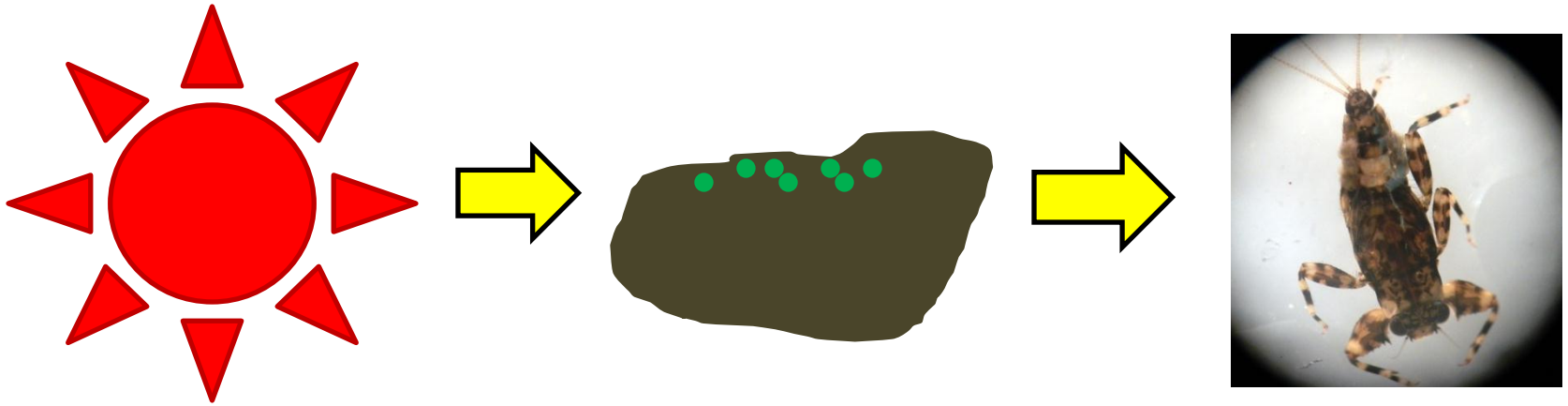


Research Theme:

**Effect of Light Availability on
the Abundance of Grazer
Type Zoobenthos at
Kurokawa River, Japan**

Presented by: Wong Yun Yun

Introduction



There is connection between sunlight availability and abundance of grazer type aquatic insects in the stream habitat

Material and Methods

Study Location: Kurokawa River, Japan

(35° 52.516' N, 137° 40.511' E)



| No | Habitat | Light Condition |
|----|---------------|-----------------|
| 1 | Riffle (R) | Open (O) |
| 2 | Riffle (R) | Shady (S) |
| 3 | Pool (P) | Open (O) |
| 4 | Pool (P) | Shady (S) |

Procedure (Sampling in the Field)

1. Two 50cm x 50cm quadrates was set up at respective habitat (RO, RS, PO, PS).
2. Each sampling point was taken photo to show the rock condition (epilithic algae)
3. At each quadrate, three rocks measuring 10-20cm in length and 5-10cm in thickness was randomly collected from the exposed layer of the stream bed.

Procedure (Sampling in the Field)

4. All the attached zoobenthos and organic matter were collected by using Surber sampler.
5. The collected specimen were then properly kept in sample bag for lab analysis.
6. The environmental variables (water depth, light intensity, water temperature & DO) were measured for each sampling site.

Procedure (Laboratory Analysis)

1. Zoobenthos were sorted out from each collected sample and group them according to their morphological characteristics.
2. The zoobenthos were observed and identified up to Order classification by using stereomicroscope.
3. According to habitats, calculate the number of each Order that with specific feeding habit:

Procedure (Laboratory Analysis)

| Classification | General Feeding Habit |
|-----------------------|------------------------------|
| EPHEMEROPTERA | GRAZER |
| ODONATA | PREDATOR |
| PLECOPTERA | PREDATOR |
| MEGALOPTERA | PREDATOR |
| TRICHOPTERA | MIX DIET |
| COLEOPTERA | MIX DIET |
| DIPTERA | FILTERER |

Procedure (Laboratory Analysis)

4. Comparison of the abundance of grazer type zoobenthos among habitats with the effects of:
 - light condition
 - habitat (riffle/pool)

RESULT

1. Photos of Sampling Points
2. Environmental Variables of Sampling Points
3. Comparison of Feeding Groups for each Sampling Point
4. Comparison of abundance of grazer between habitats and light conditions
5. List of Detected Zoobenthos

