investigating sites.

(6) The analyses by multivariate methods can lead to a construction of any reference sites, which later these sites can be used for comparison with any sites of concern. The group of reference sites is more encouraged than only assigning to a single site.

(7) Most indicator species published internationally which being able to indicate water pollution, this findings also discover most of the results agreed to those publications. However, there are still some taxa being noticeably placed in doubt as raised by this study. This is mainly from our native taxa are of tropical environment in which to some extent they characterize some forms of differentiation from those in temperate zone. For example, European researchers found their *Simulium* sp. everywhere across the landscapes, but our native *Simulium* sp. is only limited to the upstream coollands.

(8) The degrees of environmental quality factors at a site, even only a result from one year of research, it is clear that, such degrees can be assessed by using macroinvetebrate fauna variation results. This will lead to a critical issue in nature conservation and restoration at a particular sites or certain landscapes.

(9) The "biodiversity" certainly as agreed to international approach can be assessed by this animal group. To include macroinvertebrate approach in "biodiversity" quantifying methods is the most appropriate way as claimed by many international investigators. The findings by this study is also agreed to that statement as these taxa are water-forestry related animals in nature. The more pristine areas the more macroinvertebrate taxa will be, this is what we actually ascertain.

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Appendix 1

Macroinvertebrate fauna of the Pong catchment in October, 1995

Site Code	Order	Family	Species	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6
C01	Ephemeroptera	Ephemeridae	Litobrancha sp.	0	0	0	2	0	0
C01	Ephemeroptera	Caenidae	Caenis sp.1	0	0	0	1	0	0
C01	Trichoptera	Hydropsychidae	Macrostemum similior	0	0	0	0	1	0
C01	Trichoptera	Ecnomidae	Ecnomus sp.	0	0	0	1	0	0
C01	Trichoptera	Polycentropodidae	Polycentropus sp.	0	0	1	0	0	0
C01	Diptera	Chironomidae	Chironominae	2	0	3	2	1	11
C01	Diptera	Chironomidae	Tanypodinae	1	0	1	6	1	4
C02	Ephemeroptera	Ephemeridae	Litobrancha sp.	0	0	0	0	0	1
C02	Ephemeroptera	Caenidae	Caenis sp.1	0	0	0	0	1	0
C02	Coleoptera	Elmidae	Stenelmis sp.	0	0	0	0	0	1
C02	Diptera	Chironomidae	Chironominae	6	0	5	1	4	4
C02	Diptera	Chironomidae	Tanypodinae	2	5	0	0	3	3
C02	Diptera	Chaoboridae	Chaoborus sp.	0	1	0	0	0	0
C02	Decapoda	Palaemonidae	Macrobrachium lanchesteri	0	2	0	0	1	0
C03	Ephemeroptera	Ephemeridae	Litobrancha sp.	1	0	0	0	1	2
C03	Trichoptera	Polycentropodidae	Polycentropus sp.	0	0	0	0	2	0
C03	Diptera	Chironomidae	Chironominae	5	7	1	20	1	1
C03	Diptera	Chironomidae	Tanypodinae	0	0	0	0	1	3
C03	Diptera	Ceratopogonidae	Bezzia sp.	5	0	0	0	0	0
C03	Diptera	Chaoboridae	Chaoborus sp.	0	1	31	0	7	1
C03	Oligochaeta	Oligochaeta	Oligochaeta	27	2	0	9	7	0
H01	Trichoptera	Hydropsychidae	Hydropsyche sp.	0	1	0	0	0	0
H01	Ephemeroptera	Heptageniidae	Heptagenia sp.	0	0	0	1	0	0
H01	Ephemeroptera	Baetidae	Baetis sp.2	0	0	0	1	0	0
H01	Ephemeroptera	Caenidae	Caenis sp.1	1	2	0	0	0	1
H01	Trichoptera	Ecnomidae	Ecnomus sp.	0	0	0	0	0	1
H01	Plecoptera	Perlidae	Neoperla sp.	0	0	1	0	0	0
H01	Odonata	Gomphidae	Erpetogomphus sp.	0	0	0	1	0	1
H01	Diptera	Chironomidae	Chironominae	0	0	0	0	2	2
H01	Diptera	Tipulidae	Hexatoma sp.	0	1	1	1	0	1
H02	Ephemeroptera	Baetidae	Baetis sp.2	0	0	1	0	0	0
H02	Ephemeroptera	Leptophlebiidae	Habrophlebiodes sp.	0	2	1	0	0	0
H02	Hemiptera	Gerridae	Merrobates sp.	0	0	0	0	1	0
H02	Coleoptera	Hydrophilidae	Hydrochus sp.	0	1	0	0	0	0
H02	Diptera	Chironomidae	Chironominae	14	11	17	15	3	6
H02	Diptera	Chironomidae	Tanypodinae	2	1	1	2	0	1
H02	Decapoda	Palaemonidae	Macrobrachium lanchesteri	0	0	1	0	0	0
H03	Trichoptera	Odontoceridae	Nimamyia sp.	1	0	0	0	0	0
H03	Trichoptera	Hydropsychidae	Cheumatopsyche malayaensis	1	0	0	0	0	0
H03	Ephemeroptera	Polymitarcyidae	Campsurus sp.	0	1	2	0	0	0
H03	Ephemeroptera	Caenidae	Caenis sp.1	0	0	1	1	2	2
H03	Ephemeroptera	Leptophlebiidae	Habrophlebiodes sp.	2	0	1	1	5	3
H03	Ephemeroptera	Baetidae	Baetis sp.2	0	0	0	1	0	0
H03	Coleoptera	Elmidae	Hexacylloepus sp.	1	0	0	0	0	0
H03	Coleoptera	Dytiscidae	Cybister sp.	0	0	0	0	1	1
H03	Megaloptera	Sialidae	Sialis sp.	1	1	1	0	0	0
H03	Odonata	Gomphidae	Dromogomphus sp.	1	0	0	0	0	0
H03	Odonata	Gomphidae	Hagenius sp.	0	0	1	0	0	0
H03	Diptera	Tabanidae	Tabanidae	0	0	1	0	0	0
H03	Diptera	Chironomidae	Chironominae	0	0	1	0	2	2
H03	Decapoda	Palaemonidae	Macrobrachium lanchesteri	0	0	0	1	0	0
H04	Ephemeroptera	Ephemeridae	Ephemera sp.	11	1	1	3	0	5
H04	Ephemeroptera	Caenidae	Caenis sp.1	0	1	0	1	0	0
H04	Ephemeroptera	Leptophlebiidae	Habrophlebiodes sp.	0	1	4	1	0	1
H04	Ephemeroptera	Baetidae	Baetis sp.2	3	0	0	0	0	1

Macroinvertebrate fauna of the Pong catchment in October, 1995 (continue)

Site Code	Order	Family	Species	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6
H04	Ephemeroptera	Baetidae	Baetis sp.3	1	0	0	0	1	0
H04	Trichoptera	Odontoceridae	Namamyia sp.	0	0	0	2	0	0
H04	Coleoptera	Elmidae	Hexacylloepus sp.	0	0	0	0	0	1
H04	Coleoptera	Psephenidae	Eubrianax sp.	0	0	0	1	0	0
H04	Coleoptera	Hydrophilidae	Hydrophilidae	0	1	0	0	0	0
H04	Odonata	Gomphidae	Erpetogomphus sp.	0	1	0	0	0	0
H04	Odonata	Libellulidae	Libellulidae	0	0	1	0	0	0
H04	Odonata	Platycnemididae	Platycnemididae	1	0	0	0	0	0
H04	Lepidoptera	Pyralidae	Petrophila sp.	0	0	0	0	1	0
H04	Diptera	Chironomidae	Chironominae	3	1	0	1	0	1
H04	Diptera	Chironomidae	Tanypodinae	0	1	0	0	0	0
H04	Mesogastropoda	Viviparidae	Mekongia sp.	0	0	0	1	0	0
N01	Coleoptera	Elmidae	Stenelmis sp.	1	0	0	0	0	0
N01	Coleoptera	Curculionidae	Stenopelmus sp.	0	0	0	0	1	0
N01	Diptera	Chironomidae	Chironominae	0	1	0	1	0	0
N01	Diptera	Chironomidae	Tanypodinae	1	0	0	0	2	0
N01	Veneroida	Corbiculidae	Corbicula blandina	1	0	0	0	1	0
N01	Mesogastropoda	Viviparidae	Melanoides tuberculata	1	0	0	0	0	0
N01	Oligochaeta	Oligochaeta	Oligochaeta	10	17	12	8	8	13
N02	Diptera	Chironomidae	Chironominae	1	1	0	0	8	1
N02	Diptera	Chironomidae	Tanypodinae	0	1	2	0	0	11
N02	Diptera	Ceratopogonidae	Bezzia sp.	0	0	0	1	0	0
N02	Diptera	Tipulidae	Hexatoma sp.	0	1	0	0	0	0
N02	Mesogastropoda	Viviparidae	Melanoides tuberculata	0	0	0	1	0	0
N02	Veneroida	Corbiculidae	Corbicula blandina	0	0	0	0	1	0
N02	Oligochaeta	Oligochaeta	Oligochaeta	11	3	5	18	9	0
N03	Trichoptera	Hydropsychidae	Macronemum similior	0	0	1	0	0	0
N03	Trichoptera	Polycentropodidae	Polycentropus sp.	2	0	0	0	0	0
N03	Ephemeroptera	Leptophlebiidae	Leptophlebia sp.	0	0	1	1	0	0
N03	Mesogastropoda	Viviparidae	Filopaludina martensi martensi	0	0	1	1	0	0
N03	Odonata	Gomphidae	Aphylla sp.	2	0	0	0	1	1
N03	Odonata	Gomphidae	Orentogomphus sp.	0	0	1	0	0	0
N03	Diptera	Chironomidae	Chironominae	2	2	4	0	1	0
N03	Diptera	Chironomidae	Tanypodinae	0	4	8	4	1	0
N03	Diptera	Athericidae	Athericidae	0	0	0	1	0	0
N03	Mesogastropoda	Viviparidae	Filopaludina martensi martensi	0	0	1	0	0	0
N03	Oligochaeta	Oligochaeta	Oligochaeta	1	0	0	0	0	0
N04	Trichoptera	Polycentropodidae	Polycentropus sp.	1	0	0	1	0	2
N04	Ephemeroptera	Ephemeridae	Litobrancha sp.	4	21	18	3	12	11
N04	Ephemeroptera	Caenidae	Caenis sp.1	30	1	3	0	0	1
N04	Coleoptera	Elmidae	Hexacylloepus sp.	0	1	2	1	1	0
N04	Odonata	Gomphidae	Aphylla sp.	0	0	0	1	0	0
N04	Diptera	Chironomidae	Chironominae	14	2	1	4	1	2
N04	Diptera	Chironomidae	Tanypodinae	0	2	0	1	0	0
N04	Diptera	Athericidae	Athericidae	0	0	0	1	0	0
N05	Trichoptera	Hydropsychidae	Cheumatopsyche malayensis	0	0	1	0	0	0
N05	Ephemeroptera	Ephemeridae	Litobrancha sp.	1	0	0	0	0	0
N03	Ephemeroptera	Baetidae	Baetis sp.1	0	0	1	0	0	0
N05	Coleoptera	Ptilodactylidae	Ptilodactylidae	0	0	0	0	1	0
N05	Diptera	Chironomidae	Chironominae	1	0	0	0	1	0
N05	Oligochaeta	Oligochaeta	Oligochaeta	0	0	0	0	2	0
P01	Diptera	Chironomidae	Chironominae	0	1	0	0	0	0
P01	Diptera	Ceratopogonidae	Bezzia sp.	0	0	1	0	0	0
P02	Trichoptera	Hydropsychidae	Macronemum similior	0	1	0	0	0	1

Macroinvertebrate fauna of the Pong catchment in October, 1995 (continue)

Site Code	Order	Family	Species	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6
P02	Trichoptera	Hydropsychidae	Cheumatopsyche sp.	0	0	0	1	0	0
P02	Ephemeroptera	Caenidae	Caenis sp.1	0	0	1	0	0	0
P02	Diptera	Chironomidae	Chironominae	4	0	0	0	0	0
P02	Diptera	Tipulidae	Hexatoma sp.	0	0	0	0	0	1
P02	Odonata	Gomphidae	Aphylla sp.	0	0	0	0	1	1
P02	Odonata	Macromiidae	Macromia sp.	0	0	2	0	1	1
P03	Trichoptera	Hydropsychidae	Macrostemum similior	0	0	0	0	2	0
P03	Trichoptera	Hydropsychidae	Cheumatopsyche sp.	0	2	0	0	5	0
P03	Trichoptera	Polycentropodidae	Polycentropus sp.	0	0	0	0	1	0
P03	Diptera	Chironomidae	Chironominae	3	0	0	1	2	0
P03	Diptera	Chironomidae	Tanypodinae	0	0	0	0	0	1
P03	Diptera	Tipulidae	Hexatoma sp.	1	1	0	0	1	2
P03	Odonata	Macromiidae	Macromia sp.	0	0	0	1	0	0
P03	Odonata	Gomphidae	Erpetogomphus sp.	1	1	3	1	0	1
P03	Odonata	Gomphidae	Progomphus sp.	0	0	1	0	0	0
P03	Decapoda	Palaemonidae	Macrobrachium lanchesteri	0	0	1	0	0	2
P04	Trichoptera	Hydropsychidae	Ceratopsyche sp.	0	0	0	0	1	0
P04	Trichoptera	Hydropsychidae	Leptonema sp.	0	1	0	1	0	1
P04	Ephemeroptera	Leptophlebiidae	Leptophlebia sp.	1	0	0	1	0	0
P04	Ephemeroptera	Siphlonuridae	Ameletus sp.	0	0	0	0	1	0
P04	Plecoptera	Perlidae	Neoperla sp.	0	0	0	0	1	0
P04	Coleoptera	Elmidae	Stenelmis sp.	1	0	0	0	0	0
P04	Diptera	Chironomidae	Chironominae	1	0	1	0	0	0
P04	Diptera	Simuliidae	Simulium sp.	0	0	0	1	0	0
P04	Diptera	Tipulidae	Hexatoma sp.	0	0	0	1	0	0
P04	Decapoda	Palaemonidae	Macrobrachium lanchesteri	0	1	0	0	0	1
P05	Odonata	Gomphidae	Erpetogomphus sp.	1	0	0	0	0	0
P05	Coleoptera	Elmidae	Hexacylloepus sp.	0	1	0	0	0	0
P05	Diptera	Chironomidae	Chironominae	0	0	0	0	0	1
P06	Trichoptera	Ecnomidae	Ecnomus sp.	5	1	0	2	1	1
P06	Trichoptera	Hydropsychidae	Macrostemum similior	23	0	0	0	0	0
P06	Trichoptera	Polycentropodidae	Polycentropus sp.	4	0	0	0	0	0
P06	Ephemeroptera	Polymitarcyidae	Campsurus sp.	3	8	0	2	0	3
P06	Odonata	Coenagrionidae	Cinhilegaster sp.	0	0	0	0	0	1
P06	Hemiptera	Nauceridae	Pelocoris sp.	0	0	1	0	0	0
P06	Hemiptera	Belostomatidae	Abedus sp.	0	0	1	0	0	0
P06	Diptera	Chironomidae	Chironominae	76	123	177	142	40	104
P06	Diptera	Chironomidae	Tanypodinae	2	0	1	0	0	0
P06	Diptera	Chaoboridae	Chaoborus sp.	1	0	0	0	1	0
P07	Trichoptera	Ecnomidae	Ecnomus sp.	0	0	0	2	0	0
P07	Trichoptera	Hydropsychidae	Macrostemum similior	2	0	0	0	0	0
P07	Trichoptera	Polycentropodidae	Polycentropus sp.	4	3	0	0	0	0
P07	Diptera	Chironomidae	Chironominae	4	4	6	2	3	6
P07	Diptera	Chironomidae	Tanypodinae	3	0	1	0	0	1
P07	Diptera	Chaoboridae	Chaoborus sp.	3	4	5	1	4	2
P07	Diptera	Ceratopogonidae	Bezzia sp.	0	0	0	0	1	0
P07	Oligochaeta	Oligochaeta	Oligochaeta	0	0	0	0	1	6
P08	Trichoptera	Ecnomidae	Ecnomus sp.	4	0	0	0	1	0
P08	Trichoptera	Hydropsychidae	Macrostemum similior	1	0	0	0	0	1
P08	Trichoptera	Polycentropodidae	Polycentropus sp.	1	1	1	0	2	0
P08	Odonata	Gomphidae	Hagenius sp.	1	0	0	0	0	0
P08	Odonata	Gomphidae	Aphylla sp.	0	0	0	0	0	2
P08	Odonata	Libellulidae	Orthemis sp.	0	0	1	0	0	1
P08	Odonata	Platycnemididae	Platycnemididae	0	0	0	0	0	1
P08	Coleoptera	Chrysomelidae	Donacia sp.	0	1	0	0	0	0

