UNIVERSITI PUTRA MALAYSIA

MACROBENTHOS AND WATER QUALITY OF LANGAT RIVER SYSTEM, MALAYSIA

AZRINA BINTI MOHAMED ZAWAWI

FSAS 2002 64
Khas buat keluarga tersayang ..................

Semoga kita semua akan sendiri diserahi rahmat oleh ALLAH S.W.T
A study on macrobenthos and water quality of Langat River system was conducted at 12 sampling stations in Langat River and its tributaries, Semenyih River, Chongkak River and Lopo River. Samples were collected every month from March 1998 to February 1999 except for September 1998 and December 1998. Ten taxa of macrobenthos with 64 species were identified. Ephemeroptera and Diptera were dominant at the upstream area of Langat River system while Oligochaeta was dominant at the downstream area. Oligochaeta had the highest percentage of mean density (98.89%) followed by Diptera (0.57%) and Ephemeroptera (0.34%). *Limnodrilus hoffmeisteri* from the order of Oligochaeta had recorded the highest mean density about
*hoffmeisteri* from the class of Oligochaeta had recorded the highest mean density about 189,967.34 ind/m² (80%) and it was dominant at all the polluted stations in the downstream of Langat River. This species can be used as the bioindicator of the polluted water bodies in Malaysia.

Twenty one physicochemical factors, which influenced the density of macrobenthos were analyzed. According to the analysis, there were some other pollutants beside the climate such as the effluent from industries, poultry farms and the surface run off, which influenced the changes of monthly physicochemical factor value.

Based on the correlation analysis, factors such as the width of the river, temperature, dissolved oxygen, orthophosphate, nitrate, ammonium and total suspended solids showed a strong significant correlation with the distribution and density for macrobenthos. Based on the water quality index analyses for the whole sampling period between March 1998 and February 1999, the water quality index for Langat River System was recorded in a range of 45 to 60 which is classified as very polluted. Water quality analysis for each sampling stations throughout the sampling periods illustrated that Stations 1, 2, 3, 4, 9, 10, 11 and 12 had a water quality index below 60, indicating that they were very polluted while Stations 5, 6, 7 and 8 were slightly polluted with water quality index in a range of 61 to 73.
Abstrak tesis yang dikemukakan kepada senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains.

**MAKROBENTOS DAN KUALITI AIR BAGI SISTEM SUNGAI LANGAT, MALAYSIA**

Oleh

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November 2002

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mendominasi semua stesen yang tercemar di hilir sungai. Spesies ini boleh dijadikan sebagai bioindikator bagi sungai-sungai tercemar di Malaysia.

Secara keseluruhannya, sebanyak 21 parameter fizikokimia telah dianalisis dan didapati mempengaruhi kepadatan makrobentos. Berdasarkan analisis yang dijalankan, terdapat beberapa faktor luaran lain yang mempengaruhi faktor fizikokimia bulanan yang diuji selain dari faktor cuaca iaitu buangan sisa industri, ladang penternakan serta hakisan.

Dari analisis korelasi yang dijalankan, beberapa faktor fizikokimia seperti kelebaran sungai, suhu, konduktiviti, pH, oksigen terlarut, ortofosfat, nitrat, ammonia dan jumlah bahan terampai sangat mempengaruhi taburan dan kepadatan makrobentos. Berdasarkan analisis indeks kualiti air yang dijalankan pada setiap bulan pensampelan dari bulan Mac 1998 hingga bulan Februari 1999, kualiti air bagi Sistem Sungai Langat berada di dalam julat 45 hingga 60 dan diklasifikasikan sebagai sangat tercemar. Analisis indeks kualiti air mengikut stesen pensampelan mendapati Stesen 1, 2, 3, 4, 9, 10, 11 dan 12 berada di bawah 60 dan diklasifikasikan sebagai sangat tercemar sementara indeks kualiti air bagi Stesen 5, 6, 7 dan 8 menunjukkan keadaan sedikit tercemar dengan indeks kualiti air yang berada dalam julat 61 hingga 73.
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I certify that an Examination Committee met on 25th November 2002 to conduct the final examination of Azrina Binti Mohamed Zawawi on her Master of Science thesis entitled "Macrobenthos and Water Quality of Langat River System, Malaysia" in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follows:

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I hereby declare that the thesis is based on my original work except for quotations and citations which have been acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Putra Malaysia or other institutions.

