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# *Corbicula fluminae* Population and Distribution in Pergau Lakes

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**Abstract.** Pergau Lake was one of the spot for harvesting *C. fluminae*. However, *C. fluminae* harvesting was prohibited for several years before. Yet, the information on this clam compositions and distribution at this area is still unknown. Therefore, a survey has been done to determine the composition of *C. fluminae* at five points in Pergau Lakes. The method used for *C. fluminae* collection of 100m lines per station by boat. The weight per bucket and the size of *C. fluminae* (length, width and height) were measured using digital venier caliper. Five points were selected but only four points obtaining alive *C. fluminae*, while in others, only dead *C. fluminae* were found. There were also differences in the length, height and width of *C. fluminae* at each point. This shows that the growth rate and lifespan of *C. fluminae* at each point are different. Therefore, the periodically rotation harvesting method can reduce the mortality of *C. fluminae* and increase the socio-economic activity in the area.

## 1. Introduction

*C. fluminae* was known as invasive clam in Europe that received positive and negative effects after being introduced in their ecosystems [1]. However, in order to overcome the negatives impact, lot of researches done to know more about this clam and solve the negative impacts such as competitions for native species, vector of parasites and pathogens, massive mortalities that can effect water quality, bio fouling, bio amplification of contaminants, and clogging the drainage system [2]. On the other hand, *C. fluminae* offers benefits such as; provide new habitat for other benthos, act as a bio indicator for pollution as well as filter for contaminated water.

In Kelantan, *C. fluminae* is a type of shellfish known as “etak” and is commonly used by local people as snacks [3]. According to Lee *et al.* [4], *C. fluminae* composition in Kelantan is decreased due to the habitat scarce from human activities and uncontrolled harvesting from high demand. Therefore, most of suppliers of raw *C. fluminae* to satisfy these demand is comes from outside Kelantan.



Pergau Lake is one of the habitats for *C. fluminae* [5]. However, the harvesting of this clam was prohibited for current years due to uncontrolled harvesting activities. Since then, harvesting activities in that area has decreased and there is no information on the distribution and composition of *C. fluminae* reported in Pergau Lake. Therefore, this paper aims to reveal the current composition and distribution of *C. fluminae* located at this lake.

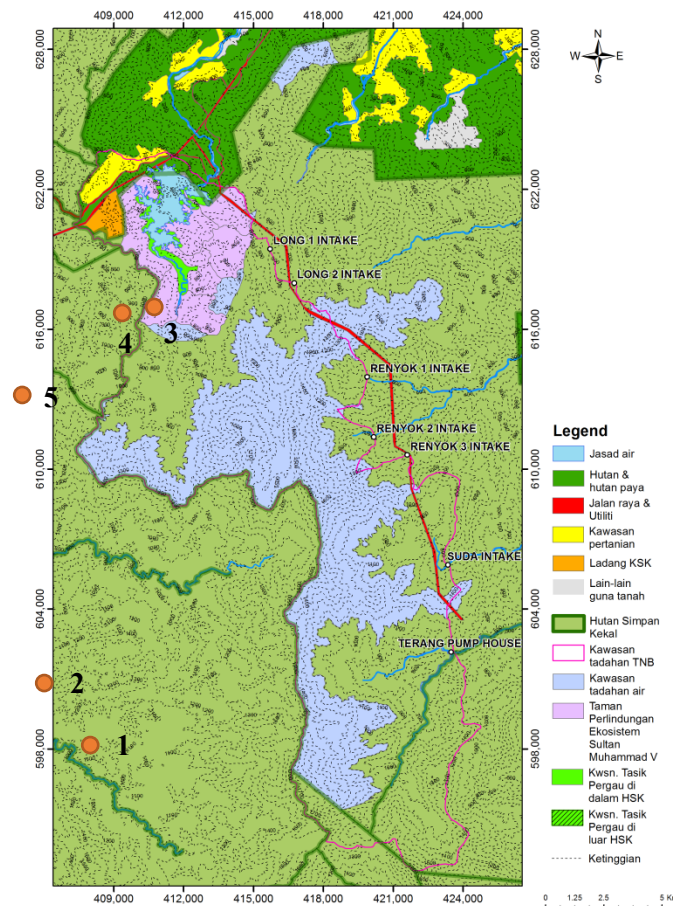
**2. Methodology**

*2.1 Study Area*

There are seven river intakes located in Pergau Lake area. Figure 1 shows the map of those seven intakes.