RO



RS



PO



PS



Environmental Variables

| No. | Factor | RO 001 | RO 002 | RS 001 | RS 002 | PO 001 | PO 002 | PS 001 | PS 002 |
|------------|---------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 1 | Water Depth (cm) | 12.5 | 17.5 | 13.5 | 42.5 | 7.5 | 36.5 | 7.5 | 10.5 |
| 2 | Light Intensity (mmol) | 1667.8 | 1652.5 | 27.57 | 43.75 | 1725.2 | 1831.2 | 67.69 | 29.67 |
| 3 | Temperature (°C) | 21.9 | 23.0 | 18.9 | 18.9 | 21.8 | 21.2 | 20.8 | 20.0 |
| 4 | Dissolve Oxygen (mg/L) | 7.45 | 6.83 | 7.93 | 8.08 | 7.94 | 7.63 | 7.55 | 7.79 |

Environmental Variables

| No. | Factor | RO 001 | RO 002 | RS 001 | RS 002 | PO 001 | PO 002 | PS 001 | PS 002 |
|-----|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1 | Water Depth (cm) | 12.5 | 17.5 | 13.5 | 42.5 | 7.5 | 36.5 | 7.5 | 10.5 |
| 2 | Light Intensity (mmol) | 1667.8 | 1652.5 | 27.57 | 43.75 | 1725.2 | 1831.2 | 67.69 | 29.67 |
| 3 | Temperature (°C) | 21.9 | 23.0 | 18.9 | 18.9 | 21.8 | 21.2 | 20.8 | 20.0 |
| 4 | Dissolve Oxygen (mg/L) | 7.45 | 6.83 | 7.93 | 8.08 | 7.94 | 7.63 | 7.55 | 7.79 |

Environmental Variables

| No. | Factor | RO 001 | RO 002 | RS 001 | RS 002 | PO 001 | PO 002 | PS 001 | PS 002 |
|-----|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1 | Water Depth (cm) | 12.5 | 17.5 | 13.5 | 42.5 | 7.5 | 36.5 | 7.5 | 10.5 |
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| 3 | Temperature (°C) | 21.9 | 23.0 | 18.9 | 18.9 | 21.8 | 21.2 | 20.8 | 20.0 |
| 4 | Dissolve Oxygen (mg/L) | 7.45 | 6.83 | 7.93 | 8.08 | 7.94 | 7.63 | 7.55 | 7.79 |

Environmental Variables

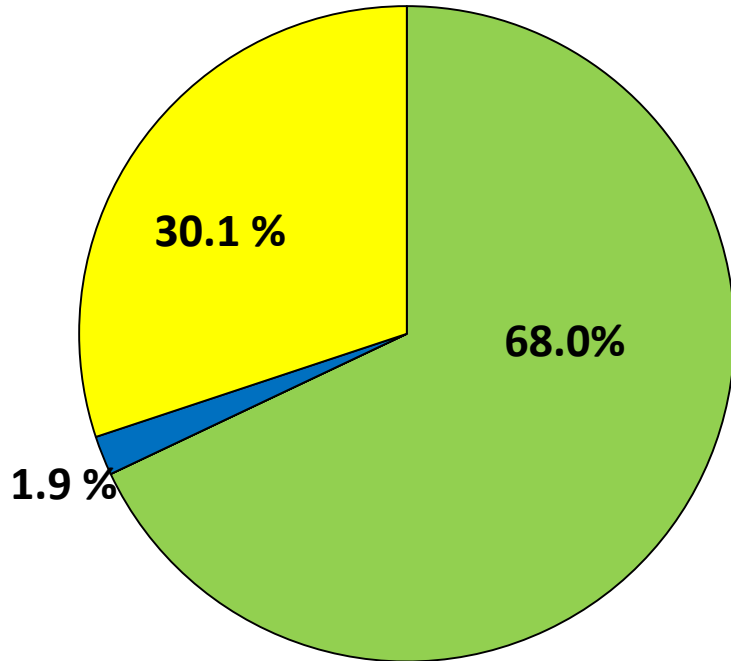
| No. | Factor | RO 001 | RO 002 | RS 001 | RS 002 | PO 001 | PO 002 | PS 001 | PS 002 |
|-----|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1 | Water Depth (cm) | 12.5 | 17.5 | 13.5 | 42.5 | 7.5 | 36.5 | 7.5 | 10.5 |
| 2 | Light Intensity (mmol) | 1667.8 | 1652.5 | 27.57 | 43.75 | 1725.2 | 1831.2 | 67.69 | 29.67 |
| 3 | Temperature (°C) | 21.9 | 23.0 | 18.9 | 18.9 | 21.8 | 21.2 | 20.8 | 20.0 |
| 4 | Dissolve Oxygen (mg/L) | 7.45 | 6.83 | 7.93 | 8.08 | 7.94 | 7.63 | 7.55 | 7.79 |