AZRINA BINTI MOHAMED ZAWAWI

Date: 24 December 2002
## TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEDICATION</td>
<td>ii</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>iii</td>
</tr>
<tr>
<td>ABSTRAK</td>
<td>iv</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>vii</td>
</tr>
<tr>
<td>APPROVAL SHEETS</td>
<td>viii</td>
</tr>
<tr>
<td>DECLARATION FORM</td>
<td>x</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>xv</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>xix</td>
</tr>
<tr>
<td>LIST OF ABBREVIATIONS</td>
<td>xxiii</td>
</tr>
</tbody>
</table>

### CHAPTER

1. INTRODUCTION | 1

2. LITERATURE REVIEW | 4
   2.1 The Importance of Rivers | 4
   2.2 Stream Ecosystem | 5
   2.3 Living Organisms | 7
      2.3.1 Definition | 7
      2.3.2 Classification | 7
      2.3.3 Adaptations to Fast Flowing Water Environments | 8
      2.3.4 The Dispersion and Drift of Macrobenthos | 10
   2.4 Influence of Abiotic Factors on Macrobenthos | 11
      Organisms
         2.4.1 Substrates | 11
         2.4.2 Water Current Velocity | 12
         2.4.3 Temperature | 13
         2.4.4 Dissolved Oxygen | 13
         2.4.5 pH | 15
         2.4.6 Inorganic Nutrients | 17
         2.4.7 Heavy Metals | 19
         2.4.8 Total Suspended Solids | 22
   2.5 Influence of Biotic Factors on Macrobenthos | 22
      2.5.1 Foods | 23
      2.5.2 Interspecific Competition | 23
      2.5.3 Habitats | 24
   2.6 River Pollution and Water Quality | 24
      2.6.1 River Pollutions | 25
      2.6.2 Water Quality | 28
3 MATERIAL AND METHODS

3.1 Study Area

3.2 Sampling and Data Collections
  3.2.1 Field Measurement
  3.2.2 Water Samples
  3.2.3 Sediments
  3.2.4 Macrobenthos

3.3 Laboratory Analyses
  3.3.1 Water Samples
  3.3.2 Sediments Analyses
  3.3.3 Macrobenthos

3.4 Analysis of Data
  3.4.1 Transformation of Data
  3.4.2 Statistical Analysis
  3.4.3 Water Quality Indices (WQI)
  3.4.4 Biotic Index

4. RESULTS

4.1 Physicochemical Factors
  4.1.1 Physical Factors
  4.1.2 Water Chemical Factors
  4.1.3 Sediments Chemical Factors

4.2 Macrobenthos
  4.2.1 Species Composition
  4.2.2 Percentage Abundance
  4.2.3 Macrobenthos Density
  4.2.4 Species Distribution
  4.2.5 Monthly Fluctuation of Selected Species

4.3 Relationship Between Macrobenthos and Physicochemical Factors
  4.3.1 Correlation Between Macrobenthos and Physicochemical Factors
  4.3.2 Multiple Regression Analysis
  4.3.3 Monthly Multiple Regression Analysis

4.4 Water Quality
  4.4.1 Water Quality Index
  4.4.2 Monthly Water Quality Index
  4.4.3 Correlation Analysis Between Water Quality Index and Macrobenthos
  4.4.4 Regression Analysis Between Water Quality Index and Macrobenthos
  4.4.5 Biotic Index (Biological Scores)