Macroinvertebrate fauna of the Pong catchment in October, 1995 (continue)

Site Code	Order	Family	Species	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6
P08	Hemiptera	Nepidae	Pelocoris sp.	0	0	0	0	0	2
P08	Hemiptera	Belostomatidae	Abedus sp.	0	0	0	0	0	1
P08	Diptera	Chironomidae	Chironominae	10	10	6	9	12	2
P08	Diptera	Chironomidae	Tanypodinae	0	8	7	3	0	3
P08	Diptera	Ceratopogonidae	Bezzia sp.	0	1	2	0	0	0
P08	Decapoda	Palaemonidae	Macrobrachium lanchesteri	1	0	0	5	0	0
P09	Trichoptera	Polycentropodidae	Polycentropus sp.	5	4	1	3	1	7
P09	Odonata	Gomphidae	Aphylla sp.	0	0	0	1	0	0
P09	Odonata	Gomphidae	Hagenius sp.	0	1	0	0	0	0
P09	Diptera	Chironomidae	Chironominae	11	17	0	1	7	0
P09	Diptera	Ceratopogonidae	Bezzia sp.	0	0	0	3	0	0
P09	Decapoda	Palaemonidae	Macrobrachium lanchesteri	0	0	0	1	1	1
P10	Trichoptera	Polycentropodidae	Polycentropus sp.	0	4	0	0	0	0
P10	Trichoptera	Ecnomidae	Ecnomus sp.	2	1	0	0	0	0
P10	Ephemeroptera	Ephemeridae	Litobrancha sp.	8	4	0	0	0	0
P10	Ephemeroptera	Caenidae	Caenis sp.1	1	0	0	0	0	0
P10	Coleoptera	Elmidae	Hexacylloepus sp.	1	0	0	0	0	0
P10	Diptera	Chironomidae	Chironominae	6	0	1	1	3	3
P10	Diptera	Chironomidae	Tanypodinae	0	0	0	0	19	0
P10	Decapoda	Palaemonidae	Macrobrachium lanchesteri	0	0	1	1	1	0
P10	Gastropoda	Thiaridae	Melanoides tuberculata	0	0	0	0	0	1
P11	Ephemeroptera	Polymitarcyidae	Campsurus sp.	1	0	0	0	0	0
P11	Diptera	Chironomidae	Chironominae	11	7	5	3	3	8
P11	Diptera	Chironomidae	Tanypodinae	1	0	0	7	0	0
P11	Oligochaeta	Oligochaeta	Oligochaeta	0	3	0	1	3	0
P12	Diptera	Chironomidae	Chironominae	4	12	2	3	2	4
P12	Diptera	Chironomidae	Tanypodinae	2	2	1	4	2	4
P12	Diptera	Ceratopogonidae	Bezzia sp.	1	0	0	0	0	0
P12	Diptera	Chaoboridae	Chaoborus sp.	0	0	0	0	0	1
P12	Oligochaeta	Oligochaeta	Oligochaeta	2	0	0	0	0	0
P13	Diptera	Chironomidae	Chironominae	0	1	0	0	0	0
P13	Oligochaeta	Oligochaeta	Oligochaeta	0	1	0	0	0	0
P14	Ephemeroptera	Ephemeridae	Litobrancha sp.	10	0	3	10	7	3
P14	Ephemeroptera	Caenidae	Caenis sp.2	0	0	0	0	1	0
P14	Diptera	Chironomidae	Chironominae	1	0	0	0	0	0
P14	Diptera	Chironomidae	Tanypodinae	1	0	0	0	0	1
P14	Oligochaeta	Oligochaeta	Oligochaeta	0	1	0	0	0	0
P15	Trichoptera	Ecnomidae	Ecnomus sp.	2	0	0	0	0	0
P15	Trichoptera	Polycentropodidae	Polycentropus sp.	0	0	0	0	0	1
P15	Trichoptera	Hydropsychidae	Macrostemum similior	15	0	0	0	0	0
P15	Ephemeroptera	Ephemeridae	Litobrancha sp.	1	0	0	0	0	1
P15	Diptera	Chironomidae	Chironominae	3	4	4	13	5	1
P15	Diptera	Chironomidae	Tanypodinae	3	0	2	0	0	0
P15	Diptera	Ceratopogonidae	Bezzia sp.	0	0	0	1	0	0
P15	Oligochaeta	Oligochaeta	Oligochaeta	0	0	1	0	0	0
P15	Veneroida	Corbiculidae	Corbicula blandiana	0	0	0	1	0	0

Macroinvertebrate fauna of the Pong catchment in December, 1995

Site Code	Order	Family	Species	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6
C01	Coleoptera	Elmidae	Stenelmis sp.	0	0	0	0	1	1
C01	Diptera	Chironomidae	Chironominae	5	2	0	4	2	3
C01	Diptera	Chironomidae	Tanypodinae	0	1	0	0	0	0
C01	Diptera	Chaoboridae	Chaoborus sp.	0	0	0	1	0	0
C01	Oligochaeta	Oligochaeta	Oligochaeta	0	1	5	0	1	2
C02	Ephemeroptera	Ephemeridae	Litobrancha sp.	0	0	0	0	1	0
C02	Coleoptera	Elmidae	Stenelmis sp.	0	0	0	0	0	1
C02	Diptera	Chironomidae	Chironominae	2	6	9	1	3	4
C02	Diptera	Chironomidae	Tanypodinae	0	2	4	0	0	2
C02	Diptera	Chaoboridae	Chaoborus sp.	1	0	0	0	0	2
C02	Diptera	Ceratopogonidae	Bezzia sp.	0	0	0	0	1	0
C03	Diptera	Chironomidae	Chironominae	0	0	1	5	2	4
C03	Diptera	Ceratopogonidae	Bezzia sp.	0	0	1	0	0	0
H01	Coleoptera	Elmidae	Stenelmis sp.	0	0	0	0	0	0
H01	Coleoptera	Elmidae	Cleptelmis sp.	0	0	0	0	2	0
H01	Ephemeroptera	Leptophlebiidae	Choroterpes sp.	0	0	0	0	0	0
H01	Ephemeroptera	Leptophlebiidae	Habrophlebioides sp.	2	0	0	0	0	0
H01	Ephemeroptera	Heptageniidae	Heptagenia sp.	0	0	0	0	0	0
H01	Ephemeroptera	Caenidae	Caenis sp.1	1	0	1	0	3	0
H01	Ephemeroptera	Ephemeridae	Ephemera sp.	0	0	0	0	0	0
H01	Ephemeroptera	Baetidae	Baetis sp.2	7	0	3	1	3	2
H01	Ephemeroptera	Siphlonuridae	Siphlonuridae	1	0	0	0	0	0
H01	Diptera	Chironomidae	Chironominae	0	0	0	0	0	5
H01	Diptera	Chironomidae	Tanypodinae	0	0	59	21	27	5
H01	Diptera	Tipulidae	Limnophila sp.	0	0	0	4	3	4
H01	Odonata	Gomphidae	Ergetogomphus sp.	0	0	2	2	2	1
H01	Odonata	Gomphidae	Labrogomphus sp.	1	0	0	0	0	0
H01	Trichoptera	Hydropsychidae	Macrostemum similior	4	0	3	0	0	0
H01	Trichoptera	Hydropsychidae	Cheumatopsyche malayensis	165	0	216	11	63	12
H01	Trichoptera	Hydropsychidae	Amphipsyche meridiana	11	0	4	0	0	0
H01	Trichoptera	Hydropsychidae	Synaptopsyche klakahana	107	0	0	0	0	0
H01	Trichoptera	Hydroptilidae	Hydroptila sp.	1	0	0	0	0	0
H01	Trichoptera	Ecnomidae	Ecnomus sp.	1	0	0	0	0	0
H01	Diptera	Chironomidae	Chironominae	154	0	0	0	0	0
H01	Diptera	Rhagionidae	Rhagionidae	1	0	0	0	0	0
H01	Diptera	Tipulidae	Tipulidae	3	0	0	0	0	0
H02	Trichoptera	Philopotamidae	Chimarra sp.	1	1	0	0	1	0
H02	Trichoptera	Psychomyiidae	Oligostomis sp.	1	0	0	0	0	1
H02	Ephemeroptera	Leptophlebiidae	Choroterpes sp.	0	0	1	1	0	4
H02	Ephemeroptera	Baetidae	Baetis sp.1	0	0	1	1	0	4
H02	Diptera	Chironomidae	Chironominae	0	1	0	1	1	0
H02	Diptera	Chironomidae	Tanypodinae	0	0	1	1	1	0
H02	Diptera	Ceratopogonidae	Bezzia sp.	0	0	1	0	1	0
H02	Megaloptera	Sialidae	Sialis sp.	1	2	0	1	0	0
H02	Coleoptera	Dytiscidae	Hyphydrus sp.	2	0	0	0	0	0
H02	Odonata	Macromiidae	Macromia sp.	1	2	0	1	1	0
H02	Decapoda	Palaemonidae	Macrobrachium lanchesteri	2	0	0	0	0	0
H03	Trichoptera	Calamoceratidae	Anisocentropus sp.	2	1	9	24	0	10
H03	Trichoptera	Hydroptilidae	Oxyethira sp.	2	1	2	0	0	0
H03	Trichoptera	Philopotamidae	Chimarra sp.	1	0	2	0	0	0
H03	Trichoptera	Polycentropodidae	Phylocentropus sp.	1	0	0	0	1	0
H03	Trichoptera	Ecnomidae	Ecnomus sp.	1	0	0	0	1	1
H03	Trichoptera	Goeridae	Goera sp.	0	0	0	0	0	1
H03	Ephemeroptera	Heptageniidae	Heptagenia sp.	2	0	2	0	0	0
H03	Ephemeroptera	Leptophlebiidae	Choroterpes sp.	0	0	7	0	0	1

Macroinvertebrate fauna of the Pong catchment in December, 1995 (continue)

Site Code	Order	Family	Species	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6
H03	Ephemeroptera	Caenidae	Caenis sp.1	13	3	4	0	2	2
H03	Ephemeroptera	Ephemeridae	Litobrancha sp.	2	5	0	3	0	4
H03	Ephemeroptera	Ephemeridae	Ephemera sp.	13	5	4	3	2	4
H03	Ephemeroptera	Baetidae	Baetis sp.1	2	1	0	0	1	4
H03	Megaloptera	Sialidae	Sialis sp.	2	1	2	1	2	0
H03	Coleoptera	Psephenidae	Eubrianax sp.	6	1	6	0	4	0
H03	Coleoptera	Hydrophilidae	Berosus sp.	0	1	0	0	0	1
H03	Diptera	Chironomidae	Chironominae	61	3	28	4	2	7
H03	Diptera	Chironomidae	Tanypodinae	62	4	3	3	2	2
H03	Diptera	Rhagionidae	Atherix sp.	1	5	3	3	0	1
H03	Diptera	Culicidae	Mimomyia sp.	0	1	0	0	1	1
H03	Diptera	Ceratopogonidae	Bezzia sp.	1	1	0	1	0	1
H03	Diptera	Tipulidae	Limnophila sp.	0	1	0	1	0	1
H03	Odonata	Coenagrionidae	Argiocnemis sp.	2	1	2	1	2	0
H03	Odonata	Macromiidae	Macromia sp.	1	1	0	0	2	2
H03	Odonata	Gomphidae	Ergetogomphus sp.	1	1	2	1	2	2
H03	Odonata	Gomphidae	Sinogomphus sp.	2	1	2	1	1	0
H03	Odonata	Libellulidae	Diplacodes sp.	1	1	4	0	3	2
H03	Hemiptera	Corixidae	Tenagobia sp.	0	2	1	0	0	1
H03	Hemiptera	Gerridae	Rhyacohates sp.	0	2	1	0	1	0
H03	Oligochaeta	Oligochaeta	Oligochaeta	0	1	4	24	3	10
H04	Trichoptera	Ecnomidae	Ecnomus sp.	1	2	0	0	0	1
H04	Ephemeroptera	Heptageniidae	Heptagenia sp.	32	1	27	1	4	2
H04	Ephemeroptera	Ephemeridae	Ephemera sp.	2	13	27	1	1	6
H04	Ephemeroptera	Caenidae	Caenis sp.1	1	2	1	1	1	0
H04	Ephemeroptera	Baetidae	Baetis sp.2	0	0	0	0	1	1
H04	Odonata	Gomphidae	Progomphus sp.	1	1	1	0	0	0
H04	Odonata	Macromiidae	Macromia sp.	0	1	0	0	0	2
H04	Diptera	Chironomidae	Chironominae	8	3	3	16	4	5
H04	Diptera	Chironomidae	Tanypodinae	2	1	4	17	1	3
H04	Diptera	Rhagionidae	Atherix sp.	0	1	5	0	1	1
H04	Hemiptera	Gerridae	Rhyacobates sp.	0	1	1	0	0	0
H04	Hemiptera	Corixidae	Tenagobia sp.	0	1	0	1	4	2
H04	Oligochaeta	Oligochaeta	Oligochaeta	1	2	0	0	0	2
N01	Trichoptera	Polycentropodidae	Phylocentropus sp.	0	0	0	1	0	0
N01	Plecoptera	Perlidae	Phanoperla sp.	0	0	0	1	0	0
N01	Plecoptera	Perlidae	Neoperla sp.	42	3	9	1	0	22
N01	Ephemeroptera	Ephemeridae	Ephemera sp.	0	1	2	0	0	0
N01	Ephemeroptera	Caenidae	Caenis sp.1	1	0	2	1	0	0
N01	Diptera	Chironomidae	Chironominae	6	5	8	12	14	3
N01	Diptera	Chironomidae	Tanypodinae	6	2	7	4	2	2
N01	Diptera	Ceratopogonidae	Bezzia sp.	1	2	8	1	2	2
N01	Oligochaeta	Oligochaeta	Oligochaeta	42	3	9	20	0	22
N01	Plecoptera	Perlidae	Neoperla sp.	42	3	9	1	0	22
N02	Ephemeroptera	Ephemeridae	Litobrancha sp.	0	3	3	1	0	2
N02	Coleoptera	Psephenidae	Eubrianax sp.	0	0	0	1	0	1
N02	Diptera	Chironomidae	Chironominae	0	1	0	2	0	1
N02	Diptera	Chironomidae	Tanypodinae	0	0	0	1	0	0
N02	Diptera	Ceratopogonidae	Bezzia sp.	0	1	0	1	0	0
N02	Oligochaeta	Oligochaeta	Oligochaeta	0	3	3	1	0	2
N03	Coleoptera	Elmidae	Stenelmis sp.	1	0	0	1	0	0
N03	Decapoda	Palaemonidae	Macrobrachium lanchesteri	1	0	0	0	0	0
N03	Diptera	Chironomidae	Chironominae	1	2	1	1	1	0
N03	Diptera	Chironomidae	Tanypodinae	1	1	1	1	1	0
N03	Diptera	Ceratopogonidae	Bezzia sp	1	1	1	2	1	0

Macroinvertebrate fauna of the Pong catchment in December, 1995 (continue)