Environmental Variables

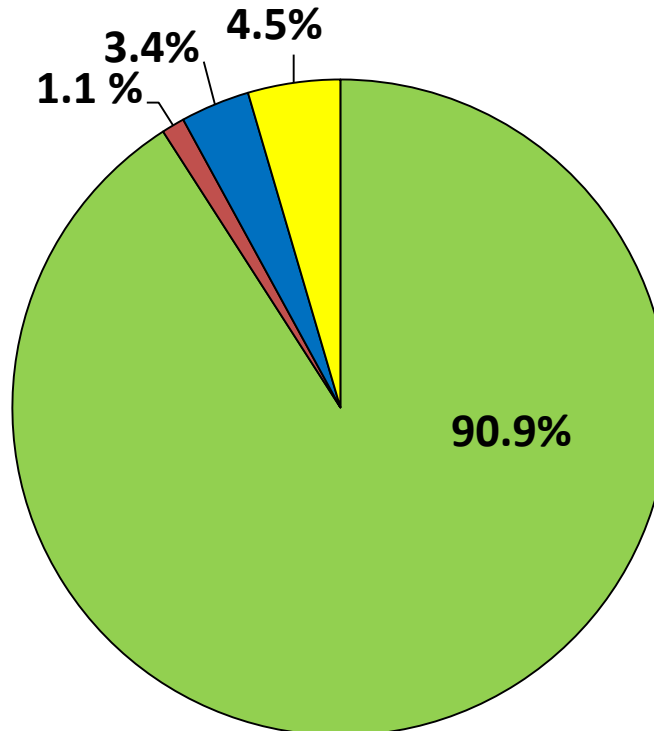
| No. | Factor | RO 001 | RO 002 | RS 001 | RS 002 | PO 001 | PO 002 | PS 001 | PS 002 |
|-----|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1 | Water Depth (cm) | 12.5 | 17.5 | 13.5 | 42.5 | 7.5 | 36.5 | 7.5 | 10.5 |
| 2 | Light Intensity (mmol) | 1667.8 | 1652.5 | 27.57 | 43.75 | 1725.2 | 1831.2 | 67.69 | 29.67 |
| 3 | Temperature (°C) | 21.9 | 23.0 | 18.9 | 18.9 | 21.8 | 21.2 | 20.8 | 20.0 |
| 4 | Dissolve Oxygen (mg/L) | 7.45 | 6.83 | 7.93 | 8.08 | 7.94 | 7.63 | 7.55 | 7.79 |