5 DISCUSSION

6 CONCLUSION
BIBLIOGRAPHY

APPENDICES

A1 Raw Data of Physicochemical Factors
A2 Raw Data of Macrobenthos
A3 List of Abbreviations for Macrobenthos
A4 Raw Data of Water Quality Index
B1 Physicochemical Factors (Values ± SE, N=3) at 12 Sampling Stations of Langat River System in March
B2 Physicochemical Factors (Values ± SE, N=3) at 12 Sampling Stations of Langat River System in April
B3 Physicochemical Factors (Values ± SE, N=3) at 12 Sampling Stations of Langat River System in May
B4 Physicochemical Factors (Values ± SE, N=3) at 12 Sampling Stations of Langat River System in June
B5 Physicochemical Factors (Values ± SE, N=3) at 12 Sampling Stations of Langat River System in July
B6 Physicochemical Factors (Values ± SE, N=3) at 12 Sampling Stations of Langat River System in August
B7 Physicochemical Factors (Values ± SE, N=3) at 12 Sampling Stations of Langat River System in September
B8 Physicochemical Factors (Values ± SE, N=3) at 12 Sampling Stations of Langat River System in October
B9 Physicochemical Factors (Values ± SE, N=3) at 12 Sampling Stations of Langat River System in November
B10 Physicochemical Factors (Values ± SE, N=3) at 12 Sampling Stations of Langat River System in December
C Monthly Amount (%) of All Macrobenthos According to the Order at 12 Sampling Stations of Langat River System
D1 Densities of Macrobenthos (ind/m² ± SE, N=3) at 12 Sampling Stations of Langat River System in March
D2 Densities of Macrobenthos (ind/m² ± SE, N=3) at 12 Sampling Stations of Langat River System in April
D3 Densities of Macrobenthos (ind/m² ± SE, N=3) at 12 Sampling Stations of Langat River System in May
D4 Densities of Macrobenthos (ind/m² ± SE, N=3) at 12 Sampling Stations of Langat River System in June
D5 Densities of Macrobenthos (ind/m² ± SE, N=3) at 12 Sampling Stations of Langat River System in July
D6 Densities of Macrobenthos (ind/m² ± SE, N=3) at 12 Sampling Stations of Langat River System in August
D7 Densities of Macrobenthos (ind/m² ± SE, N=3) at 12 Sampling Stations of Langat River System in September
D8 Densities of Macrobenthos (ind/m² ± SE, N=3) at 12 Sampling Stations of Langat River System in October
Stations of Langat River System in November

D9 Densities of Macrobenthos (ind/m² ± SE, N=3) at 12 Sampling Stations of Langat River System in January

D10 Densities of Macrobenthos (ind/m² ± SE, N=3) at 12 Sampling Stations of Langat River System in February

E1 Monthly Multiple Regression Analysis Between Dependent Variables (Macrobenthos) and Independent Variables (Physicochemical Factors) at 12 Sampling Stations of Langat River System in March

E2 Monthly Multiple Regression Analysis Between Dependent Variables (Macrobenthos) and Independent Variables (Physicochemical Factors) at 12 Sampling Stations of Langat River System in April

E3 Monthly Multiple Regression Analysis Between Dependent Variables (Macrobenthos) and Independent Variables (Physicochemical Factors) at 12 Sampling Stations of Langat River System in June

E4 Monthly Multiple Regression Analysis Between Dependent Variables (Macrobenthos) and Independent Variables (Physicochemical Factors) at 12 Sampling Stations of Langat River System in July

E5 Monthly Multiple Regression Analysis Between Dependent Variables (Macrobenthos) and Independent Variables (Physicochemical Factors) at 12 Sampling Stations of Langat River System in August

E6 Monthly Multiple Regression Analysis Between Dependent Variables (Macrobenthos) and Independent Variables (Physicochemical Factors) at 12 Sampling Stations of Langat River System in October

E7 Monthly Multiple Regression Analysis Between Dependent Variables (Macrobenthos) and Independent Variables (Physicochemical Factors) at 12 Sampling Stations of Langat River System in November

E8 Monthly Multiple Regression Analysis Between Dependent Variables (Macrobenthos) and Independent Variables (Physicochemical Factors) at 12 Sampling Stations of Langat River System in January

E9 Monthly Multiple Regression Analysis Between Dependent Variables (Macrobenthos) and Independent Variables (Physicochemical Factors) at 12 Sampling Stations of Langat River System in February