Site Code	Order	Family	Species	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6
N03	Ephemeroptera	Baetidae	Baetis sp.2	1	1	1	2	1	0
N03	Trichoptera	Polycentropodidae	Neureclipsis sp.	1	0	1	0	0	0
N03	Trichoptera	Leptoceridae	Leptocerus sp.	1	0	0	0	2	1
N03	Trichoptera	Polycentropodidae	Phylocentropus sp.	1	0	0	0	2	1
N04	Trichoptera	Polycentropodidae	Phylocentropus sp.	0	3	0	3	0	6
N04	Trichoptera	Polycentropodidae	Neureclipsis sp.	0	0	0	0	1	6
N04	Trichoptera	Ecnomidae	Ecnomus sp.	0	3	0	3	0	1
N04	Ephemeroptera	Ephemeridae	Litobrancha sp.	0	0	1	1	1	0
N04	Ephemeroptera	Leptophlebiidae	Choroterpes sp.	0	2	1	1	1	0
N04	Coleoptera	Elmidae	Stenelmis sp.	1	3	1	0	1	0
N04	Coleoptera	Psephenidae	Eubrianax sp.	0	4	1	0	1	0
N04	Diptera	Chironomidae	Chironominae	2	4	0	6	3	2
N04	Diptera	Chironomidae	Tanypodinae	2	1	1	6	3	2
N04	Diptera	Ceratopogonidae	Bezzia sp.	0	1	1	0	7	0
N04	Oligochaeta	Oligochaeta	Oligochaeta	0	2	0	0	1	0
N05	Ephemeroptera	Ephemeridae	Litobrancha sp.	0	0	0	2	0	0
N05	Trichoptera	Ecnomidae	Ecnomus sp.	1	0	0	0	0	0
N05	Trichoptera	Polycentropodidae	Polycentropus sp.	2	0	1	0	3	0
N05	Odonata	Macromiidae	Macromia sp.	0	0	1	0	0	0
N05	Diptera	Chironomidae	Chironominae	3	0	0	0	0	0
N05	Diptera	Chironomidae	Tanypodinae	5	0	0	2	0	0
N05	Diptera	Ceratopogonidae	Bezzia sp.	3	0	0	1	0	0
P01	Ephemeroptera	Heptageniidae	Heptagenia sp.	2	0	0	0	0	0
P01	Ephemeroptera	Caenidae	Caenis sp.1	3	0	0	0	1	0
P01	Trichoptera	Pharyganeidae	Ptilostomis sp.	0	0	1	0	0	0
P01	Diptera	Chironomidae	Chironominae	6	9	8	13	12	1
P01	Diptera	Tipulidae	Pedicia sp.	0	0	3	1	0	0
P01	Plecoptera	Perlidae	Phanoperla sp.	1	0	0	0	0	0
P01	Coleoptera	Psephenidae	Eubrianax sp.	1	0	0	0	0	0
P01	Coleoptera	Elmidae	Stenelmis sp.	0	0	1	0	0	0
P01	Odonata	Gomphidae	Ergetogomphus sp.	1	0	0	1	2	2
P01	Odonata	Gomphidae	Macromia sp.	0	1	0	0	0	0
P01	Decapoda	Palaemonidae	Macrobrachium lanchesteri	1	0	0	0	0	12
P02	Ephemeroptera	Caenidae	Caenis sp.1	0	33	233	1	29	4
P02	Ephemeroptera	Baetidae	Baetis sp.1	0	2	1	1	2	2
P02	Ephemeroptera	Leptophlebiidae	Choroterpes sp.	0	0	1	0	0	0
P02	Trichoptera	Hydropsychidae	Macrostemum similior	97	41	1	77	25	3
P02	Trichoptera	Hydropsychidae	Cheumatopsyche sp.	500	351	6	532	61	12
P02	Trichoptera	Hydropsychidae	Macronema sp.	18	24	2	44	5	2
P02	Trichoptera	Hydroptilidae	Oxhydrichia sp.	1	2	1	0	2	1
P02	Trichoptera	Goeridae	Goera sp.	0	0	2	0	0	0
P02	Plecoptera	Perlidae	Phanoperla sp.	0	0	0	1	0	0
P02	Coleoptera	Elmidae	Stenelmis sp.	0	5	19	20	4	1
P02	Odonata	Gomphidae	Ergetogomphus sp.	0	2	3	0	1	1
P02	Odonata	Macromiidae	Macromia sp.	0	0	1	0	0	0
P02	Odonata	Protoneuridae	Protoneura sp.	0	1	0	0	0	0
P02	Diptera	Chironomidae	Chironominae	0	5	10	24	4	13
P02	Diptera	Chironomidae	Tanypodinae	0	6	9	7	3	2
P02	Diptera	Ceratopogonidae	Bezzia sp.	0	0	0	0	1	0
P02	Diptera	Simuliidae	Simulium sp.	0	0	0	1	0	0
P02	Diptera	Tipulidae	Pedicia sp.	0	0	0	0	0	2
P02	Decapoda	Palaemonidae	Macrobrachium lanchesteri	0	0	0	0	1	0
P02	Bivalvia	Corbiculidae	Corbicula fluminea	0	0	0	0	105	3
P03	Ephemeroptera	Leptophlebiidae	Choroterpes sp.	0	0	1	0	0	0
P03	Ephemeroptera	Ephemeridae	Litobrancha sp.	2	1	0	0	0	1

Macroinvertebrate fauna of the Pong catchment in Decemberber, 1995 (continue)

Site Code	Order	Family	Species	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6
P03	Trichoptera	Goeridae	Goera sp.	0	1	0	0	0	0
P03	Trichoptera	Polycentropodidae	Polycentropus sp.	2	2	1	2	2	3
P03	Hemiptera	Gerridae	Rhyacobates sp.	1	0	0	0	0	0
P03	Coleoptera	Psephenidae	Eubrianax sp.	0	0	0	0	0	1
P03	Diptera	Chironomidae	Chironominae	0	1	1	0	0	2
P03	Diptera	Chironomidae	Tanypodinae	0	1	0	0	0	0
P03	Diptera	Ceratopogonidae	Bezzia sp.	0	0	1	0	0	0
P03	Diptera	Tipulidae	Limnophila sp.	0	3	0	1	0	3
P03	Decapoda	Palaemonidae	Macrobrachium lanchesteri	0	0	0	0	0	1
P04	Ephemeroptera	Heptageniidae	Heptagenia sp.	5	3	0	1	0	4
P04	Ephemeroptera	Caenidae	Caenis sp.1	0	6	4	3	4	4
P04	Ephemeroptera	Leptophlebiidae	Choroterpes sp.	4	5	2	7	1	2
P04	Ephemeroptera	Leptophlebiidae	Chematopsyche sp.	0	0	3	0	0	0
P04	Trichoptera	Hydroptilidae	Ochrotrichia sp.	1	3	1	0	1	0
P04	Trichoptera	Hydropsychidae	Macronema sp.	0	0	1	0	0	0
P04	Coleoptera	Psephenidae	Eubrianax sp.	1	0	0	0	0	0
P04	Coleoptera	Elmidae	Stenelmis sp.	1	0	8	1	2	1
P04	Plecoptera	Perlidae	Phanoperla sp.	1	2	0	1	0	3
P04	Diptera	Chironomidae	Tanypodinae	0	3	1	2	0	0
P04	Diptera	Chironomidae	Chironominae	0	0	1	1	0	0
P04	Diptera	Tipulidae	Limnophila sp.	0	0	3	0	1	0
P04	Odonata	Macromiidae	Macromia sp.	0	0	0	1	0	0
P04	Decapoda	Palaemonidae	Macrobrachium lanchesteri	0	0	0	1	1	2
P04	Veneroida	Corbiculidae	Corbicula blandiana	3	0	0	1	1	3
P05	Ephemeroptera	Ephemeridae	Litobrancha sp.	0	0	0	3	0	0
P05	Ephemeroptera	Caenidae	Caenis sp.2	0	0	0	2	0	0
P05	Odonata	Gomphidae	Erpetogomphus sp.	0	0	0	0	1	0
P05	Coleoptera	Elmidae	Stenelmis sp.	0	0	2	0	0	0
P05	Diptera	Chironomidae	Chironominae	3	0	2	0	2	0
P05	Diptera	Chironomidae	Tanypodinae	0	0	1	0	0	0
P05	Diptera	Chaoboridae	Chaoborus sp.	3	3	4	0	1	3
P05	Diptera	Ceratopogonidae	Bezzia sp.	0	0	1	0	0	0
P05	Oligochaeta	Oligochaeta	Oligochaeta	0	0	1	0	0	0
P06	Ephemeroptera	Polymitarcyidae	Campsurus sp.	0	6	2	1	0	0
P06	Trichoptera	Ecnomidae	Ecnomus sp.	0	2	1	0	0	0
P06	Trichoptera	Polycentropodidae	Phylocentropus sp.	0	0	0	0	0	1
P06	Odonata	Macromiidae	Macromia sp.	0	0	0	0	0	1
P06	Diptera	Chironomidae	Chironominae	28	52	49	46	29	45
P06	Diptera	Chironomidae	Tanypodinae	9	8	1	3	7	11
P06	Diptera	Ceratopogonidae	Bezzia sp.	0	0	0	0	0	4
P06	Oligochaeta	Oligochaeta	Oligochaeta	0	0	0	0	1	0
P07	Trichoptera	Polycentropodidae	Phylocentropus sp.	3	2	0	1	2	2
P07	Diptera	Chironomidae	Chironominae	4	3	1	6	2	6
P07	Diptera	Chironomidae	Tanypodinae	4	2	0	2	8	0
P07	Diptera	Ceratopogonidae	Bezzia sp.	1	0	0	0	0	0
P07	Diptera	Chaoboridae	Chaoborus sp.	2	26	1	1	8	12
P07	Oligochaeta	Oligochaeta	Oligochaeta	0	3	1	5	0	0
P08	Trichoptera	Ecnomidae	Ecnomus sp.	0	0	1	0	0	0
P08	Ephemeroptera	Caenidae	Caenis sp.2	2	1	0	0	0	8
P08	Trichoptera	Ecnomidae	Ecnomus sp.	1	1	0	0	0	0
P08	Diptera	Chironomidae	Chironominae	2	34	21	1	16	6
P08	Diptera	Chironomidae	Tanypodinae	3	0	0	5	1	2
P08	Diptera	Chaoboridae	Chaoborus sp.	2	0	4	1	0	1
P08	Oligochaeta	Oligochaeta	Oligochaeta	3	0	0	0	0	0
P08	Bivalvia	Corbiculidae	Corbicula Flandinna	1	0	0	0	17	2

Macroinvertebrate fauna of the Pong catchment in December, 1995 (continue)

Site Code	Order	Family	Species	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6
P09	Ephemeroptera	Caenidae	Caenis sp.2	10	0	3	0	0	0
P09	Ephemeroptera	Baetidae	Baetis sp.1	0	2	1	0	0	0
P09	Trichoptera	Ecnomidae	Ecnomus sp.	1	0	3	0	0	0
P09	Coeloptera	Elmidae	Stenelmis sp.	0	1	7	0	1	0
P09	Odonata	Macromiidae	Macromia sp.	1	0	0	0	0	0
P09	Odonata	Gomphidae	Aphylla sp.	0	0	1	0	0	1
P09	Odonata	Gomphidae	Ergetogomphus sp.	0	0	1	0	0	1
P09	Odonata	Chlorolestidae	Megalestes sp.	0	1	0	0	0	1
P09	Diptera	Chironomidae	Chironominae	5	9	5	2	37	10
P09	Diptera	Chironomidae	Tanypodinae	4	3	0	0	1	1
P09	Diptera	Ceratopogonidae	Bezzia sp.	3	1	0	0	1	0
P09	Oligochaeta	Oligochaeta	Oligochaeta	0	0	2	0	0	0
P09	Bivalvia	Corbiculidae	Corbicula blandiana	0	0	4	0	0	0
P10	Ephemeroptera	Ephemeridae	Litobrancha sp.	0	1	2	5	0	0
P10	Trichoptera	Ecnomidae	Ecnomus sp.	0	0	0	0	1	0
P10	Coleoptera	Elmidae	Stenelmis sp.	0	0	0	1	0	0
P10	Diptera	Chironomidae	Chironominae	7	0	0	3	9	22
P10	Diptera	Chironomidae	Tanypodinae	0	0	0	0	1	3
P10	Diptera	Chaoboridae	Chaoborus sp.	0	0	1	0	0	0
P10	Diptera	Ceratopogonidae	Bezzia sp.	2	0	0	0	1	0
P11	Ephemeroptera	Polymitarcyidae	Campsurus sp.	0	1	0	0	0	0
P11	Diptera	Chironomidae	Chironominae	20	7	8	3	11	2
P11	Diptera	Chironomidae	Tanypodinae	0	0	1	0	0	0
P11	Oligochaeta	Oligochaeta	Oligochaeta	0	0	0	2	3	6
P12	Diptera	Chironomidae	Tanypodinae	0	0	2	0	0	0
P12	Diptera	Chaoboridae	Chaoborus sp.	0	0	1	0	0	0
P12	Diptera	Tipulidae	Limnophila sp.	1	0	0	0	0	0
P12	Oligochaeta	Oligochaeta	Oligochaeta	20	0	0	0	10	2
P13	Diptera	Chironomidae	Chironominae	1	0	1	5	4	0
P13	Oligochaeta	Oligochaeta	Oligochaeta	1	0	1	0	0	0
P14	Ephemeroptera	Ephemeridae	Litobrancha sp.	0	2	1	0	2	0
P14	Ephemeroptera	Caenidae	Caenis sp.2	0	0	1	0	0	0
P14	Trichoptera	Ecnomidae	Ecnomus sp.	0	0	0	2	0	0
P14	Diptera	Chironomidae	Chironominae	7	1	1	1	2	6
P14	Diptera	Chironomidae	Tanypodinae	0	2	3	0	1	0
P14	Diptera	Chaoboridae	Chaoborus sp.	0	5	1	3	0	0
P14	Diptera	Ceratopogonidae	Bezzia sp.	2	2	1	0	2	1
P15	Ephemeroptera	Ephemeridae	Litobrancha sp.	0	0	0	3	0	0
P15	Trichoptera	Philopotamidae	Chimarra sp.	1	0	0	1	0	0
P15	Diptera	Chironomidae	Chironominae	0	0	0	2	0	0
P15	Diptera	Chironomidae	Tanypodinae	0	0	0	7	0	0
P15	Diptera	Chaoboridae	Chaoborus sp.	1	5	1	0	1	0

Macroinvertebrate fauna of the Pong catchment in February, 1996

Site Code	Order	Family	Species	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6
C01	Diptera	Chironomidae	Chironominae	6	1	1	1	1	6
C01	Diptera	Chironomidae	Tanypodinae	1	0	0	8	1	4
C01	Diptera	Chaoboridae	Chaoborus sp.	0	0	1	0	0	0
C01	Diptera	Ceratopogonidae	Bezzia sp.	0	1	0	1	3	0
C01	Oligochaeta	Oligochaeta	Oligochaeta	0	0	0	0	0	1
C02	Ephemeroptera	Ephemeridae	Litobrancha sp.	0	0	0	1	1	0
C02	Trichoptera	Polycentropodidae	Phylocentropus sp.	0	0	0	0	1	0
C02	Diptera	Chironomidae	Chironominae	4	7	2	0	1	1
C02	Diptera	Chironomidae	Tanypodinae	0	0	1	0	3	0
C02	Diptera	Chaoboridae	Chaoborus sp.	0	0	3	3	0	0
C02	Diptera	Ceratopogonidae	Bezzia sp.	0	0	0	0	0	1
C02	Oligochaeta	Oligochaeta	Oligochaeta	2	0	0	0	0	0
C03	Diptera	Chironomidae	Chironominae	0	2	0	3	12	11
C03	Diptera	Chaoboridae	Chaoborus sp.	0	0	0	0	0	3
C03	Diptera	Ceratopogonidae	Bezzia sp.	18	2	0	0	1	0
C03	Coleoptera	Elmidae	Cleptelmis sp.	0	1	0	0	0	0
C03	Ventroida	Corbiculidae	Corbicula blandiana	0	0	1	1	0	0
H01	Coleoptera	Hydrophilidae	Hydrophilidae	0	0	0	0	3	1
H01	Coleoptera	Gyrinidae	Dineutus sp.	0	0	0	0	0	0
H01	Coleoptera	Elmidae	Stenelmis sp.	0	0	0	3	1	0
H01	Coleoptera	Elmidae	Pharocerus sp.	0	0	0	0	0	0
H01	Decapoda	Palaemonidae	Macrobrachium lanchesteri	1	2	0	1	0	0
H01	Diptera	Chironomidae	Chironominae	0	0	0	0	0	0
H01	Diptera	Chironomidae	Tanypodinae	7	8	0	5	2	0
H01	Diptera	Ceratopogonidae	Bezzia sp.	0	0	1	0	0	0
H01	Diptera	Rhagionidae	Atherix sp.	1	0	0	4	0	1
H01	Diptera	Tipulidae	Limnophila sp.	2	0	0	0	0	0
H01	Ephemeroptera	Potamanthidae	Potamanthus sp.	1	4	22	24	19	17
H01	Ephemeroptera	Ephemeridae	Ephemera sp.	2	0	0	0	0	0
H01	Ephemeroptera	Baetidae	Baetis sp.1	2	2	0	0	0	8
H01	Ephemeroptera	Caenidae	Caenis sp.1	0	0	0	0	0	0
H01	Ephemeroptera	Leptophlebiidae	Choroterpes sp.	1	1	0	3	0	0
H01	Ephemeroptera	Heptageniidae	Heptagenia sp.	0	0	1	0	0	2
H01	Odonata	Gomphidae	Labrogomphus sp.	0	1	1	12	4	0
H01	Plecoptera	Perlidae	Phanoperla sp.	0	0	0	0	0	0
H01	Trichoptera	Polycentropodidae	Polycentropus sp.	1	0	4	9	20	0
H01	Trichoptera	Polycentropodidae	Phylocentropus sp.	0	2	0	0	0	5
H01	Trichoptera	Polycentropodidae	Neureclipsis sp.	1	0	0	0	0	0
H01	Trichoptera	Philopotamidae	Chimarra sp.	0	1	3	1	0	0
H01	Trichoptera	Calamoceratidae	Anisocentropus sp.	0	0	0	0	1	0
H01	Trichoptera	Hydropsychidae	Cheumatopsyche malayensis	1	1	9	17	0	0
H01	Trichoptera	Hydropsychidae	Macrostemum similior	0	0	0	0	18	0
H01	Trichoptera	Ecnomidae	Ecnomus sp.	0	0	2	2	0	0
H02	Coleoptera	Elmidae	Stenelmis sp.	0	1	1	0	0	0
H02	Diptera	Chironomidae	Chironominae	0	0	2	0	0	0
H02	Ephemeroptera	Baetidae	Baetis sp.1	0	0	2	0	1	1
H02	Ephemeroptera	Leptophlebiidae	Choroterpes sp.	0	0	0	0	1	0
H02	Megaloptera	Sialidae	Sialis sp.	0	0	2	0	0	3
H02	Odonata	Gomphidae	Sinogomphus sp.	1	1	0	0	2	0
H03	Coleoptera	Psephenidae	Eubrianax sp.	0	0	0	0	0	1