RO

001
N = 103



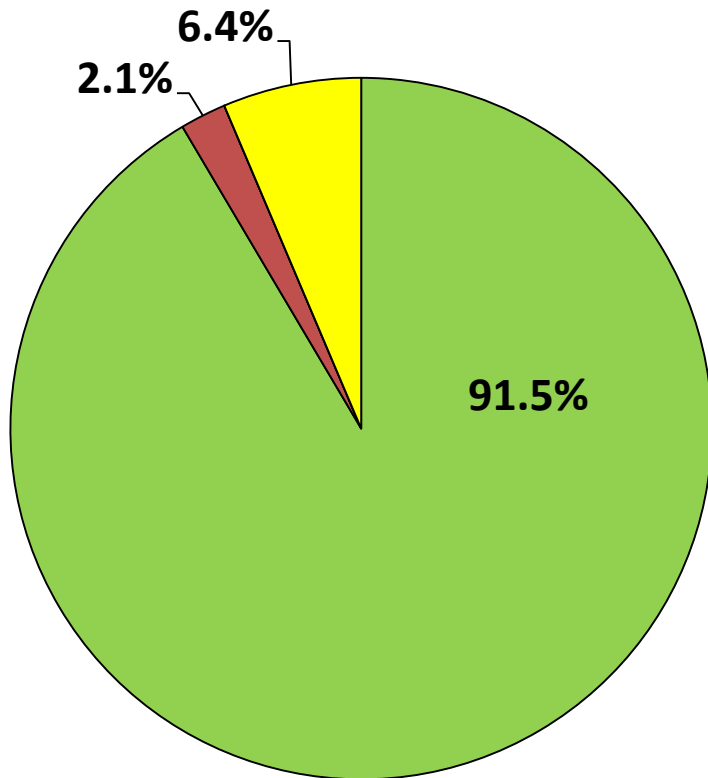
002
N = 88



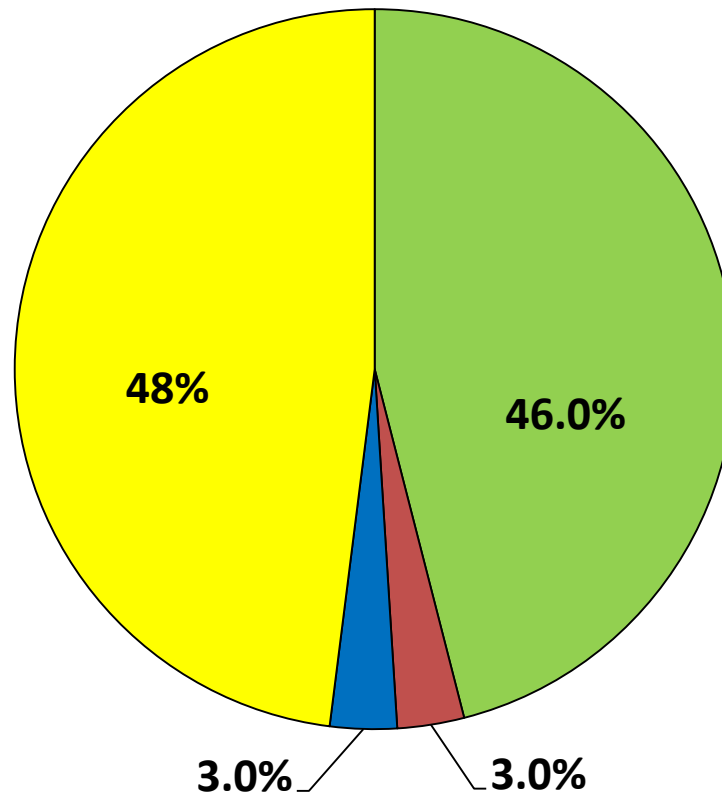
-  Grazer
-  Predator
-  Filterer
-  Mix





RS

001
N = 47



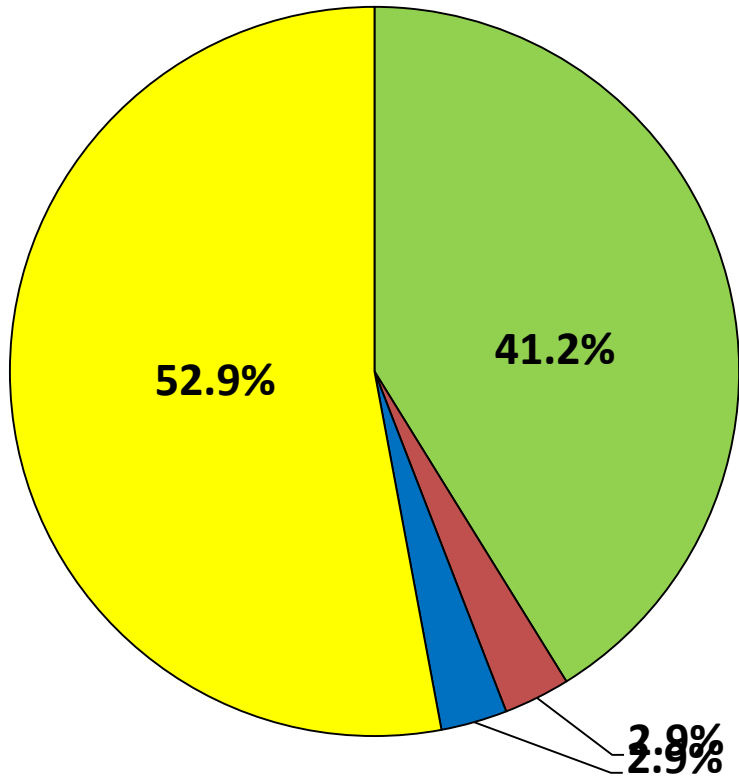
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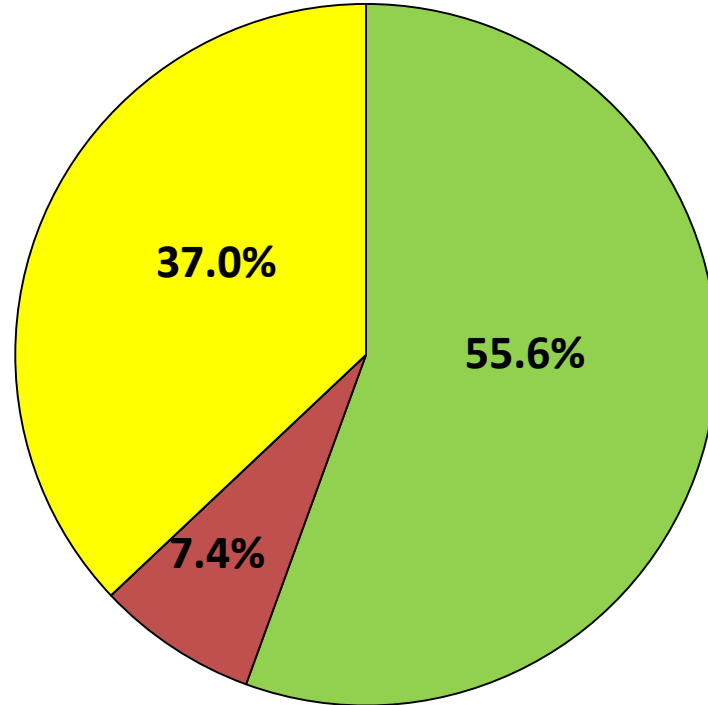
-  Grazer
-  Predator
-  Filterer
-  Mix