F Best Fit Equations for The Estimation

G Proposed Interim National Water Quality Standards for Malaysia

H BMWP Score System

BIODATA OF AUTHOR
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Field Measurement</td>
<td>45</td>
</tr>
<tr>
<td>2.</td>
<td>The Absorbance of a Series of Six Standards of Phosphate Solution</td>
<td>48</td>
</tr>
<tr>
<td>3.</td>
<td>The Absorbance of a Series of Seven Standards Ammonium Standard Solution</td>
<td>49</td>
</tr>
<tr>
<td>4.</td>
<td>The Absorbance of a Series of Six Standards of Nitrite-Solution</td>
<td>51</td>
</tr>
<tr>
<td>5.</td>
<td>Composition of Macrobenthos at 12 Sampling Stations of Langat River System</td>
<td>137</td>
</tr>
<tr>
<td>6.</td>
<td>Mean Number of Individuals (%) of All Macrobenthos (No ± SE,N=3)</td>
<td>143</td>
</tr>
<tr>
<td>8.</td>
<td>Yearly Multiple Regression Analysis Between the Dependent Variables (Macrobenthos) and the Independent Variables (Physicochemical Factors) at 12 Sampling Stations of Langat River System.</td>
<td>163</td>
</tr>
<tr>
<td>10.</td>
<td>Monthly Means of Water Quality Index (WQI) at 12 Sampling Stations of Langat River System.</td>
<td>170</td>
</tr>
<tr>
<td>11.</td>
<td>Correlation Analysis (Pearson) Between Water Quality Index (WQI) and Macrobenthos at 12 Sampling Stations of Langat River System.</td>
<td>172</td>
</tr>
<tr>
<td>12.</td>
<td>Multiple Regression Analysis Between Dependent Variables (Macrobenthos) and Independent Variables (Water Quality Index).</td>
<td>174</td>
</tr>
<tr>
<td>14.</td>
<td>Raw Data of Physicochemical Factors.</td>
<td>213</td>
</tr>
</tbody>
</table>
15. Raw Data of Macrobenthos

16. Raw Data of Water Quality Index

17. Physicochemical Factors (Values $\pm$ SE, N=3) at 12 Sampling Stations of Langat River System in March.

18. Physicochemical Factors (Values $\pm$ SE, N=3) at 12 Sampling Stations of Langat River System in April.

19. Physicochemical Factors (Values $\pm$ SE, N=3) at 12 Sampling Stations of Langat River System in May.

20. Physicochemical Factors (Values $\pm$ SE, N=3) at 12 Sampling Stations of Langat River System in June.

21. Physicochemical Factors (Values $\pm$ SE, N=3) at 12 Sampling Stations of Langat River System in July.

22. Physicochemical Factors (Values $\pm$ SE, N=3) at 12 Sampling Stations of Langat River System in August.

23. Physicochemical Factors (Values $\pm$ SE, N=3) at 12 Sampling Stations of Langat River System in October.

24. Physicochemical Factors (Values $\pm$ SE, N=3) at 12 Sampling Stations of Langat River System in November.

25. Physicochemical Factors (Values $\pm$ SE, N=3) at 12 Sampling Stations of Langat River System in January.

26. Physicochemical Factors (Values $\pm$ SE, N=3) at 12 Sampling Stations of Langat River System in February.

27. Monthly Amount (%) of All Macrobenthos According to the Order at 12 Sampling Stations of Langat River System.

28. Densities of Macrobenthos (ind/m$^2$ $\pm$ SE, N=3) at 12 Sampling Stations of Langat River System in March.

29. Densities of Macrobenthos (ind/m$^2$ $\pm$ SE, N=3) at 12 Sampling Stations of Langat River System in April.

30. Densities of Macrobenthos (ind/m$^2$ $\pm$ SE, N=3) at 12 Sampling Stations of Langat River System in May.
31. Densities of Macrobenthos (ind/m$^2$ ± SE, N=3) at 12 Sampling Stations of Langat River System in June.

32. Densities of Macrobenthos (ind/m$^2$ ± SE, N=3) at 12 Sampling Stations of Langat River System in July.

33. Densities of Macrobenthos (ind/m$^2$ ± SE, N=3) at 12 Sampling Stations of Langat River System in August.

34. Densities of Macrobenthos (ind/m$^2$ ± SE, N=3) at 12 Sampling Stations of Langat River System in October.

35. Densities of Macrobenthos (ind/m$^2$ ± SE, N=3) at 12 Sampling Stations of Langat River System in November.

36. Densities of Macrobenthos (ind/m$^2$ ± SE, N=3) at 12 Sampling Stations of Langat River System in January.

37. Densities of Macrobenthos (ind/m$^2$ ± SE, N=3) at 12 Sampling Stations of Langat River System in February.

38. Monthly Multiple Regression Analysis Between Dependent Variables (Macrobenthos) and Independent Variables (Physicochemical Factors) at 12 Sampling Stations of Langat River System in March.