Macroinvertebrate fauna of the Pong catchment in February, 1996 (continue)

Site Code	Order	Family	Species	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6
H03	Coleoptera	Elmidae	Stenelmis sp.	1	0	0	0	2	0
H03	Diptera	Chironomidae	Chironominae	107	2	13	1	51	6
H03	Diptera	Chironomidae	Tanypodinae	18	6	21	0	0	0
H03	Diptera	Ceratopogonidae	Bezzia sp.	0	0	2	17	3	1
H03	Diptera	Rhagionidae	Atherix sp.	4	1	0	0	0	0
H03	Diptera	Tipulidae	Limnophila sp.	0	0	1	0	0	0
H03	Diptera	Culicidae	Mimomyia sp.	0	1	0	0	0	0
H03	Ephemeroptera	Baetidae	Baetis sp.1	0	0	1	0	7	0
H03	Ephemeroptera	Caenidae	Caenis sp.1	0	1	0	0	9	0
H03	Ephemeroptera	Leptophlebiidae	Choroterpes sp.	0	0	32	2	0	0
H03	Hemiptera	Corixidae	Sigara sp.	0	0	0	0	2	0
H03	Hemiptera	Corixidae	Tenagobia sp.	1	1	0	0	0	0
H03	Megaloptera	Sialidae	Sialis sp.	0	1	1	0	0	2
H03	Odonata	Libellulidae	Diplacodes sp.	0	0	10	1	1	0
H03	Odonata	Coenagrionidae	Argiocnemis sp.	8	7	0	0	1	3
H03	Odonata	Aeshnidae	Aeschnophlebia sp.	0	0	1	0	1	0
H03	Odonata	Gomphidae	Nesogomphus sp.	0	0	0	0	0	0
H03	Odonata	Gomphidae	Erpetogomphus sp.	0	0	0	1	2	0
H03	Oligochaeta	Oligochaeta	Oligochaeta	0	0	0	0	0	0
H03	Trichoptera	Ecnomidae	Ecnomus sp.	0	0	10	4	1	0
H03	Trichoptera	Leptoceridae	Triaenodes sp.	2	0	0	0	0	0
H03	Trichoptera	Calamoceratidae	Anisocentropus sp.	0	0	0	0	1	0
H03	Trichoptera	Polycentropodidae	Polycentropus sp.	1	4	0	0	0	0
N01	Coleoptera	Elmidae	Stenelmis sp.	4	0	1	1	0	0
N01	Diptera	Chironomidae	Chironominae	1	3	5	0	0	1
N01	Diptera	Chironomidae	Tanypodinae	11	0	0	3	6	0
N01	Diptera	Tipulidae	Limnophila sp.	0	14	8	0	1	13
N01	Ephemeroptera	Ephemeridae	Litobrancha sp.	1	1	0	1	0	0
N01	Oligochaeta	Oligochaeta	Oligochaeta	62	0	0	23	0	21
N01	Veneroida	Corbiculidae	Corbicula blandina	1	42	10	3	65	1
N02	Diptera	Chironomidae	Chironominae	0	0	0	0	0	6
N02	Diptera	Chironomidae	Tanypodinae	3	4	0	4	0	1
N02	Diptera	Ceratopogonidae	Bezzia sp.	0	0	0	0	2	0
N02	Ephemeroptera	Ephemeridae	Litobrancha sp.	1	0	0	0	0	1
N02	Ephemeroptera	Leptophlebiidae	Choroterpes sp.	1	0	0	0	2	0
N03	Coleoptera	Psephenidae	Eubrianax sp.	2	0	0	0	0	0
N03	Coleoptera	Elmidae	Stenelmis sp.	1	0	0	0	0	0
N03	Diptera	Chironomidae	Chironominae	2	0	0	0	0	0
N03	Ephemeroptera	Caenidae	Caenis sp.1	1	0	1	0	0	0
N03	Trichoptera	Polycentropodidae	Polycentropus sp.	0	0	1	0	1	0
N03	Trichoptera	Polycentropodidae	Neureclipsis sp.	1	0	0	0	0	0
N04	Coleoptera	Gyrinidae	Dineutus sp.	0	0	1	0	0	0
N04	Coleoptera	Psephenidae	Eubrianax sp.	0	0	1	0	2	0
N04	Coleoptera	Elmidae	Stenelmis sp.	0	0	0	0	0	0
N04	Decapoda	Palaemonidae	Macrobrachium lamchesteri	5	2	1	0	1	2
N04	Diptera	Chironomidae	Chironominae	1	3	0	0	7	10
N04	Diptera	Chironomidae	Tanypodinae	1	0	1	0	0	0
N04	Diptera	Ceratopogonidae	Bezzia sp.	1	0	0	0	3	2
N04	Ephemeroptera	Ephemeridae	Litobrancha sp.	0	0	0	0	0	0
N04	Ephemeroptera	Caenidae	Caenis sp.1	11	3	0	0	1	9

Macroinvertebrate fauna of the Pong catchment in February, 1996 (continue)

Site Code	Order	Family	Species	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6
N04	Ephemeroptera	Leptophlebiidae	Choroterpes sp.	0	0	5	0	3	6
N04	Oligochaeta	Oligochaeta	Oligochaeta	0	0	0	4	0	0
N04	Trichoptera	Ecnomidae	Ecnomus sp.	0	0	1	0	1	13
N05	Coleoptera	Psephenidae	Eubrianax sp.	1	1	0	1	0	0
N05	Diptera	Chironomidae	Chironominae	0	0	1	0	2	2
N05	Diptera	Chironomidae	Tanypodinae	0	0	0	0	0	10
N05	Diptera	Chaoboridae	Chaoborus sp.	0	0	0	0	1	0
N05	Diptera	Ceratopogonidae	Bezzia sp.	11	7	7	4	0	1
N05	Ephemeroptera	Caenidae	Caenis sp.1	0	0	0	0	2	1
N05	Oligochaeta	Oligochaeta	Oligochaeta	0	0	0	0	0	5
N05	Ephemeroptera	Ephemeridae	Litobrancha sp.	0	0	5	0	12	0
N05	Trichoptera	Polycentropodidae	Neureclipsis sp.	0	2	0	3	0	3
P01	Ephemeroptera	Caenidae	Caenis sp.1	0	0	2	5	2	0
P01	Ephemeroptera	Ephemeridae	Ephemera sp.	0	0	0	1	0	0
P01	Ephemeroptera	Baetidae	Baetis sp.2	0	0	0	2	1	4
P01	Trichoptera	Calamoceratidae	Anisocentropus sp.	0	0	1	1	0	0
P01	Trichoptera	Hydropsychidae	Cheumatopsyche malayensis	3	0	3	0	0	0
P01	Trichoptera	Psychomyiidae	Tinodes sp.	0	1	0	0	0	0
P01	Trichoptera	Polycentropodidae	Cyrnellus sp.	0	1	1	0	0	0
P01	Odonata	Gomphidae	Erpetogomphus sp.	3	2	3	16	0	3
P01	Odonata	Libellulidae	Acisoma sp.	0	0	1	0	0	0
P01	Odonata	Libellulidae	Diplacodes sp.	0	0	0	0	0	1
P01	Coleoptera	Elmidae	Cleptelmis sp.	1	3	0	0	0	0
P01	Hemiptera	Aphelocheiridae	Aphelocheirus sp.	0	0	0	0	0	0
P01	Diptera	Chironomidae	Chironominae	2	1	1	13	14	7
P01	Diptera	Chironomidae	Tanypodinae	1	1	0	0	4	0
P01	Diptera	Ceratopogonidae	Bezzia sp.	0	0	0	0	2	7
P01	Diptera	Tipulidae	Limnophila sp.	4	8	5	1	1	0
P01	Veneroida	Corbiculidae	Corbicula blandiana	4	1	0	0	0	1
P02	Ephemeroptera	Caenidae	Caenis sp.1	0	3	0	1	1	0
P02	Ephemeroptera	Baetidae	Baetis sp.2	10	5	0	42	5	11
P02	Trichoptera	Hydropsychidae	Cheumatopsyche malayensis	0	0	0	4	0	32
P02	Trichoptera	Hydropsychidae	Macrostemum similior	0	0	0	2	0	10
P02	Trichoptera	Hydroptilidae	Ochrotrichia sp.	0	1	0	11	1	5
P02	Odonata	Gomphidae	Erpetogomphus sp.	2	0	0	3	0	1
P02	Odonata	Gomphidae	Sieboldius sp.	0	0	0	0	0	1
P02	Odonata	Libellulidae	Diplacodes sp.	0	9	0	0	3	0
P02	Odonata	Protoneuridae	Prodasineura sp.	0	0	0	0	1	0
P02	Odonata	Coenagrionidae	Argiocnemis sp.	0	1	0	0	0	0
P02	Coleoptera	Elmidae	Cleptelmis sp.	0	0	7	11	0	13
P02	Coleoptera	Elmidae	Stenelmis sp.	0	4	0	1	12	0
P02	Coleoptera	Hydrophilidae	Berosus sp.	0	0	0	0	1	0
P02	Coleoptera	Gyrinidae	Dineutus sp.	0	4	7	7	0	0
P02	Coleoptera	Psephenidae	Eubrianax sp.	0	0	0	1	0	0
P02	Hemiptera	Gerridae	Rhagadotarsus sp.	28	0	0	0	0	0
P02	Hemiptera	Corixidae	Tenagobia sp.	0	4	0	0	0	0
P02	Diptera	Chironomidae	Chironominae	12	84	39	42	22	38
P02	Diptera	Chironomidae	Tanypodinae	0	19	0	17	40	9
P02	Diptera	Ceratopogonidae	Bezzia sp.	0	8	1	0	10	1

Macroinvertebrate fauna of the Pong catchment in February, 1996 (continue)

Site Code	Order	Family	Species	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6
P02	Diptera	Tipulidae	Limnophila sp.	0	0	0	0	0	1
P02	Veneroida	Corbiculidae	Corbicula blandiana	60	13	34	33	18	8
P02	Decapoda	Palaemonidae	Macrobrachium lanchesteri	0	1	0	0	0	0
P02	Oligochaeta	Oligochaeta	Oligochaeta	0	2	34	0	3	7
P03	Ephemeroptera	Caenidae	Caenis sp.1	1	0	0	5	0	0
P03	Ephemeroptera	Caenidae	Centroptilum sp.	0	0	0	11	0	0
P03	Ephemeroptera	Leptophlebiidae	Choroterpes sp.	9	0	0	0	0	0
P03	Ephemeroptera	Ephemeridae	Ephemera sp.	0	3	0	2	0	0
P03	Trichoptera	Hydropsychidae	Chematopsyche malaysiensis	265	0	96	1	64	55
P03	Trichoptera	Hydropsychidae	Macrostemum similior	16	0	0	0	1	0
P03	Trichoptera	Leptoceridae	Trianodes sp.	0	6	1	4	0	0
P03	Trichoptera	Hydroptilidae	Ochrotrichia sp.	0	0	0	4	0	0
P03	Plecoptera	Perlidae	Phanoperla sp.	1	0	1	0	0	1
P03	Odonata	Gomphidae	Erpetogomphus sp.	7	4	7	1	5	4
P03	Odonata	Gomphidae	Labrogomphus sp.	0	4	0	0	0	0
P03	Odonata	Libellulidae	Diplacodes sp.	0	1	0	0	0	0
P03	Odonata	Protoneuridae	Prodasineura sp.	0	1	0	0	0	0
P03	Coleoptera	Elmidae	Cleptelmis sp.	55	0	7	8	27	0
P03	Coleoptera	Elmidae	Stenelmis sp.	0	0	0	0	0	9
P03	Coleoptera	Psephenidae	Eubrianax sp.	1	0	0	0	0	0
P03	Coleoptera	Dytiscidae	Eretes sp.	1	0	0	0	0	0
P03	Coleoptera	Dytiscidae	Dytiscus sp.	0	0	0	0	0	1
P03	Diptera	Chironomidae	Chironominae	0	7	0	8	0	0
P03	Diptera	Chironomidae	Tanypodinae	1	2	0	11	4	0
P03	Diptera	Ceratopogonidae	Bezzia sp.	0	7	0	0	0	0
P03	Diptera	Tipulidae	Limnophila sp.	37	0	3	13	34	3
P03	Diptera	Culicidae	Mimomyia sp.	0	1	0	0	0	0
P03	Veneroida	Corbiculidae	Corbicula blandiana	1	0	7	4	8	6
P03	Decapoda	Palaemonidae	Macrobrachium lanchesteri	0	0	0	1	0	0
P04	Ephemeroptera	Caenidae	Caenis sp.1	15	33	0	4	1	2
P04	Ephemeroptera	Baetidae	Baetis sp.1	0	1	0	0	2	1
P04	Ephemeroptera	Heptageniidae	Heptagenia sp.	0	0	0	0	0	1
P04	Ephemeroptera	Leptophlebiidae	Choroterpes sp.	1	0	17	0	7	21
P04	Trichoptera	Ecnomidae	Ecnomus sp.	0	2	3	1	2	1
P04	Odonata	Libellulidae	Diplacodes sp.	0	1	1	0	0	0
P04	Hemiptera	Corixidae	Palmacorixa sp.	5	0	0	0	0	0
P04	Hemiptera	Gerridae	Limnogonus sp.	0	0	0	2	0	0
P04	Diptera	Chironomidae	Chironominae	39	18	9	8	0	18
P04	Diptera	Chironomidae	Tanypodinae	119	8	7	5	0	8
P04	Diptera	Ceratopogonidae	Bezzia sp.	1	1	0	0	0	0
P04	Diptera	Tipulidae	Limnophila sp.	1	0	0	0	0	0
P04	Veneroida	Corbiculidae	Corbicula blandiana	0	3	0	0	0	1
P04	Decapoda	Palaemonidae	Macrobrachium lanchesteri	0	0	7	0	0	3
P04	Oligochaeta	Oligochaeta	Oligochaeta	2	0	0	0	0	0
P05	Ephemeroptera	Ephemeridae	Litobrancha sp	0	0	0	0	0	1
P05	Diptera	Chironomidae	Chironominae	1	0	0	1	7	0
P05	Diptera	Chironomidae	Tanypodinae	0	0	2	0	0	0
P05	Diptera	Chaoboridae	Chaoborus sp.	24	121	17	19	0	18
P05	Veneroida	Corbiculidae	Corbicula blandiana	0	0	0	1	0	0
P05	Oligochaeta	Oligochaeta	Oligochaeta	3	0	0	0	0	0