PO

001
N = 34



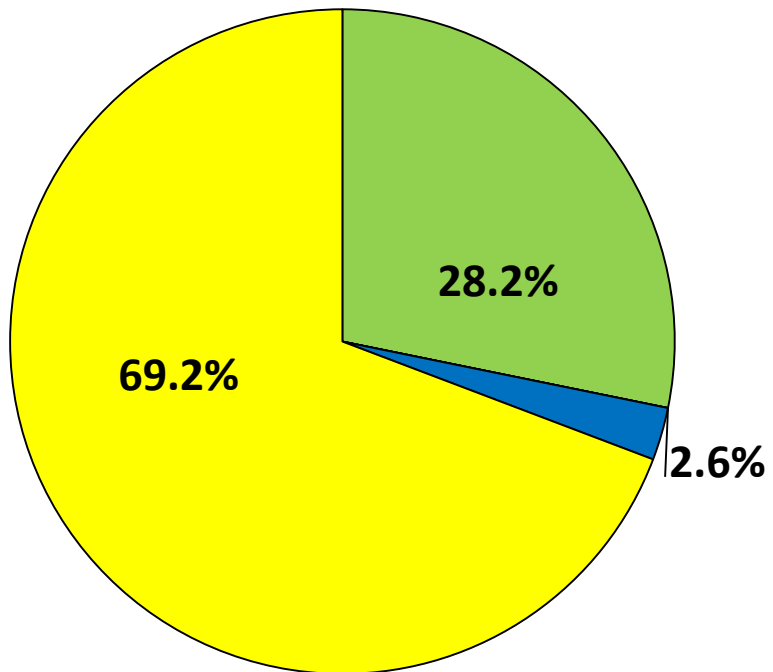
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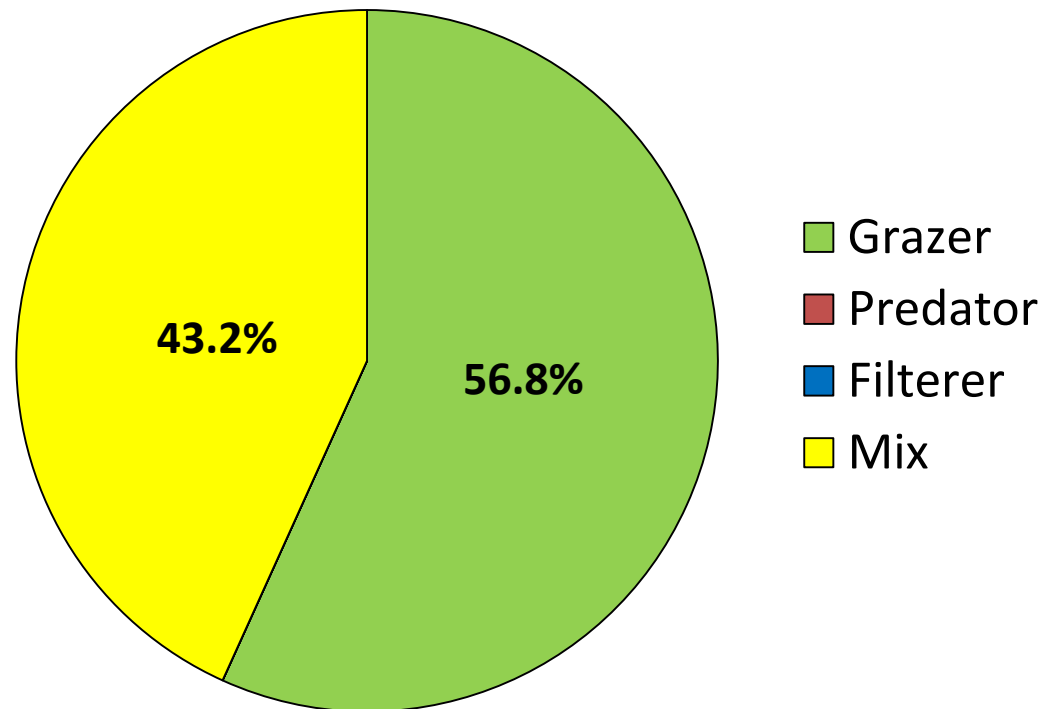
-  Grazer
-  Predator
-  Filterer
-  Mix