**Table 1.** Location and elevation for each point.

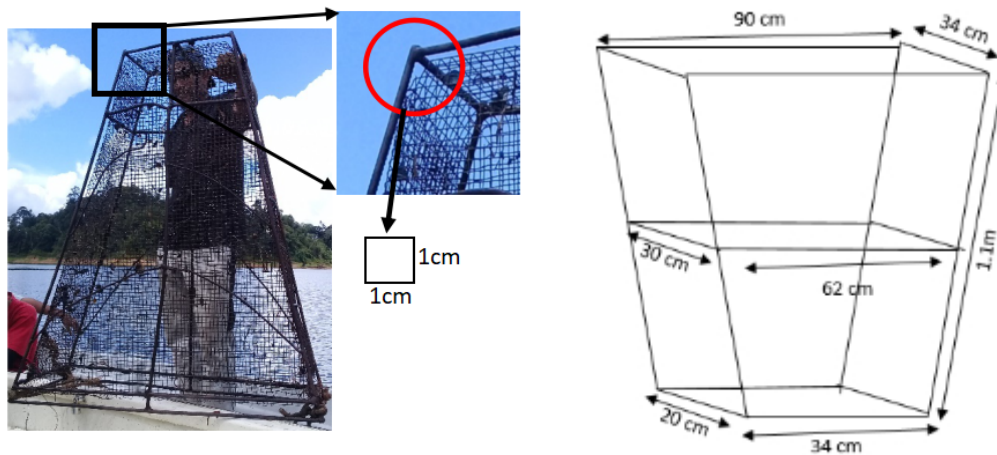
Station	Location		Elevation
Point 1	N05°36.386'	E 101°41.061'	617m
Point 2	N05°36.160'	E 101°41.319'	623m
Point 3	N05°37.134'	E 101°42.306'	631m
Point 4	N05°37.238'	E 101°42.198'	630m
Point 5	N05°37.452'	E 101°41.699'	630m



**Figure 1.** Map Pergau Lakes and location Point 1 till Point 5

### 2.2 Sampling Method

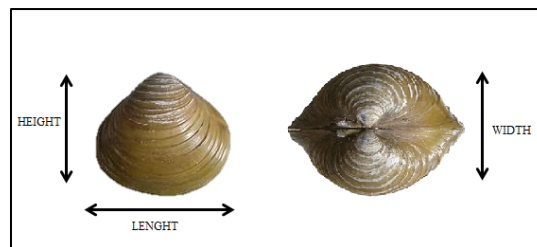
*C. fluminae* were collected using a harvester sampler tools that was modified using steel (Figure 2). The harvester tool was randomly dragged 100metres forward and backward two times for each point by boat and rope. The surviving *C. fluminae* were separated from the dead and the remaining shells before being collected in a zipper plastic bags.



**Figure 2.** Harvester sampler tools

### 2.3 Laboratory Analysis

Size of *C. fluminae* such as length, height [6] and width (Figure 3) was measured and record. The number of *C. fluminea* was calculated as compositions data.



**Figure 3.** Length, width and height measurement

### 3. Results and Discussion

A total of 649 individuals (2752.71g) of *C. fluminae* were collected at all four points. No alived *C. fluminae* was collected at Point 1; only dead *C. fluminae* and shell. Whereas, only one living *C. fluminae* was detected at Point 3. Figure 4 shows abundant of dead *C. fluminae* collected at point 1. From this study, the population of dead *C. fluminae* in Pergau Lakes can be seen. There are also factors that cause *C. fluminae* mortality such as life expectancy, low food availibltiy and space availability, hot water events, siltation loads, decreased water flow, low dissolve oxygen and extreme abiotic changes [7,2,8]. This phenomena is believed to increase the concentration of ammonia [7] at the bottom of the lake and cause *C. fluminae* to decay and die. Figure 4 shows that lot of young and small *C. fluminae* die before reaching life-span of 30 to 50mm.