Macroinvertebrate fauna of the Pong catchment in February, 1996 (continue)

Site Code	Order	Family	Species	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6
P06	Ephemeroptera	Caenidae	Caenis sp.2	0	1	14	0	4	7
P06	Ephemeroptera	Potamanthidae	Potamanthus sp.	0	1	9	0	0	6
P06	Trichoptera	Ecnomidae	Ecnomus sp.	0	1	2	0	1	0
P06	Trichoptera	Polycentropodidae	Phylocentropus sp.	0	0	0	5	0	0
P06	Odonata	Gomphidae	Hagenius sp.	0	0	1	0	1	2
P06	Odonata	Macromiidae	Epophthalmia sp.	0	0	0	0	1	0
P06	Odonata	Libellulidae	Diplacodes sp.	0	0	0	0	0	2
P06	Diptera	Chironomidae	Chironominae	5	55	67	42	74	11
P06	Diptera	Chironomidae	Tanypodinae	7	9	6	6	10	18
P06	Diptera	Ceratopogonidae	Bezzia sp.	0	0	1	1	1	1
P06	Oligochaeta	Oligochaeta	Oligochaeta	0	0	2	0	0	0
P07	Ephemeroptera	Caenidae	Caenis sp.2	1	0	0	12	0	0
P07	Ephemeroptera	Potamanthidae	Potamanthus sp.	3	0	0	10	0	0
P07	Trichoptera	Polycentropodidae	Phylocentropus sp.	1	0	0	0	5	2
P07	Diptera	Chironomidae	Chironominae	42	7	8	23	3	4
P07	Diptera	Chironomidae	Tanypodinae	3	15	49	2	6	37
P07	Diptera	Ceratopogonidae	Bezzia sp.	1	0	0	2	1	0
P07	Diptera	Chaoboridae	Chaoborus sp.	0	0	0	0	0	1
P07	Oligochaeta	Oligochaeta	Oligochaeta	0	0	0	1	0	0
P08	Ephemeroptera	Caenidae	Caenis sp.2	0	1	9	0	2	20
P08	Ephemeroptera	Baetidae	Baetis sp.2	0	0	0	0	2	0
P08	Trichoptera	Polycentropodidae	Phylocentropus sp.	0	0	1	0	1	0
P08	Trichoptera	Ecnomidae	Ecnomus sp.	0	1	0	0	0	0
P09	Odonata	Gomphidae	Stenogomphus sp.	0	1	0	0	0	0
P08	Odonata	Libellulidae	Diplacodes sp.	0	0	0	0	0	1
P08	Diptera	Chironomidae	Chironominae	6	50	22	5	33	19
P08	Diptera	Chironomidae	Tanypodinae	2	5	4	4	13	5
P08	Diptera	Ceratopogonidae	Bezzia sp.	0	9	3	1	1	0
P08	Veneroida	Corbiculidae	Corbicula blandiana	1	0	0	5	8	0
P08	Oligochaeta	Oligochaeta	Oligochaeta	0	0	0	1	0	1
P09	Trichoptera	Ecnomidae	Ecnomus sp.	0	0	0	2	0	0
P09	Hemiptera	Corixidae	Micronecta sp.	0	1	0	0	0	0
P09	Diptera	Chironomidae	Chironominae	8	17	58	24	8	38
P09	Diptera	Chironomidae	Tanypodinae	0	5	0	1	3	3
P09	Diptera	Ceratopogonidae	Bezzia sp.	0	1	0	0	0	0
P09	Veneroida	Corbiculidae	Corbicula blandiana	1	0	0	0	0	0
P09	Decapoda	Palaemonidae	Macrobrachium lanchesteri	0	1	0	0	0	0
P10	Ephemeroptera	Caenidae	Caenis sp.2	0	0	0	0	1	0
P10	Diptera	Chironomidae	Chironominae	2	4	2	4	6	1
P10	Diptera	Chironomidae	Tanypodinae	1	1	0	1	1	0
P10	Diptera	Chaoboridae	Chaoborus sp.	1	0	0	0	0	0
P10	Diptera	Ceratopogonidae	Bezzia sp.	0	1	0	0	0	2
P11	Ephemeroptera	Caenidae	Caenis sp.2	6	12	0	0	0	0
P11	Trichoptera	Ecnomidae	Ecnomus sp.	1	0	0	0	0	0
P11	Diptera	Chironomidae	Chironominae	36	30	7	7	7	14
P11	Diptera	Chironomidae	Tanypodinae	3	1	0	0	1	0
P11	Diptera	Ceratopogonidae	Bezzia sp.	0	0	0	0	1	1
P11	Oligochaeta	Oligochaeta	Oligochaeta	0	1	0	0	0	0
P12	Diptera	Chironomidae	Chironominae	21	21	1	4	91	26
P12	Diptera	Chironomidae	Tanypodinae	0	0	0	0	7	0

Macroinvertebrate fauna of the Pong catchment in February, 1996 (continue)

Site Code	Order	Family	Species	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6
P12	Diptera	Ceratopogonidae	Bezzia sp.	0	5	0	0	0	0
P12	Veneroida	Corbiculidae	Corbicula blandiana	0	11	0	0	0	0
P12	Oligochaeta	Oligochaeta	Oligochaeta	1	1	0	0	0	0
P13	Diptera	Chironomidae	Chironominae	0	0	0	0	0	3
P13	Diptera	Chironomidae	Tanypodinae	1	0	1	0	0	0
P14	Ephemeroptera	Caenidae	Caenis sp.2	0	0	0	0	1	0
P14	Ephemeroptera	Ephemeridae	Litobrancha sp.	0	0	1	0	5	2
P14	Diptera	Chironomidae	Chironominae	3	6	0	5	1	1
P14	Diptera	Chironomidae	Tanypodinae	0	0	3	0	1	1
P14	Diptera	Ceratopogonidae	Bezzia sp.	0	1	2	0	0	1
P14	Oligochaeta	Oligochaeta	Oligochaeta	3	0	0	0	0	0
P15	Diptera	Chironomidae	Chironominae	2	0	0	1	0	1
P15	Diptera	Chironomidae	Tanypodinae	0	0	0	1	0	0
P15	Diptera	Chaoboridae	Chaoborus sp.	0	1	3	0	1	2
P15	Oligochaeta	Oligochaeta	Oligochaeta	1	0	0	0	1	0

Macroinvertebrate fauna of the Pong catchment in April, 1996.

Site Code	Order	Family	Species	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6
C01	Diptera	Chironomidae	Chironominae	0	0	1	0	0	0
C01	Diptera	Chironomidae	Tanypodinae	0	0	1	1	0	1
C01	Diptera	Chaoboridae	Chaoborus sp.	4	6	14	0	12	0
C02	Diptera	Chironomidae	Chironominae	0	0	0	1	0	6
C02	Diptera	Chironomidae	Tanypodinae	0	1	0	1	0	1
C02	Diptera	Chaoboridae	Chaoborus sp.	13	1	2	0	1	0
C02	Diptera	Ceratopogonidae	Bezzia sp.	0	0	0	1	0	0
C03	Diptera	Chironomidae	Chironominae	1	0	9	0	6	0
C03	Diptera	Chaoboridae	Chaoborus sp.	0	0	1	0	0	0
C03	Diptera	Ceratopogonidae	Bezzia sp.	0	0	0	2	0	0
C03	Oligochaeta	Oligochaeta	Oligochaeta	0	0	1	0	0	0
H01	Coleoptera	Elmidae	Stenelmis sp.	0	0	0	0	1	0
H01	Coleoptera	Elmidae	Cleptelmis sp.	2	1	1	2	0	0
H01	Diptera	Chironomidae	Chironominae	0	0	0	21	8	18
H01	Diptera	Chironomidae	Tanypodinae	6	11	34	0	1	1
H01	Diptera	Tipulidae	Limnophila sp.	0	0	5	2	1	5
H01	Ephemeroptera	Leptophlebiidae	Choroterpes sp.	5	5	4	4	1	0
H01	Ephemeroptera	Heptageniidae	Heptagenia sp.	0	0	2	4	1	2
H01	Ephemeroptera	Caenidae	Caenis sp.1	0	0	0	0	3	0
H01	Ephemeroptera	Ephemeridae	Ephemera sp.	0	0	1	3	0	1
H01	Hemiptera	Aphelocheiridae	Aphelocheirus sp.	1	0	0	0	2	0
H01	Odonata	Gomphidae	Ergetogomphus sp.	0	0	0	0	0	0
H01	Plecoptera	Perlidae	Phanoperla sp.	1	0	3	0	0	0
H01	Trichoptera	Goeridae	Goera sp.	0	0	1	0	1	0
H01	Trichoptera	Hydropsychidae	Amphipsyche meridiana	2	0	0	0	0	0
H01	Trichoptera	Stenopsychidae	Stenopsyche siamensis	0	0	1	3	0	0
H01	Trichoptera	Psychomyiidae	Tinodes sp.	1	0	0	0	7	0
H01	Trichoptera	Polycentropodidae	Polycentropus sp.	0	4	32	10	2	23
H01	Trichoptera	Ecnomidae	Ecnomus sp.	1	0	0	6	0	0
H01	Trichoptera	Philopotamidae	Chimarra sp.	0	0	0	0	1	3
H02	Diptera	Chironomidae	Chironominae	22	0	0	0	0	0
H02	Ephemeroptera	Ephemeridae	Ephemera sp.	1	3	1	3	0	2
H03	Coleoptera	Elmidae	Cleptelmis sp.	0	0	0	0	0	0
H03	Coleoptera	Psephenidae	Eubrianax sp.	3	0	3	0	1	1
H03	Coleoptera	Dytiscidae	Derronectes sp.	0	1	1	0	0	0
H03	Diptera	Chironomidae	Chironominae	0	0	11	0	0	2
H03	Diptera	Chironomidae	Tanypodinae	13	1	1	1	0	0
H03	Diptera	Ceratopogonidae	Bezzia sp.	0	0	0	0	0	1
H03	Ephemeroptera	Caenidae	Caenis sp.1	0	0	2	1	0	0
H03	Ephemeroptera	Potamanthidae	Potamanthus sp.	1	0	0	0	1	0
H03	Ephemeroptera	Ephemeridae	Ephemera sp.	0	0	0	0	0	0
H03	Odonata	Libellulidae	Orthetrum sp.	0	0	1	0	1	0
H03	Odonata	Gomphidae	Sinogomphus sp.	0	0	2	0	0	0
H03	Oligochaeta	Oligochaeta	Oligochaeta	3	1	0	0	17	0
H03	Trichoptera	Polycentropodidae	Polycentropus sp.	1	0	1	1	1	24
N01	Coleoptera	Elmidae	Stenelmis sp.	0	0	4	0	7	5
N01	Diptera	Chironomidae	Chironominae	1	7	0	3	0	0
N01	Ephemeroptera	Caenidae	Caenis sp.1	2	2	0	0	0	0

Macroinvertebrate fauna of the Pong catchment in April 1996 (continue)

Site Code	Order	Family	Species	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6
N01	Odonata	Gomphidae	Erpetogomphus sp.	0	0	1	0	0	1
N01	Oligochaeta	Oligochaeta	Oligochaeta	0	0	0	0	0	1
N01	Veneroida	Corbiculidae	Corbicula blumfina	1	1	1	1	1	36
N02	Diptera	Chironomidae	Chironominae	0	0	0	0	0	1
N02	Diptera	Chironomidae	Tanypodinae	2	4	1	1	5	0
N02	Diptera	Muscidae	Limnophora sp.	0	0	0	0	0	1
N02	Diptera	Ceratopogonidae	Bezzia sp.	0	1	0	0	1	0
N03	Coleoptera	Elmidae	Cleptelmis sp.	0	0	3	0	0	0
N03	Coleoptera	Elmidae	Stenelmis sp.	1	1	4	19	13	5
N03	Diptera	Chironomidae	Chironominae	0	0	0	8	0	0
N03	Diptera	Chironomidae	Tanypodinae	6	0	4	1	0	2
N03	Diptera	Ceratopogonidae	Bezzia sp.	0	0	0	1	0	0
N03	Ephemeroptera	Caenidae	Caenis sp.1	2	2	0	1	0	0
N03	Ephemeroptera	Leptophlebiidae	Choroterpes sp.	0	0	0	0	5	0
N03	Ephemeroptera	Ephemeridae	Litobrancha sp.	0	0	0	1	0	0
N03	Oligochaeta	Oligochaeta	Oligochaeta	0	0	0	1	5	9
N03	Trichoptera	Polycentropodidae	Polycentropus sp.	2	0	0	1	0	0
N03	Trichoptera	Ecnomidae	Ecnomus sp.	1	0	1	0	0	0
N04	Coleoptera	Elmidae	Cleptelmis sp.	0	0	0	1	0	0
N04	Coleoptera	Elmidae	Stenelmis sp.	6	0	0	0	1	1
N04	Coleoptera	Psephenidae	Eubrianax sp.	1	0	0	1	0	0
N04	Diptera	Chironomidae	Chironominae	4	0	20	0	4	0
N04	Diptera	Chironomidae	Tanypodinae	4	1	5	0	0	1
N04	Diptera	Ceratopogonidae	Bezzia sp.	3	3	9	0	3	0
N04	Oligochaeta	Oligochaeta	Oligochaeta	0	0	0	1	0	1
N04	Trichoptera	Polycentropodidae	Polycentropus sp.	1	1	1	0	1	0
N05	Diptera	Chironomidae	Chironominae	2	0	0	0	1	0
N05	Diptera	Chironomidae	Tanypodinae	0	3	2	6	0	1
N05	Diptera	Chaoboridae	Chaoborus sp.	1	0	2	0	2	0
N05	Diptera	Ceratopogonidae	Bezzia sp.	0	3	0	0	0	1
N05	Ephemeroptera	Ephemeridae	Litobrancha sp.	0	0	1	0	0	0
N05	Oligochaeta	Oligochaeta	Oligochaeta	0	1	0	0	0	0
P01	Ephemeroptera	Ephemeridae	Litobrancha sp.	1	0	0	0	0	0
P01	Ephemeroptera	Leptophlebiidae	Choroterpes sp.	0	1	0	0	0	0
P01	Trichoptera	Sericostomatidae	Notidobia sp.	0	0	1	0	0	0
P01	Coleoptera	Elmidae	Cleptelmis sp.	0	2	0	0	0	0
P01	Odonata	Gomphidae	Stenogomphus sp.	0	0	0	1	0	0
P01	Diptera	Chironomidae	Chironominae	0	0	0	0	2	0
P01	Diptera	Tipulidae	Limnophila sp.	0	0	0	0	0	1
P01	Oligochaeta	Oligochaeta	Oligochaeta	0	1	0	0	0	0
P02	Ephemeroptera	Leptophlebiidae	Choroterpes sp.	0	1	0	0	0	0
P02	Ephemeroptera	Caenidae	Caenis sp.1	0	5	0	0	0	1
P02	Coleoptera	Elmidae	Cleptelmis sp.	0	10	0	0	0	0
P02	Coleoptera	Elmidae	Stenelmis sp.	0	0	0	0	0	1
P02	Odonata	Gomphidae	Erpetogomphus sp.	0	1	0	1	0	0
P02	Odonata	Gomphidae	Labrogomphus sp.	0	0	0	0	1	0
P02	Odonata	Libellulidae	Diplacodes sp.	0	0	0	1	0	0
P02	Diptera	Chironomidae	Chironominae	0	1	3	0	1	2
P02	Diptera	Chironomidae	Tanypodinae	0	0	4	0	0	0

Macroinvertebrate fauna of the Pong catchment in April 1996 (continue).