PS

001
N = 39

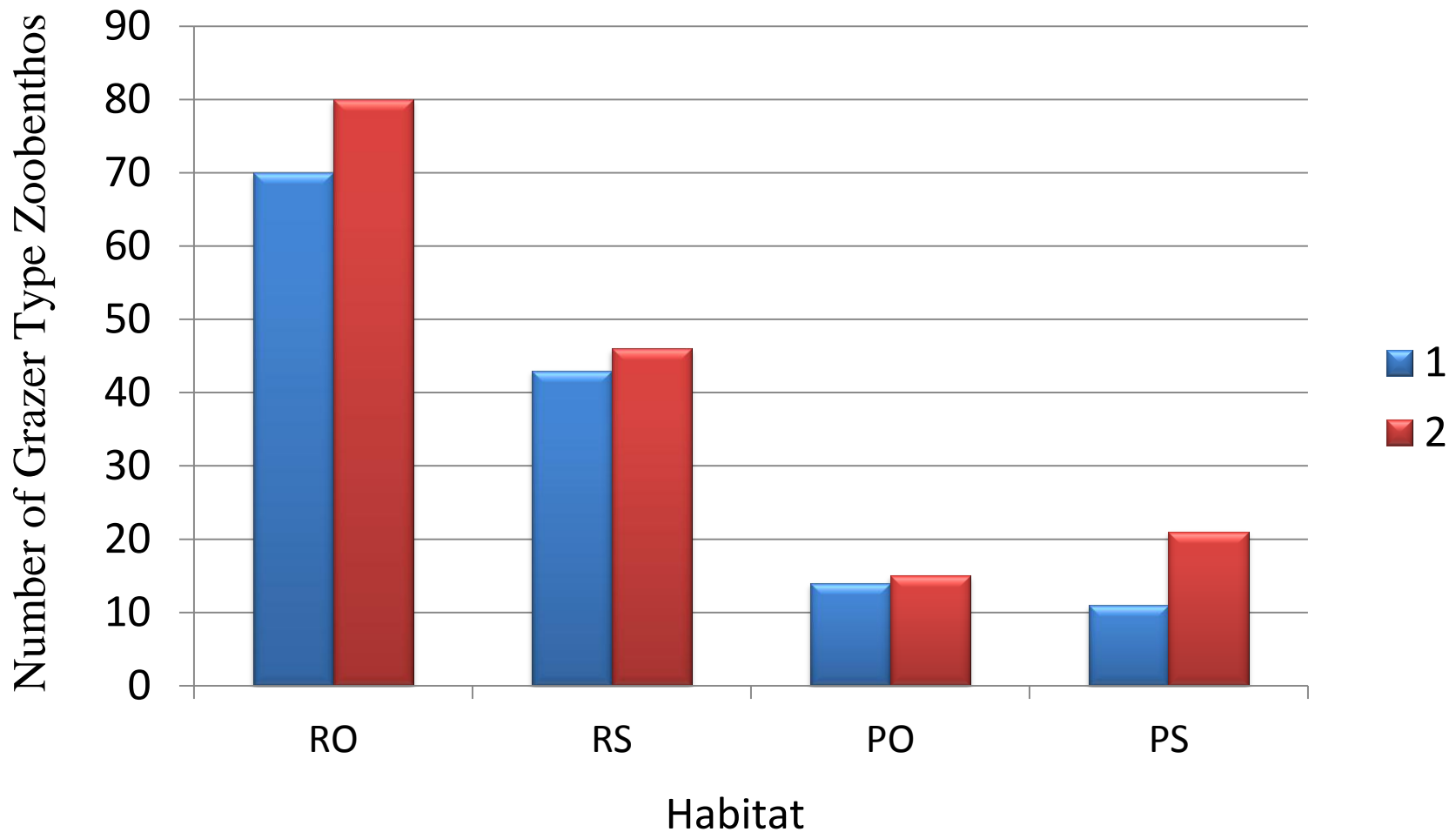


002
N = 37

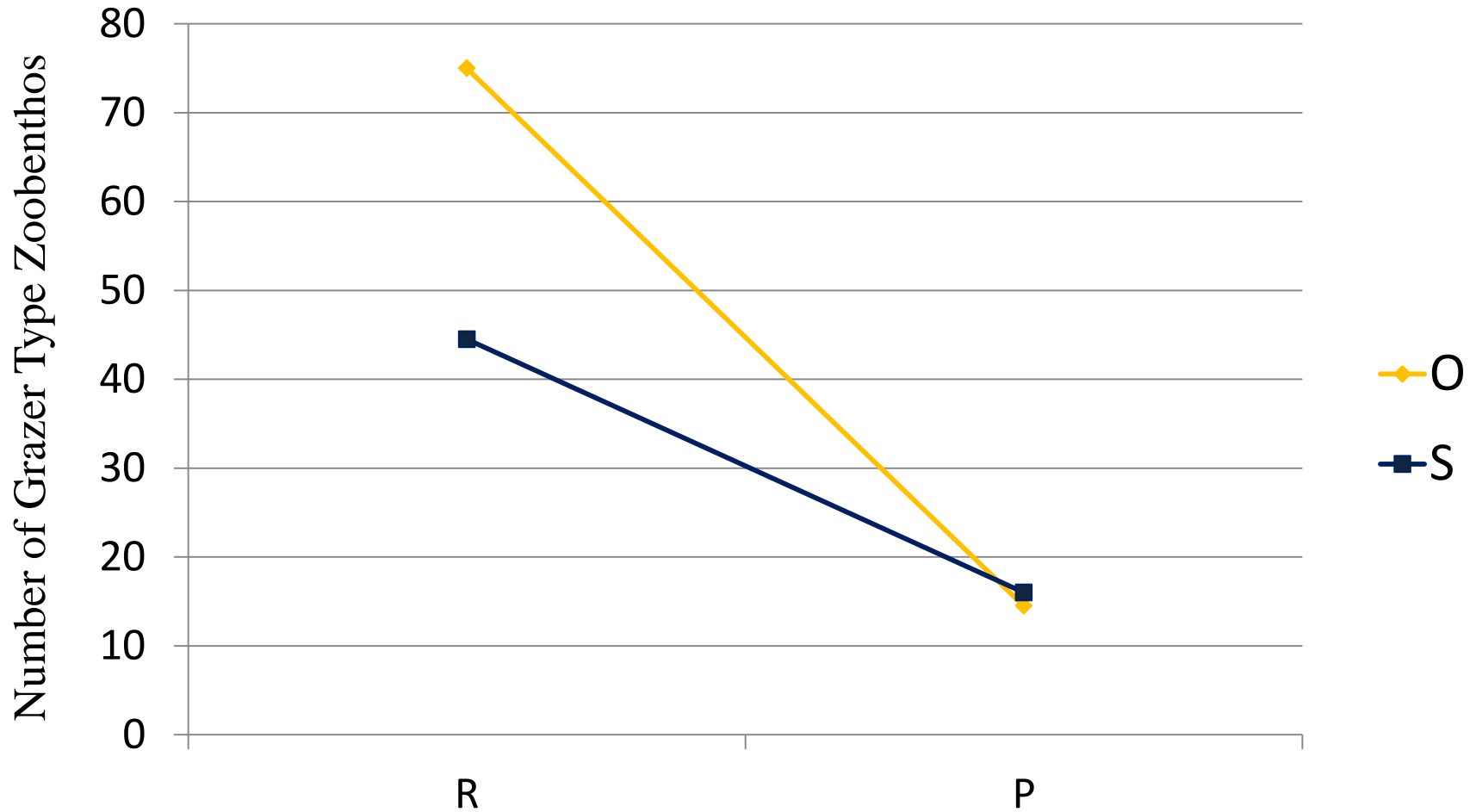


- Grazer
- Predator
- Filterer
- Mix

Comparison of the Abundance of Grazer between habitats (R & P) and Light Condition (O & S)