**Figure 4.** Dead *C. fluminae* found and collected

The sizes of *C. fluminae* were different at each point. All *C. fluminae* collected are mature which is more than 10mm in length [5]. According to Donald *et al.* [7] *C. fluminea* at size ranged between 8.2mm and 8.5mm is more fragile towards ammonia compare to 11mm above. The largest size of *C. fluminae* found is available at Point 2 with an average length of 28.89mm (range from 21.07mm to 33.74mm) followed by Point 5 with an average length of 22.62mm (range from 15.97mm to 25.81mm). At meantime, Point 4 composed of *C. fluminae* with length 12.65 mm in average (range 11.29mm to 14.76mm). Whereas an individual found at Point 3 with length 21.07mm. However, average height *C. fluminae* from Point 2 is lower than *C. fluminae* collected at Point 3 even the length average is the highest. This shows the growth of *C. fluminae* is differs at those points. Table 2 shows the composition, size (length, width and height) and weight of *C. fluminae* collected at 5 points. Aweng *et al.* [5] mentioned the size of *C. fluminae* is depends on food availability and substrates type.

**Table 2.** Size of *C. fluminae* collected at each point

Point		1	2	3	4	5
No. Individu		0	43	1	17	588
Weight		0	625g	2.71g	25.00g	2.10Kg
Average (mm)	Length	0	28.90	21.07	12.65	22.63
	Height	0	16.26	21.32	8.50	13.77
	Width	0	25.08	18.26	11.38	19.98
Min (mm)	Length	0	21.07	21.07	11.29	15.97
	Height	0	12.32	21.32	7.50	10.65
	Width	0	18.26	18.26	10.30	14.62
Max (mm)	Length	0	33.74	21.07	14.76	25.81
	Height	0	19.20	21.32	9.56	16.68
	Width	0	29.35	18.26	12.99	26.95

#### 4. Conclusion

The uneven growth and survival of *C. fluminae* at each points indicates the need for rational harvesting activities to ensure that *C. fluminae* is harvested sustainably and to prevent premature death phenomena. Therefore, it is recommended that monthly *C. fluminae* harvesting be organized. Indirectly, the program will develop the eco-tourism industry in Pergau Lake. In line with this, the economic value of the local community can also be increased; in turn can help in promoting and preserve the cultural heritage of Kelantan people which makes *C. fluminae* as traditional snacks (smoked etak).

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### References

- [1] Rosa I C, Joana L P, Raquel C, Joaõ G, MariA P P and Fernando G 2014 *Ann. Limnol. - Int. J. Lim.* **50** 37-47
- [2] Sousa R, Antunes C and Guilhermino L 2008 *Ann. Limnol. - Int. J. Lim.* **44(2)** 85-94
- [3] Dee K H, Abdullah F, Md Nasir S, Appalasamy S, Mohd Ghazi R and Eh Rak A 2019 *BioMed research international 2019* (9596810) doi:10.1155/2019/9596810
- [4] Lee S W, Faiz A A ,Zharif R, Akrimah Y and Eh Rak A 2018 *International Journal of Aquatic Science* **9(2)** 120-121
- [5] Aweng E R, Nur Fasihah Ab K and Sharifah Aisyah S O 2018 *International Journal of Engineering & Technology* **7(2.29)** 279-281
- [6] Zaweem N M S, Aweng E R, Sukree S, Sharifah Aisyah S O and Liayan A F 2017 *Journal of Resource Science and Technology* **7** 76-83
- [7] Donald S C, Jennifer L S, Naomi L C and Joseph R B 2005 *Journal of the North American Benthological Society* **24(2)** 369-380
- [8] Martina I I, Carlos A, Guilhermino L and Sousa R 2011 *Biol Invasions* **13** 277-280