Site Code	Order	Family	Species	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6
P02	Diptera	Athericidae	Atrichops sp.	0	1	0	0	0	2
P02	Diptera	Simuliidae	Simulium sp.	0	0	1	0	0	0
P02	Veneroida	Corbiculidae	Corbicula blandiana	1	0	0	2	2	1
P02	Oligochaeta	Oligochaeta	Oligochaeta	49	48	11	3	16	24
P03	Trichoptera	Philopotamidae	Chimarra sp.	0	0	1	0	0	0
P03	Coleoptera	Elmidae	Cleptelmis sp.	7	0	4	0	0	2
P03	Coleoptera	Elmidae	Stenelmis sp.	0	0	1	1	0	0
P03	Odonata	Gomphidae	Erpetogomphus sp.	1	0	0	0	0	0
P03	Hemiptera	Nepidae	Ranatra sp.	1	0	0	0	0	0
P03	Diptera	Chironomidae	Chironominae	2	1	3	0	0	0
P03	Diptera	Athericidae	Atrichops sp.	1	0	0	0	0	0
P03	Diptera	Ceratopogonidae	Bezzia sp.	1	0	1	0	0	0
P03	Diptera	Tipulidae	Limnophila sp.	1	5	7	1	0	1
P03	Veneroida	Corbiculidae	Corbicula blandiana	4	5	8	14	20	5
P04	Ephemeroptera	Leptophlebiidae	Choroterpes sp.	0	0	15	5	4	4
P04	Ephemeroptera	Leptophlebiidae	Traverella sp.	0	1	0	0	0	0
P04	Ephemeroptera	Caenidae	Caenis sp.1	0	0	5	2	0	2
P04	Ephemeroptera	Heptageniidae	Heptagenia sp.	0	1	1	0	0	2
P04	Trichoptera	Ecnomidae	Ecnomus sp.	10	1	2	0	2	1
P04	Trichoptera	Hydropsychidae	Macrostemum similior	0	1	0	0	0	0
P04	Coleoptera	Elmidae	Stenelmis sp.	0	0	0	0	1	0
P04	Odonata	Gomphidae	Erpetogomphus sp.	0	0	0	0	0	1
P04	Hemiptera	Belostomatidae	Sphaerodema sp.	1	1	1	0	0	0
P04	Diptera	Chironomidae	Chironominae	1	0	1	0	0	0
P04	Veneroida	Corbiculidae	Corbicula blandiana	0	0	2	0	0	0
P05	Ephemeroptera	Caenidae	Caenis sp.2	0	1	0	0	0	0
P05	Coleoptera	Elmidae	Cleptelmis sp.	0	1	0	0	0	0
P05	Diptera	Chironomidae	Chironominae	0	3	2	0	0	1
P05	Diptera	Chironomidae	Tanypodinae	0	2	1	1	1	1
P05	Diptera	Chaoboridae	Chaoborus sp.	1	0	0	2	1	1
P06	Ephemeroptera	Potamanthidae	Potamanthus sp.	0	0	2	0	1	0
P06	Trichoptera	Polycentropodidae	Phylocentropus sp.	0	3	0	0	0	1
P06	Diptera	Chironomidae	Chironominae	12	19	89	5	87	21
P06	Diptera	Chironomidae	Tanypodinae	2	1	0	8	2	2
P06	Diptera	Ceratopogonidae	Bezzia sp.	1	2	0	0	1	0
P07	Trichoptera	Polycentropodidae	Phylocentropus sp.	3	1	0	0	2	0
P07	Trichoptera	Ecnomidae	Ecnomus sp.	0	0	0	0	1	0
P07	Hemiptera	Belostomatidae	Sphaerodema sp.	0	0	0	0	1	0
P07	Diptera	Chironomidae	Chironominae	4	6	1	0	4	1
P07	Diptera	Chironomidae	Tanypodinae	2	1	33	17	2	4
P07	Diptera	Ceratopogonidae	Bezzia sp.	0	1	0	0	0	0
P07	Oligochaeta	Oligochaeta	Oligochaeta	1	0	0	0	0	0
P08	Ephemeroptera	Baetidae	Baetis sp.2	1	0	0	1	0	0
P08	Ephemeroptera	Baetidae	Centroptilum sp.	0	0	0	0	1	0
P08	Trichoptera	Polycentropodidae	Phylocentropsis sp.	1	0	0	2	0	0
P08	Trichoptera	Hydropsychidae	Amphipsyche meridiana	0	0	1	0	0	0
P08	Trichoptera	Leptoceridae	Triaenodes sp.	0	0	0	1	0	0
P08	Odonata	Gomphidae	Lubricogomphus sp.	0	0	0	1	0	0

Macroinvertebrate fauna of the Pong catchment in April 1996 (continue).

Site Code	Order	Family	Species	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6
P08	Odonata	Libellulidae	Diplacodes sp.	1	0	0	0	0	0
P08	Diptera	Chironomidae	Chironominae	7	9	2	2	2	0
P08	Diptera	Chironomidae	Tanypodinae	8	4	4	1	2	0
P08	Diptera	Ceratopogonidae	Bezzia sp.	4	0	0	1	0	7
P08	Veneroida	Corbiculidae	Corbicula blandiana	2	2	0	0	0	0
P08	Oligochaeta	Oligochaeta	Oligochaeta	10	2	0	0	2	0
P09	Ephemeroptera	Baetidae	Centroptilum sp.	0	0	0	0	2	0
P09	Trichoptera	Polycentropodida e	Phylocentropus sp.	0	0	0	0	1	0
P09	Coleoptera	Elmidae	Cleptelmis sp.	0	0	0	0	2	0
P09	Diptera	Chironomidae	Chironominae	15	6	6	12	12	9
P09	Diptera	Chironomidae	Tanypodinae	0	0	0	0	1	1
P09	Diptera	Ceratopogonidae	Bezzia sp.	0	0	0	0	8	0
P09	Veneroida	Corbiculidae	Corbicula blandiana	0	0	0	0	2	0
P10	Ephemeroptera	Ephemeridae	Litobrancha sp.	6	2	0	0	0	2
P10	Ephemeroptera	Caenidae	Caenis sp.2	0	1	0	0	0	0
P10	Trichoptera	Polycentropodida e	Phylocentropus sp.	0	0	0	1	0	0
P10	Trichoptera	Ecnomidae	Ecnomus sp.	0	0	0	0	1	0
P10	Coleoptera	Elmidae	Stenelmis sp.	0	0	0	0	1	0
P10	Diptera	Chironomidae	Chironominae	2	0	2	0	1	0
P10	Diptera	Chironomidae	Tanypodinae	1	0	1	0	0	0
P10	Diptera	Ceratopogonidae	Bezzia sp.	2	0	1	1	2	0
P10	Oligochaeta	Oligochaeta	Oligochaeta	0	0	1	0	0	0
P11	Ephemeroptera	Caenidae	Caenis sp.2	0	1	1	0	0	1
P11	Trichoptera	Ecnomidae	Ecnomus sp.	0	0	0	0	0	1
P11	Odonata	Gomphidae	Sinogomphus sp.	1	0	0	0	0	0
P11	Diptera	Chironomidae	Chironominae	16	21	19	8	8	72
P11	Diptera	Chironomidae	Tanypodinae	7	2	0	1	0	6
P11	Diptera	Ceratopogonidae	Bezzia sp.	0	0	0	1	1	7
P11	Oligochaeta	Oligochaeta	Oligochaeta	8	0	0	2	0	0
P12	Diptera	Chironomidae	Chironominae	5	0	1	0	0	0
P12	Diptera	Chironomidae	Tanypodinae	1	0	0	0	0	0
P12	Diptera	Ceratopogonidae	Bezzia sp.	0	0	1	0	0	0
P12	Veneroida	Corbiculidae	Corbicula blandiana	0	0	0	5	0	1
P12	Oligochaeta	Oligochaeta	Oligochaeta	1	0	1	0	0	1
P13	Diptera	Chironomidae	Chironominae	0	1	0	0	0	0
P13	Diptera	Chaoboridae	Chaoborus sp.	0	1	1	0	0	0
P13	Veneroida	Corbiculidae	Corbicula blandiana	0	0	5	0	0	0
P14	Ephemeroptera	Ephemeridae	Litobrancha sp.	0	1	0	0	0	0
P14	Trichoptera	Polycentropodida e	Phylocentropus sp.	0	2	0	0	0	1
P14	Trichoptera	Ecnomidae	Ecnomus sp.	0	1	0	0	0	0
P14	Diptera	Chironomidae	Chironominae	5	8	4	1	3	0
P14	Diptera	Chironomidae	Tanypodinae	2	2	3	12	3	4
P14	Diptera	Ceratopogonidae	Bezzia sp.	0	1	1	0	0	0
P14	Veneroida	Corbiculidae	Corbicula blandiana	0	0	1	0	0	0
P14	Oligochaeta	Oligochaeta	Oligochaeta	3	0	0	0	0	0
P15	Diptera	Ceratopogonidae	Bezzia sp.	0	0	0	0	0	1
P15	Oligochaeta	Oligochaeta	Oligochaeta	1	0	8	0	0	2

Macroinvertebrate fauna of the Pong catchment in June, 1996.

Site Code	Order	Family	Species	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6
C01	Trichoptera	Polycentropodidae	Phylocentropus sp.	0	0	1	0	0	0
C01	Coleoptera	Elmidae	Cleptelmis sp.	0	0	0	0	0	1
C01	Diptera	Chironomidae	Tanypodinae	0	2	0	1	0	0
C02	Trichoptera	Polycentropodidae	Phylocentropus sp.	0	0	1	0	0	7
C02	Coleoptera	Elmidae	Cleptelmis sp.	0	0	0	0	0	1
C02	Diptera	Chironomidae	Chironominae	0	0	5	2	0	9
C02	Diptera	Chironomidae	Tanypodinae	0	1	3	0	2	1
C02	Diptera	Ceratopogonidae	Bezzia sp.	0	0	1	0	0	1
C02	Oligochaeta	Oligochaeta	Oligochaeta	0	0	0	0	0	1
C03	Trichoptera	Polycentropodidae	Phylocentropus sp.	4	2	0	0	1	0
C03	Diptera	Chironomidae	Chironominae	0	0	0	1	1	0
C03	Diptera	Chironomidae	Tanypodinae	3	0	0	0	0	0
C03	Oligochaeta	Oligochaeta	Oligochaeta	2	0	0	6	0	0
H01	Coleoptera	Psephenidae	Eubrianax sp.	2	0	1	0	1	1
H01	Diptera	Chironomidae	Chironominae	0	0	0	1	0	0
H01	Diptera	Chironomidae	Tanypodinae	1	0	3	0	0	0
H01	Diptera	Rhagionidae	Atherix sp.	1	0	0	0	0	0
H01	Diptera	Tipulidae	Limnophila sp.	0	0	0	0	1	1
H01	Ephemeroptera	Ephemeridae	Ephemera sp.	7	6	4	3	0	0
H01	Ephemeroptera	Caenidae	Caenis sp.1	0	0	1	0	1	1
H01	Ephemeroptera	Leptophlebiidae	Choroterpes sp.	0	0	0	0	0	0
H01	Ephemeroptera	Leptophlebiidae	Thraulodes sp.	0	0	1	0	0	0
H01	Hemiptera	Belostomatidae	Sphaerodema sp.	4	3	0	0	0	1
H01	Coleoptera	Elmidae	Cleptelmis sp.	2	0	0	0	0	0
H01	Plecoptera	Perlidae	Phanoperla sp.	0	1	1	0	1	0
H01	Trichoptera	Polycentropodidae	Nemeclipsis sp.	6	0	0	0	0	0
H01	Trichoptera	Polycentropodidae	Phylocentropus sp.	0	1	0	0	1	0
H01	Trichoptera	Psychomyiidae	Tinodes sp.	0	0	2	2	0	0
H01	Trichoptera	Goeridae	Goera sp.	1	2	0	0	0	0
H01	Trichoptera	Hydropsychidae	Cheumatopsyche mulayiensis	0	0	2	2	1	0
H01	Trichoptera	Hydropsychidae	Hydropsyche sp.	13	3	2	0	0	0
H02	Megaloptera	Sialidae	Sialis sp.	1	2	2	1	0	1
H03	Coleoptera	Dytiscidae	Neptosternus sp.	1	0	0	0	1	0
H03	Coleoptera	Elmidae	Stenelmis sp.	0	0	0	0	0	0
H03	Coleoptera	Psephenidae	Eubrianax sp.	0	0	0	0	1	0
H03	Coleoptera	Hydrophilidae	Enochrus sp.	0	0	0	0	0	1
H03	Decapoda	Palaemonidae	Macrobrachium lanchesteri	1	0	1	0	0	0
H03	Diptera	Athericidae	Atrichops sp.	1	0	0	0	0	0
H03	Diptera	Chironomidae	Chironominae	0	5	0	0	1	0
H03	Diptera	Chironomidae	Tanypodinae	1	3	0	0	0	0
H03	Diptera	Ceratopogonidae	Bezzia sp.	0	1	0	0	2	0
H03	Diptera	Tipulidae	Limnophila sp.	0	1	1	0	0	0
H03	Ephemeroptera	Ephemeridae	Ephemera sp	0	0	0	0	0	0
H03	Ephemeroptera	Baetidae	Pseudocloeon sp.	1	5	0	1	1	0
H03	Ephemeroptera	Baetidae	Centroptilum sp.	0	0	1	0	0	0
H03	Ephemeroptera	Caenidae	Caenis sp.1	0	0	0	1	0	5
H03	Ephemeroptera	Heptageniidae	Heptagenia sp.	0	0	0	0	1	0
H03	Ephemeroptera	Potamanthidae	Potamanthus sp.	0	0	0	0	3	1
H03	Hemiptera	Corixidae	Cenocorixa sp.	0	0	0	0	0	0
H03	Veneroida	Corbiculidae	Corbicula blandina	0	0	7	0	3	0
H03	Odonata	Macromiidae	Macromia sp.	3	0	0	0	1	3
H03	Odonata	Libellulidae	Diplacodes sp.	0	1	0	0	0	0
H03	Oligochaeta	Oligochaeta	Oligochaeta	0	0	0	0	1	0
H03	Trichoptera	Ecnomidae	Ecnomus sp.	0	1	0	1	0	0

Macroinvertebrate fauna of the Pong catchment in June, 1996 (continuous).