39. Monthly Multiple Regression Analysis Between Dependent Variables (Macrobenthos) and Independent Variables (Physicochemical Factors) at 12 Sampling Stations of Langat River System in April.

40. Monthly Multiple Regression Analysis Between Dependent Variables (Macrobenthos) and Independent Variables (Physicochemical Factors) at 12 Sampling Stations of Langat River System in June.

41. Monthly Multiple Regression Analysis Between Dependent Variables (Macrobenthos) and Independent Variables (Physicochemical Factors) at 12 Sampling Stations of Langat River System in July.

42. Monthly Multiple Regression Analysis Between Dependent Variables (Macrobenthos) and Independent Variables (Physicochemical Factors) at 12 Sampling Stations of Langat River System in August.

43. Monthly Multiple Regression Analysis Between Dependent Variables (Macrobenthos) and Independent Variables (Physicochemical Factors) at 12 Sampling Stations of Langat River System in October.

44. Monthly Multiple Regression Analysis Between Dependent Variables
(Macrobenthos) and Independent Variables (Physicochemical Factors) at 12 Sampling Stations of Langat River System in November.

45. Monthly Multiple Regression Analysis Between Dependent Variables (Macrobenthos) and Independent Variables (Physicochemical Factors) at 12 Sampling Stations of Langat River System in January. 321

46. Monthly Multiple Regression Analysis Between Dependent Variables (Macrobenthos) and Independent Variables (Physicochemical Factors) at 12 Sampling Stations of Langat River System in February. 322

47. Proposed Interim National Water Quality Standards for Malaysia. 323

48. Biological Monitoring Working Party (BMWP) Score System. 324
LIST OF FIGURES

Figure | Title | Page
--- | --- | ---
1. | Langat River System in Peninsular of Malaysia. | 33
2. | Locations of Sampling Stations (Stations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12) at Langat River System. | 35
3. | Station 1 at Telok Dato’ near Banting. | 36
4. | Station 2 at Brooklands Oil Palm Estate. | 36
5. | Station 3 at Dengkil Oil Palm Plantation | 38
6. | Station 4 at Bandar Baru Bangi. | 38
7. | Station 5 at Kampung Batu 17 in Hulu Langat | 39
8. | Station 6 at Kampung Orang Asli in Hulu Langat. | 39
9. | Station 7 at Lopo River. | 41
10. | Station 8 at Chongkak River | 41
11. | Station 9 at Kampung Sungai Buah, Semenyih River. | 42
12. | Station 10 at Rinching River. | 42
13. | Station 11 at Semenyih River (Near Semenyih Town). | 44
14. | Station 12 at Semenyih River (Near Tekala River). | 44
15. | Mean depth (depth ± SE, N=3) at Stations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12) of Langat River System from March 1998 to February 1999. | 61
16. | Mean Temperature (°C ± SE, N=3) at Stations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12) of Langat River System from March 1998 to February 1999. | 66
17. | Mean Conductivity (µmhos/cm ± SE, N=3) of Stations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12) at Langat River System from March 1998 to February 1999. | 70
18. | Mean pH (pH ± SE, N=3) at Stations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12) of Langat River System from March 1998 to February 1999. | 74
19. Mean Dissolved Oxygen (mg/l ± SE, N=3) of Stations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12) at Langat River System from March 1998 to February 1999.

20. Mean Biochemical Oxygen Demand (mg/l ± SE, N=3) of Stations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12) at Langat River System from March 1998 to February 1999.

21. Mean Concentration of Orthophosphate (mg/l ± SE, N=3) at Stations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12) of Langat River System from March 1998 to February 1999.

22. Mean Concentration of Nitrate (mg/l ± SE, N=3) at Stations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12) of Langat River System from March 1998 to February 1999.

23. Mean Concentration of Nitrite (mg/l ± SE, N=3) at Stations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12) of Langat River System from March 1998 to February 1999.

24. Mean Concentration of Ammonium (mg/l ± SE, N=3) at Stations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12) of Langat River System from March 1998 to February 1999.

25. Mean Concentration of Total Suspended Solids (TSS) (mg/l ± SE, N=3) at Stations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12) of Langat River System from March 1998 to February 1999.

26. Mean Concentration of Total Dissolved Solids (TDS) (mg/l ± SE, N=3) at Stations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12) of Langat River System from March 1998 to February 1999.