Comparison of the Abundance of Grazer between habitats (R & P) and Light Condition (O & S)



List of Detected Zoobenthos

| No. | Classification | RO 001 | RO 002 | RS 001 | RS 002 | PO 001 | PO 002 | PS 001 | PS 002 |
|-----|----------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1 | Ephemeroptera | 70 | 80 | 43 | 46 | 14 | 15 | 11 | 21 |
| 2 | Plecoptera | 0 | 0 | 1 | 3 | 1 | 2 | 0 | 0 |
| 3 | Megaloptera | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | Trichoptera | 31 | 4 | 3 | 48 | 18 | 10 | 27 | 16 |
| 5 | Diptera | 2 | 3 | 0 | 3 | 1 | 0 | 1 | 0 |
| 6 | Pupa | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 7 | Non Insect | 3 | 0 | 0 | 5 | 0 | 1 | 4 | 0 |
| | TOTAL | 106 | 88 | 47 | 105 | 35 | 28 | 43 | 38 |

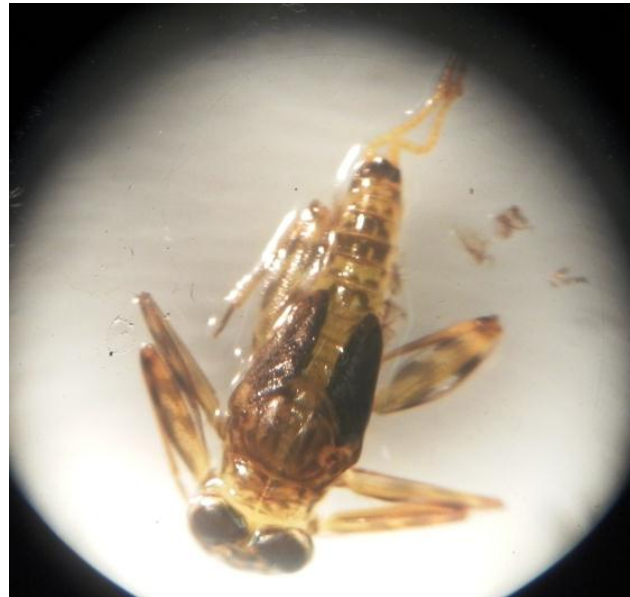
List of Detected Zoobenthos

| No. | Classification | RO 001 | RO 002 | RS 001 | RS 002 | PO 001 | PO 002 | PS 001 | PS 002 |
|-----|----------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1 | Ephemeroptera | 70 | 80 | 43 | 46 | 14 | 15 | 11 | 21 |
| 2 | Plecoptera | 0 | 0 | 1 | 3 | 1 | 2 | 0 | 0 |
| 3 | Megaloptera | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | Trichoptera | 31 | 4 | 3 | 48 | 18 | 10 | 27 | 16 |
| 5 | Diptera | 2 | 3 | 0 | 3 | 1 | 0 | 1 | 0 |
| 6 | Pupa | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 7 | Non Insect | 3 | 0 | 0 | 5 | 0 | 1 | 4 | 0 |
| | TOTAL | 106 | 88 | 47 | 105 | 35 | 28 | 43 | 38 |

Ephemeroptera



Baetidae



Heptageniidae

Discussion

1) There are some limitations in this study which may contribute to the research error:

- research site
- time
- manpower
- equipment

Discussion

2) Suggestion:

- extra careful & considerable in choosing a suitable sampling point
- time management & planning
- repetition of work/increase sample size
- Research in group is preferable (in serious research case)

Discussion

3) Suggestion:

- Chlorophyll a measurement will be a more appropriate method
- Classification shall be go up to Family level

Conclusion

In the case of Kurokawa River:

- 1) There is an interaction found between habitat and sunlight availability.
- 2) Habitat seems to be a stronger indicator of the abundance of grazer
- 3) More scientific findings are needed to examine the hypothesis

References

R. W. Merritt & K. W. Cummins (1996) An introduction to the Aquatic Insects of North America (Third Edition). Kendall/Hunt Publishing Company

谷田一三，丸山博纪&高井干夫(2000)原色川虫图鉴.

Terima Kasih banyak banyak