Site Code	Order	Family	Species	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6
H03	Trichoptera	Leptoceridae	Triaenodes sp.	1	0	0	0	0	0
H04	Coleoptera	Elmidae	Clepteimis sp.	0	1	1	0	2	1
H04	Coleoptera	Psepheenidae	Eubrianax sp.	0	0	2	0	0	0
H04	Coleoptera	Gyrinidae	Dineutus sp.	1	0	0	1	4	4
H04	Decapoda	Palaemonidae	Macrobrachium lanchesteri	0	0	1	2	1	0
H04	Diptera	Chironomidae	Chironominae	6	0	0	5	0	0
H04	Diptera	Chironomidae	Tanypodinae	0	2	14	0	10	2
H04	Diptera	Simuliidae	Simulium sp.	6	0	0	8	0	1
H04	Ephemeroptera	Ephemeridae	Ephemera sp	27	11	0	0	10	0
H04	Ephemeroptera	Baetidae	Centroptilum sp.	1	0	0	7	1	2
H04	Ephemeroptera	Caenidae	Caenis sp.1	0	1	15	0	0	4
H04	Ephemeroptera	Heptageniidae	Heptagenia sp.	5	0	0	18	2	0
H04	Trichoptera	Leptoceridae	Triaenodes sp.	0	0	1	0	0	5
H04	Ephemeroptera	Leptophlebiidae	Pseudeptophlebia sp.	0	0	0	1	0	0
H04	Ephemeroptera	Leptophlebiidae	Choroterpes sp.	3	0	1	0	0	0
H04	Ephemeroptera	Leptophlebiidae	Leptophlebia sp.	0	1	0	1	0	0
H04	Ephemeroptera	Leptophlebiidae	Thraulodes sp.	0	0	0	0	0	7
H04	Megaloptera	Corydalidae	Neochauliodes sp.	0	0	0	0	2	0
H04	Odonata	Aeshnidae	Oplonaeschna sp.	0	0	0	1	0	1
H04	Odonata	Libellulidae	Diplacodes sp.	0	0	0	0	0	0
H04	Odonata	Gomphidae	Erpetogomphus sp.	1	0	0	2	5	0
H04	Odonata	Platycnemidae	Copera marginipes	0	0	0	0	1	0
H04	Trichoptera	Ecnomidae	Ecnomus sp.	0	0	0	0	0	0
H04	Trichoptera	Calamoceratidae	Anisocentropus sp.	0	1	0	0	2	2
H04	Trichoptera	Philopotamidae	Chimarra sp.	1	0	4	0	0	1
H04	Trichoptera	Hydropsychidae	Macronemum similior	0	0	1	0	0	5
H04	Trichoptera	Hydropsychidae	Ceratopsyche sp.	0	0	9	0	0	2
H04	Trichoptera	Hydroptilidae	Hydroptila sp.	0	0	2	0	1	0
H04	Trichoptera	Hydroptilidae	Oecethira sp.	0	0	0	0	0	1
H04	Trichoptera	Molannidae	Molanna sp.	0	0	1	0	0	0
N01	Diptera	Chironomidae	Chironominae	0	2	0	0	0	2
N01	Diptera	Chironomidae	Tanypodinae	0	0	0	0	0	1
N01	Diptera	Ceratopogonidae	Bezzia sp.	1	1	0	0	1	1
N01	Oligochaeta	Oligochaeta	Oligochaeta	0	0	0	15	0	0
N01	Veneroida	Corbiculidae	Corbicula blandina	21	4	18	0	11	17
N02	Coleoptera	Elmidae	Clepteimis sp.	0	0	0	2	0	0
N02	Diptera	Chironomidae	Tanypodinae	0	1	2	0	0	0
N02	Diptera	Ceratopogonidae	Bezzia sp.	2	0	0	0	1	1
N02	Ephemeroptera	Caenidae	Caenis sp.1	0	1	0	0	0	0
N02	Oligochaeta	Oligochaeta	Oligochaeta	0	0	0	0	0	1
N03	Coleoptera	Elmidae	Clepteimis sp.	0	3	1	0	1	0
N03	Diptera	Chironomidae	Tanypodinae	0	0	0	3	0	0
N03	Diptera	Athericidae	Atrichops sp.	0	1	0	0	3	0
N03	Ephemeroptera	Ephemeridae	Litobrancha sp.	0	1	0	1	0	0
N03	Odonata	Gomphidae	Erpetogomphus sp.	0	1	0	0	0	0
N03	Oligochaeta	Oligochaeta	Oligochaeta	0	0	0	0	1	1
N03	Trichoptera	Polycentropodidae	Phylocentropus sp.	0	1	0	0	0	0
N04	Coleoptera	Elmidae	Clepteimis sp.	0	0	0	0	0	1
N04	Diptera	Chironomidae	Chironominae	2	10	0	0	5	1
N04	Diptera	Chironomidae	Tanypodinae	1	0	4	0	0	3
N04	Diptera	Ceratopogonidae	Bezzia sp.	1	0	1	1	2	1
N04	Ephemeroptera	Ephemeridae	Litobrancha sp.	4	16	1	0	0	0
N04	Ephemeroptera	Caenidae	Caenis sp.1	0	0	1	0	0	2
N04	Oligochaeta	Oligochaeta	Oligochaeta	1	5	1	0	0	0
N04	Trichoptera	Polycentropodidae	Phylocentropus sp.	0	0	4	0	5	0
N04	Trichoptera	Ecnomidae	Ecnomus sp.	0	0	1	0	3	0
N05	Diptera	Chironomidae	Chironominae	18	0	1	0	0	0

Macroinvertebrate fauna of the Pong catchment in June, 1996 (continuous).

Site Code	Order	Family	Species	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6
N05	Diptera	Chironomidae	Tanypodinae	1	0	1	1	0	1
N05	Diptera	Ceratopogonidae	Bezzia sp.	2	0	1	1	1	1
N05	Ephemeroptera	Ephemeridae	Litobrancha sp.	32	0	0	16	0	0
N05	Ephemeroptera	Caenidae	Caenis sp.1	2	13	11	1	18	2
N05	Trichoptera	Ecnomidae	Ecnomus sp.	2	0	0	1	0	0
P01	Trichoptera	Hydropsychidae	Ceratopsyche sp.	1	0	0	0	1	2
P01	Coleoptera	Elmidae	Stenelmis sp.	0	1	0	0	1	0
P01	Diptera	Tipulidae	Limnophila sp.	0	1	0	0	0	3
P01	Oligochaeta	Oligochaeta	Oligochaeta	0	0	0	0	0	2
P02	Ephemeroptera	Baetidae	Centroptilum sp.	0	0	0	2	0	3
P02	Ephemeroptera	Caenidae	Caenis sp.1	0	0	0	0	2	0
P02	Trichoptera	Hydropsychidae	Ceratopsyche sp.	8	9	0	4	3	0
P02	Trichoptera	Hydropsychidae	Cheumatopsyche malaysiensis	0	0	0	0	0	44
P02	Odonata	Gomphidae	Erpetogomphus sp.	1	0	0	0	0	0
P02	Coleoptera	Elmidae	Cleptelmis sp.	2	1	0	1	1	2
P02	Coleoptera	Elmidae	Stenelmis sp.	0	0	0	0	0	9
P02	Diptera	Chironomidae	Chironominae	0	0	5	0	0	2
P02	Diptera	Tipulidae	Limnophila sp.	2	1	0	0	0	1
P02	Veneroida	Corbiculidae	Corbicula blandiana	0	0	0	1	2	0
P02	Oligochaeta	Oligochaeta	Oligochaeta	4	5	0	0	0	0
P03	Ephemeroptera	Caenidae	Caenis sp.1	0	0	0	1	0	1
P03	Trichoptera	Leptoceridae	Triaenodes sp.	0	0	0	0	1	0
P03	Trichoptera	Hydropsychidae	Cheumatopsyche malaysiensis	0	1	1	27	66	1
P03	Coleoptera	Elmidae	Cleptelmis sp.	0	1	1	0	1	0
P03	Coleoptera	Elmidae	Stenelmis sp.	0	0	0	1	0	0
P03	Diptera	Tipulidae	Limnophila sp.	0	2	0	7	2	0
P03	Oligochaeta	Oligochaeta	Oligochaeta	0	0	1	0	0	0
P04	Ephemeroptera	Leptophlebiidae	Paraleptophlebia sp.	0	1	0	0	0	0
P04	Ephemeroptera	Leptophlebiidae	Choroterpes sp.	0	0	0	0	0	1
P04	Ephemeroptera	Leptophlebiidae	Tricorythus sp.	1	3	4	2	0	0
P04	Trichoptera	Hydropsychidae	Cheumatopsyche malaysiensis	11	19	8	1	6	4
P04	Trichoptera	Hydropsychidae	Amphipsyche meridiana	0	0	0	0	1	0
P04	Coleoptera	Elmidae	Cleptelmis sp.	1	2	0	1	0	0
P04	Coleoptera	Elmidae	Stenelmis sp.	0	0	2	2	2	2
P04	Coleoptera	Curculionidae	Stenopelmus sp.	0	0	0	0	1	0
P04	Coleoptera	Psephenidae	Eubrianax sp.	0	2	0	0	0	0
P04	Diptera	Tipulidae	Limnophila sp.	1	0	0	0	0	0
P04	Veneroida	Corbiculidae	Corbicula blandiana	2	0	0	0	0	0
P05	Ephemeroptera	Caenidae	Caenis sp.2	0	5	0	0	0	0
P05	Ephemeroptera	Ephemeridae	Litobrancha sp.	3	38	22	24	11	8
P05	Trichoptera	Ecnomidae	Ecnomus sp.	1	0	0	0	0	0
P05	Trichoptera	Polycentropodidae	Phylocentropus sp.	5	0	1	1	0	0
P05	Coleoptera	Elmidae	Cleptelmis sp.	0	1	0	2	0	0
P05	Diptera	Chironomidae	Chironominae	0	0	0	0	1	0
P05	Diptera	Chironomidae	Tanypodinae	10	3	4	0	1	5
P05	Oligochaeta	Oligochaeta	Oligochaeta	2	0	0	0	0	0
P06	Ephemeroptera	Potamanthidae	Potamanthus sp.	0	0	0	1	0	1
P06	Trichoptera	Ecnomidae	Ecnomus sp.	0	0	0	4	0	3
P06	Trichoptera	Polycentropodidae	Phylocentropus sp.	0	0	0	0	1	0
P06	Odonata	Macromiidae	Macromia sp.	0	0	0	0	0	1
P06	Diptera	Chironomidae	Chironominae	7	34	26	363	136	426
P06	Diptera	Chironomidae	Tanypodinae	0	5	13	11	6	24
P06	Diptera	Ceratopogonidae	Bezzia sp.	0	1	0	1	0	0
P06	Diptera	Chaoboridae	Chaoborus sp.	1	1	3	1	10	0
P06	Oligochaeta	Oligochaeta	Oligochaeta	1	4	0	0	5	10

Macroinvertebrate fauna of the Pong catchment in June, 1996 (continuous).

Site Code	Order	Family	Species	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6
P07	Trichoptera	Polycentropodidae	Phylocentropus sp.	1	0	0	0	0	0
P07	Diptera	Chironomidae	Chironominae	0	0	0	0	1	1
P07	Diptera	Chironomidae	Tanypodinae	6	1	10	33	4	4
P07	Diptera	Ceratopogonidae	Bezzia sp.	1	1	1	0	2	1
P07	Diptera	Chaoboridae	Chaoborus sp.	1	0	0	1	0	2
P07	Oligochaeta	Oligochaeta	Oligochaeta	1	1	0	4	0	0
P08	Trichoptera	Ecnomidae	Ecnomus sp.	0	1	0	3	0	10
P08	Trichoptera	Hydropsychidae	Amplipsyche meridiana	5	0	0	3	1	1
P08	Trichoptera	Polycentropodidae	Phylocentropus sp.	0	0	0	1	0	0
P08	Trichoptera	Curculionidae	Stenopelmus sp.	1	0	0	0	0	0
P08	Diptera	Chironomidae	Chironominae	3	13	6	3	5	26
P08	Diptera	Chironomidae	Tanypodinae	0	3	1	1	0	8
P08	Diptera	Tipulidae	Limnophila sp.	1	0	0	0	0	0
P08	Oligochaeta	Oligochaeta	Oligochaeta	3	0	1	0	2	0
P09	Ephemeroptera	Caenidae	Caenis sp.1	0	0	3	0	0	0
P09	Ephemeroptera	Ephemeridae	Litobrancha sp.	0	0	0	1	0	0
P09	Ephemeroptera	Heptageniidae	Heptagenia sp.	0	0	6	0	0	1
P09	Trichoptera	Ecnomidae	Ecnomus sp.	0	1	1	0	0	0
P09	Trichoptera	Polycentropodidae	Phylocentropus sp.	0	1	4	1	0	0
P09	Trichoptera	Leptoceridae	Ceraclea sp.	0	2	2	0	0	0
P09	Coleoptera	Dytiscidae	Uvites sp.	0	2	0	0	0	0
P09	Odonata	Protoneuridae	Prodasineura sp.	0	0	0	0	0	2
P09	Hemiptera	Gerridae	Cylindrostethus sp.	0	1	4	3	3	0
P09	Hemiptera	Gerridae	Rheumatogonus sp.	0	0	0	0	1	0
P09	Diptera	Chironomidae	Chironominae	1	5	23	2	0	2
P09	Diptera	Chironomidae	Tanypodinae	0	17	22	0	0	0
P09	Diptera	Ceratopogonidae	Bezzia sp.	0	0	2	2	0	0
P09	Diptera	Chaoboridae	Chaoborus sp.	0	0	1	0	0	0
P09	Oligochaeta	Oligochaeta	Oligochaeta	2	0	2	0	0	0
P10	Trichoptera	Polycentropodidae	Phylocentropus sp.	1	2	0	0	1	0
P10	Diptera	Chironomidae	Chironominae	28	3	0	5	0	3
P10	Diptera	Ceratopogonidae	Bezzia sp.	2	0	0	0	0	0
P10	Oligochaeta	Oligochaeta	Oligochaeta	0	0	0	0	0	1
P11	Ephemeroptera	Caenidae	Caenis sp.2	2	0	1	0	0	0
P11	Ephemeroptera	Potamanthidae	Potamanthus sp.	2	0	7	0	0	0
P11	Diptera	Chironomidae	Chironominae	20	6	0	40	0	0
P11	Diptera	Chironomidae	Tanypodinae	0	0	0	1	0	0
P11	Diptera	Ceratopogonidae	Bezzia sp.	0	0	0	0	1	0
P11	Oligochaeta	Oligochaeta	Oligochaeta	2	0	0	0	1	0
P12	Diptera	Chironomidae	Chironominae	0	0	0	0	128	67
P12	Diptera	Ceratopogonidae	Bezzia sp.	0	0	0	0	1	0
P12	Diptera	Chaoboridae	Chaoborus sp.	1	0	0	0	0	0
P12	Oligochaeta	Oligochaeta	Oligochaeta	2	0	3	0	2	2
P13	Diptera	Chaoboridae	Chaoborus sp.	0	1	0	0	0	0
P14	Ephemeroptera	Ephemeridae	Litobrancha sp.	4	0	0	3	1	7
P14	Ephemeroptera	Baetidae	Centroptilum sp.	0	0	2	0	0	0
P14	Trichoptera	Ecnomidae	Ecnomus sp.	0	0	2	0	0	0
P14	Trichoptera	Hydropsychidae	Amphipsyche meridiana	0	0	2	0	0	0
P14	Coleoptera	Elmidae	Clypeolmis sp.	1	0	0	0	1	0
P14	Diptera	Chironomidae	Chironominae	3	0	3	0	2	0
P14	Diptera	Chironomidae	Tanypodinae	0	0	1	0	3	0
P14	Diptera	Ceratopogonidae	Bezzia sp.	0	0	2	0	0	0
P15	Ephemeroptera	Ephemeridae	Litobrancha sp.	0	0	5	1	0	0
P15	Trichoptera	Polycentropodidae	Phylocentropus sp.	1	0	2	0	0	0
P15	Diptera	Chironomidae	Chironominae	13	10	0	2	0	0
P15	Diptera	Chironomidae	Tanypodinae	1	1	4	11	1	0

Macroinvertebrate fauna of the Pong catchment in June, 1996 (continuous).

Site Code	Order	Family	Species	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6
P15	Diptera	Ceratopogonidae	Bezzia sp.	0	1	0	2	0	0
P15	Oligochaeta	Oligochaeta	Oligochaeta	0	0	0	0	1	3
P15	Oligochaeta	Oligochaeta	0	0	0	0	1	3	0.67

Appendix 2

Physicochemical variable in October, 1995.