27. Mean Concentration of Chemical Oxygen Demand (COD) (mg/l ± SE, N=3) at Stations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12) of Langat River System from March 1998 to February 1999.

28. Mean Concentration of Copper (mg/l ± SE, N=3) in Water at Stations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12) of Langat River System from March 1998 to February 1999.

29. Mean Concentration of Zinc (mg/l ± SE, N=3) in Water at Stations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12) of Langat River System from March 1998 to February 1999.

30. Mean pH (pH ± SE, N=3) of the Sediment at Stations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12) at Langat River System from March 1998 to
February 1999.

31. Mean Concentration of Organic Matter (mg/l ± SE, N=3) at Stations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12) of Langat River System from March 1998 to February 1999.

32. Mean Concentration of Cuprum (mg/l ± SE, N=3) in Sediment at Stations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12) of Langat River System from March 1998 to February 1999.

33. Mean Concentration of Zinc (mg/l ± SE, N=3) in Sediment at Stations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12) of Langat River System from March 1998 to February 1999.

34. Mean Concentration of Plumbum (mg/l ± SE, N=3) in Sediment at Stations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12) of Langat River System from March 1998 to February 1999.


36. Mean Density (ind/m²), Distributions and Fluctuations for Selected Genus of Oligochaeta (Limnodrilus hoffmeisteri and Limnodrilus profundicola).

37. Mean Density (ind/m²), Distributions and Fluctuations for Selected Genus of Diptera (Pentaneura sp., Polypedilum sp. and Simulium sp.).

38. Mean Density (ind/m²), Distributions and Fluctuations for Selected Genus of Ephemeroptera (Baetis sp., Caenis sp. and Stenacron sp.)

39. Mean Density (ind/m²), Distributions and Fluctuations for Selected Genus of Trichoptera (Cheumatopsyche sp., Macrostemum fenestratum and Hydropsyche annulata).

40. Mean Density (ind/m²), Distributions and Fluctuations for Selected Genus of Gastropoda (Filopaludina martesi martesi, Brotiacostulata) and Plecoptera (Acroneuria sp.).

41. Monthly Fluctuation for Macrobenthos According to the Order of Trichoptera, Diptera, Plecoptera, Ephemeroptera, Hemiptera and Coleoptera at 12 sampling stations of Langat River System.

42. Monthly Fluctuation for Macrobenthos According to the Order of
Odonata, Gastropoda, Oligochaeta and Crustacea at 12 sampling stations of Langat River System.

43. Mean of Water Quality Index at 12 Sampling Stations of Langat River System

44. Monthly Water Quality Index of Langat River System

LIST OF ABBREVIATIONS

AAS = Atomic Absorption Spectrophotometer
APHA = American Public Health Association
BMWP = Biological Monitoring Working Party
BOD = Biochemical Oxygen Demand
COD = Chemical Oxygen Demand
Cu (s) = Cuprum (Sediment)
Cu (w) = Cuprum (Water)
DO = Dissolved Oxygen
DOE = Department of Environment
FAS = Ferrous Ammonium Sulphate
H₂SO₄ = Acid Sulphuric
HCL = Acid Hydrochloric
HClO₄ = Acid Perchloric
HgI₂ = Mercuric Iodide
HgSO₄ = Mercuric Sulphate
HNO₃ = Acid Nitric
K₂Cr₂O₇ = Potassium Dichromate
KI = Potassium Iodide
NaOH = Natrium Hydroxide
NH₄OH = Ammonium Hydroxide
NO₂-N = Nitrite-Nitrogen
NO₃-N = Nitrate-Nitrogen
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>Org</td>
<td>Organic Matter</td>
</tr>
<tr>
<td>Pb(s)</td>
<td>Lead (Sediment)</td>
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<tr>
<td>PO₄-P</td>
<td>Orthophosphate</td>
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<tr>
<td>SE</td>
<td>Standard Error</td>
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<tr>
<td>St.</td>
<td>Station</td>
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<tr>
<td>TDS</td>
<td>Total Dissolved Solids</td>
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<tr>
<td>TSS</td>
<td>Total Suspended Solids</td>
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<tr>
<td>Zn (s)</td>
<td>Zinc (Sediment)</td>
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<tr>
<td>Zn (w)</td>
<td>Zinc (Water)</td>
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