Site code	Air t	Water t	Velo	Width	Depth	Disch	pH	Alka	Condu	TDS	Turbid	TSS	Ortho-P	N	DO	BOD
C01	30.00	29.60	0.40	74.00	9.10	223.60	8.00	56.00	261.00	180.00	26.00	37.80	0.02	0.20	3.90	0.60
C02	33.00	29.50	0.30	79.00	8.90	7.70	8.00	60.00	261.00	230.00	27.00	47.50	0.00	0.10	3.90	0.90
C03	31.00	29.20	0.80	82.00	9.00	502.10	8.00	60.00	263.00	160.00	18.00	29.30	0.07	0.10	3.50	1.20
H01	25.20	22.70	1.30	5.00	0.60	3.10	7.70	56.00	110.90	91.30	25.00	154.50	0.14	0.20	6.90	0.90
H02	24.00	24.60	0.30	7.00	0.70	1.30	7.20	44.00	75.30	64.40	26.00	134.50	0.04	0.10	6.40	1.10
H03	25.40	23.90	0.60	7.00	0.50	1.80	7.80	72.00	124.30	101.50	83.00	274.50	0.00	0.00	6.60	1.50
H04	27.00	27.50	0.60	3.00	0.10	0.20	8.30	116.00	225.00	177.60	6.80	68.00	0.02	0.30	7.20	1.20
N01	27.00	27.50	0.60	15.00	3.50	26.80	7.30	90.00	117.00	95.90	85.00	221.00	0.07	0.00	4.10	1.20
N02	30.00	25.60	0.40	27.00	2.80	17.90	8.20	76.00	158.20	127.10	65.00	175.00	0.02	0.10	4.40	1.90
N03	28.00	29.20	1.70	35.00	3.90	191.30	7.10	116.00	227.00	193.80	27.00	166.00	0.02	0.10	3.70	1.40
N04	28.00	29.30	0.90	31.00	5.40	123.70	8.00	120.00	235.00	185.20	34.00	164.00	0.02	0.10	6.60	1.30
N05	33.00	28.20	0.80	22.00	7.50	101.60	8.00	102.00	195.20	124.00	22.50	21.50	0.00	0.00	4.60	0.80
P01	28.40	24.90	1.30	17.00	1.10	20.80	8.50	104.00	171.00	136.00	46.00	37.00	0.00	0.10	7.50	1.20
P02	30.70	27.20	1.00	7.00	0.90	5.00	8.00	126.00	246.00	238.00	37.00	33.00	0.00	0.20	6.10	1.40
P03	31.30	25.60	0.80	18.00	0.50	8.50	8.10	162.00	195.30	188.00	55.00	58.00	0.00	0.10	6.10	1.90
P04	34.00	27.30	1.30	17.00	0.40	6.60	8.20	110.00	221.00	108.00	42.00	39.80	0.02	0.00	7.00	0.50
P05	32.00	27.40	0.10	28.00	4.00	8.60	8.40	108.00	217.00	156.00	35.00	28.50	0.80	0.00	6.40	0.50
P06	31.00	28.60	0.50	68.00	7.90	221.80	8.20	88.00	172.50	140.00	3.00	5.60	0.10	0.10	5.10	1.70
P07	27.00	28.90	0.60	71.00	9.60	328.30	8.20	84.00	193.10	154.00	3.50	4.40	0.04	0.10	4.40	1.20
P08	33.00	29.60	0.90	42.00	3.40	109.50	8.40	82.00	194.90	142.00	6.80	12.50	0.04	0.20	7.30	1.50
P09	33.00	29.00	0.80	51.00	5.70	203.50	8.00	84.00	184.50	148.00	30.00	58.30	0.07	0.40	6.30	1.10
P10	35.30	30.90	0.60	30.00	8.60	231.20	8.10	86.00	107.90	140.00	12.00	37.80	0.02	0.80	5.20	1.30
P11	33.50	29.50	0.10	15.00	2.00	1.90	7.60	80.00	196.30	160.00	12.00	10.50	0.02	0.05	2.70	1.10
P12	36.00	30.00	0.20	23.00	2.80	8.50	7.50	98.00	350.00	2.60	25.00	36.50	0.07	1.40	2.60	2.30
P13	30.00	31.60	0.10	78.00	4.00	28.50	8.10	92.00	330.00	236.00	28.00	36.50	0.14	1.20	2.10	4.60
P14	30.00	28.30	0.30	33.00	9.20	131.10	7.60	86.00	183.70	132.00	11.50	22.80	0.04	0.20	4.40	0.90
P15	30.00	29.70	0.10	65.00	7.30	21.90	7.80	88.00	214.00	162.00	20.00	29.80	0.10	0.50	2.80	2.10

Physicochemical variable in December, 1995.

Site code	Air t	Water t	Velo	Width	Depth	Disch	pH	Alka	Condu	TDS	Turbid	TSS	Ortho-P	N	DO	BOD
C01	28.70	24.30	0.16	47.00	6.30	40.70	7.80	92.00	637.00	396.00	22.80	27.60	0.02	0.30	7.69	1.01
C02	28.50	23.00	0.32	48.00	3.40	44.90	7.90	104.00	629.00	366.00	15.10	30.00	0.24	0.30	7.85	0.78
C03	29.30	23.40	0.36	52.00	2.09	50.70	7.90	94.00	646.00	412.00	13.60	32.00	0.10	0.30	7.52	1.01
H01	17.00	13.90	0.88	1.90	0.20	0.30	8.10	88.00	210.00	144.00	10.20	4.00	0.02	0.03	8.30	2.30
H02	22.00	13.20	0.08	2.30	0.25	0.04	8.10	92.00	141.30	78.00	21.60	7.80	0.02	0.02	8.20	1.68
H03	20.00	14.90	0.16	5.20	0.25	0.20	8.00	144.00	302.00	170.00	7.70	5.20	0.04	0.02	7.80	1.77
H04	24.00	19.20	0.00	0.50	0.05	0.00	8.00	120.00	278.00	134.00	1.80	1.80	0.04	0.03	7.90	1.31
N01	23.50	20.80	0.16	15.00	5.40	0.20	8.30	248.00	498.00	278.00	2.50	2.00	0.00	0.01	7.80	1.31
N02	26.00	21.00	0.24	24.00	2.00	10.00	8.50	82.00	201.00	112.00	12.80	11.60	0.02	0.03	6.90	1.95
N03	26.00	21.40	0.24	36.00	1.70	12.80	8.20	152.00	313.00	152.00	31.30	5.20	0.02	0.50	7.40	3.92
N04	27.00	21.40	0.16	26.00	3.00	10.90	8.30	132.00	315.00	156.00	16.10	9.20	0.02	0.30	7.47	1.02
N05	29.00	23.60	0.08	24.00	2.50	4.10	8.40	160.00	325.00	168.80	16.30	13.60	0.02	0.20	7.61	2.41
P01	30.00	22.10	0.89	7.00	0.55	2.34	8.30	132.00	308.00	212.00	5.90	7.20	0.04	0.05	8.40	1.18
P02	30.00	22.50	1.21	11.00	0.13	1.32	8.20	260.00	553.00	354.00	6.40	5.20	0.14	0.03	7.23	4.53
P03	28.00	22.30	1.37	15.00	0.30	4.99	8.50	186.00	381.00	232.00	5.20	8.80	0.00	0.01	7.95	2.36
P04	30.00	20.80	0.83	25.00	0.13	2.55	8.30	208.00	414.00	210.00	13.30	8.40	0.02	0.10	8.11	1.37
P05	32.50	24.90	0.48	36.00	1.50	52.62	8.30	186.00	382.00	210.00	12.90	9.20	0.02	0.60	6.90	1.20
P06	25.20	23.90	0.16	52.00	6.30	45.08	8.30	88.00	182.70	92.00	5.30	9.20	0.02	0.06	7.28	1.01
P07	27.20	24.00	0.40	56.00	8.00	154.11	8.00	86.00	220.00	112.00	4.60	5.60	0.04	0.04	5.18	1.31
P08	33.00	25.60	0.43	47.00	0.62	10.90	8.80	90.00	218.00	130.00	2.50	1.50	0.02	0.30	7.28	0.95
P09	30.30	25.80	0.48	39.00	0.65	12.17	8.00	96.00	365.00	130.00	14.10	16.40	0.02	0.20	7.95	0.90
P10	30.00	25.10	0.16	36.00	4.40	92.60	8.00	92.60	305.00	148.00	13.70	18.40	0.02	0.07	7.58	2.03
P11	31.00	26.40	0.08	7.60	0.38	0.20	7.80	124.00	1795.00	1880.00	22.60	48.40	0.02	1.50	2.21	1.83
P12	25.00	24.70	0.08	19.00	1.03	1.40	7.20	178.00	895.00	480.00	18.80	97.20	1.20	0.70	0.86	18.30
P13	27.00	24.50	0.08	32.00	1.20	2.79	8.10	168.00	882.00	434.00	12.70	51.20	0.70	1.50	1.56	17.80
P14	29.40	24.70	0.16	38.00	4.00	20.70	8.00	96.00	311.00	166.00	11.20	68.80	0.09	0.05	7.21	2.61
P15	28.00	24.50	0.24	48.00	5.00	50.11	8.40	94.00	307.00	170.00	21.20	28.00	0.02	0.10	6.70	3.67

Physicochemical variable in February, 1996

Site code	Air t	Water t	Velo	Width	Depth	Discha	pH	Alka	Condu	TDS	Turbid	TSS	Or-P	N	DO	BOD
C01	29.00	27.47	0.37	46.00	4.70	71.84	8.50	104.00	951.33	633.67	10.54	8.00	0.02	0.01	7.17	0.97
C02	28.00	26.50	0.16	48.00	8.40	43.22	8.50	237.00	1251.67	833.83	6.80	9.20	0.02	0.01	7.42	1.06
C03	29.00	26.33	0.16	28.00	1.65	6.73	8.42	106.00	1262.33	841.33	16.60	8.00	0.02	0.01	7.17	0.57
H01	22.10	14.75	0.44	6.00	0.18	0.50	7.85	94.00	179.45	119.55	5.45	4.00	0.04	0.14	7.63	0.54
H02	25.40	14.07	0.00	5.00	0.35	0.00	7.33	70.00	125.52	83.80	4.99	3.20	0.02	0.13	1.85	1.10
H03	26.80	20.27	0.00	6.00	0.28	0.00	8.00	190.00	313.50	208.50	2.09	2.30	0.10	0.54	7.65	4.25
N01	26.70	21.70	0.08	22.00	1.71	2.70	8.07	318.00	541.83	360.50	2.25	2.40	0.07	0.24	9.88	1.30
N02	25.80	21.02	0.08	25.00	1.96	3.81	8.22	70.00	122.67	81.78	7.09	4.40	0.07	0.24	9.27	1.08
N03	29.00	22.93	0.31	22.00	1.06	8.36	7.97	74.00	138.10	92.08	37.10	22.40	0.07	0.76	9.53	1.17
N04	30.00	23.35	0.16	28.00	2.50	9.74	7.92	82.00	153.40	102.12	242.00	11.60	0.04	0.52	8.78	0.69
N05	25.50	23.24	0.16	32.00	2.82	12.87	8.02	114.00	212.40	141.50	11.40	8.00	0.02	0.04	6.56	1.14
P01	29.00	24.58	0.21	11.00	0.14	0.29	8.42	192.00	332.83	221.83	3.80	2.50	0.02	0.05	8.83	1.68
P02	27.00	25.47	0.15	8.00	0.12	0.13	7.85	212.00	394.33	262.67	6.20	3.30	0.02	0.04	8.45	1.06
P03	29.00	24.22	0.47	12.00	0.15	0.78	8.38	226.00	397.33	264.50	28.10	22.30	0.02	0.04	8.37	0.99
P04	28.00	24.98	0.08	26.00	0.23	0.43	8.47	196.00	363.00	243.83	3.72	2.30	0.02	0.04	8.85	1.33
P05	26.90	23.28	0.17	43.00	3.45	23.91	8.28	190.00	351.33	234.00	20.90	17.20	0.02	0.04	8.50	3.32
P06	30.00	24.30	0.33	69.00	8.90	188.33	8.32	88.00	168.47	112.28	5.40	3.80	0.02	0.03	7.52	1.13
P07	28.00	23.13	0.32	71.00	9.50	198.57	8.08	88.00	201.12	133.92	5.56	4.20	0.02	0.03	7.17	1.24
P08	23.30	22.62	0.40	47.00	1.30	19.65	7.97	110.00	177.62	118.28	2.07	2.20	0.02	0.04	7.70	0.41
P09	26.00	25.53	0.53	46.00	1.80	39.74	8.58	88.00	187.07	124.63	4.99	3.60	0.01	0.02	8.83	0.53
P10	28.80	24.85	0.16	35.00	4.80	36.75	8.17	92.00	210.50	140.23	37.40	41.20	0.01	0.01	8.18	1.02
P11	27.00	25.18	0.40	6.00	0.33	0.68	7.75	94.00	290.33	193.33	65.80	73.20	0.02	0.30	5.57	1.38
P12	23.80	22.78	0.08	32.00	1.40	3.12	7.75	120.00	476.00	317.33	46.40	26.80	0.10	0.07	4.80	6.81
P13	27.00	24.58	0.12	47.00	1.73	8.37	8.02	84.00	463.50	309.83	27.30	21.60	1.40	20.00	7.82	9.56
P14	27.00	23.05	0.13	67.00	8.50	27.20	8.17	94.00	219.33	145.90	26.70	21.20	0.02	0.86	8.33	1.34
P15	28.00	27.30	0.16	58.00	8.10	69.15	8.33	88.00	215.83	143.90	11.66	8.60	0.40	0.05	7.03	1.86

Physicochemical variable in April, 1996

Site code	Air t	Water t	Velo	Width	Depth	Discha	pH	Alka	Condu	TDS	Turbid	TSS	Or-P	N	DO	BOD
C01	37.00	34.27	0.08	61.00	5.31	14.40	8.33	94.00	1218.50	811.00	23.40	9.00	0.02	0.10	8.30	1.75
C02	37.00	31.13	0.08	60.00	2.63	10.86	8.15	90.00	1286.67	1286.67	10.10	8.33	0.02	0.07	7.40	1.70
C03	33.50	30.53	0.08	40.00	6.38	17.34	8.13	92.00	1690.33	1128.33	11.90	11.33	0.02	0.08	7.10	1.62
H01	32.00	24.03	0.19	5.00	0.34	0.27	7.63	86.00	178.40	118.92	6.50	3.00	0.04	0.05	5.32	0.73
H02	29.00	22.98	0.00	4.10	0.28	0.00	7.27	46.00	95.03	63.87	34.70	86.00	1.10	0.08	1.97	2.17
H03	23.00	24.62	0.36	7.00	0.37	0.79	7.73	74.00	145.87	97.08	19.80	51.50	0.80	0.23	5.22	1.86
N01	26.00	27.90	0.11	13.00	1.07	1.20	7.83	154.00	308.17	205.17	15.30	68.50	0.40	3.90	5.52	1.37
N02	28.60	26.18	0.15	20.00	1.42	3.76	8.07	88.00	167.27	111.53	12.00	31.00	0.40	0.30	6.91	1.23
N03	29.00	27.98	0.21	20.00	1.88	6.91	7.83	90.00	187.72	124.98	63.30	74.50	0.50	0.30	6.07	1.06
N04	24.80	27.43	0.21	23.00	2.82	11.99	7.77	76.00	162.33	108.53	59.00	69.50	0.50	0.60	6.37	1.04
N05	27.00	28.32	0.16	17.00	4.02	9.51	7.90	82.00	181.03	120.60	240.00	136.00	0.60	0.80	6.38	1.10
P01	34.00	30.18	0.71	9.50	0.28	1.66	8.00	82.00	167.47	112.22	127.60	338.50	0.20	0.40	6.82	1.37
P02	28.00	29.47	0.28	3.20	0.17	0.13	7.73	118.00	272.67	181.72	23.00	68.50	0.50	3.50	8.45	1.89
P03	29.00	28.53	0.63	5.20	0.38	1.07	7.98	114.00	249.17	166.05	164.60	296.50	0.10	1.10	8.43	1.53
P04	26.20	27.20	0.86	18.00	0.48	5.98	7.98	90.00	181.75	121.17	187.00	319.00	0.50	1.10	6.68	1.31
P05	25.00	28.94	0.19	41.00	3.37	23.75	7.75	76.00	176.27	117.47	249.00	136.00	0.40	4.50	4.92	1.52
P06	22.00	24.97	0.16	63.00	6.07	52.63	7.88	82.00	171.10	113.90	4.84	3.00	0.02	0.10	3.88	1.38
P07	23.00	26.07	0.20	65.00	6.11	69.09	8.00	84.00	196.00	130.43	3.45	3.00	0.02	0.10	3.03	1.90
P08	27.00	27.68	0.27	42.00	0.70	6.69	8.43	82.00	193.77	129.18	2.35	2.00	0.04	1.40	8.35	1.04
P09	31.00	28.83	0.68	35.00	0.36	7.53	7.98	82.00	284.83	186.62	24.20	21.00	0.50	0.30	7.02	0.80
P10	39.00	33.13	0.20	54.00	3.20	30.07	8.00	82.00	198.83	132.55	25.50	21.00	0.04	0.30	7.55	1.39
P11	37.00	27.00	0.21	39.00	2.67	38.53	7.82	100.00	241.50	152.70	18.05	10.50	0.02	0.40	7.23	1.09
P12	38.00	31.10	0.13	23.00	1.20	3.40	7.53	114.00	520.00	352.67	34.60	26.50	0.10	0.50	8.70	0.64
P13	27.50	28.03	0.11	38.00	1.84	6.69	7.67	112.00	430.83	292.83	16.65	15.50	0.80	10.60	5.55	4.30
P14	30.00	29.83	0.21	48.00	2.67	23.76	7.62	76.00	229.83	152.70	40.20	23.50	0.04	0.50	7.23	2.28
P15	37.50	32.67	0.13	63.00	6.80	69.69	7.88	86.00	250.00	166.77	16.20	10.67	0.10	0.20	7.05	1.44