

**REPRODUCTIVE BIOLOGY, GROWTH AND MORTALITY OF *TYLOCHROMIS*
BANGWELENSIS (REGAN, 1920) IN BANGWEULU LAKES AND SWAMPS
COMPLEX FISHERY**

BY

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**A dissertation submitted to the University of Zambia in partial fulfilment of the
requirements for the award of the Degree of Master of Science in Tropical Ecology and
Biodiversity.**

The University of Zambia

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DECLARATION

I, **Kabundula Kahilu**, do hereby declare that this piece of work entitled, 'Reproductive biology, Growth and Mortality of *Tylochromis Bangwelensis* (Regan, 1920) in Bangweulu Lakes and Swamps Complex Fishery is my own, and that all the works of other persons have been duly acknowledged, and that this work has not been previously presented at the University of Zambia and indeed at any other University for similar purposes.

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CERTIFICATE OF APPROVAL

This dissertation by **Kabundula Kahilu** is approved as fulfilling part of the requirements for the award of the Degree of Master of Science in Tropical Ecology and Biodiversity of the University of Zambia.

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ABSTRACT

This study investigates selected aspects of the population biology of *Tylochromis bangwelensis* that included: reproductive biology, growth and mortality in Bangweulu Lakes and Swamps Complex Fishery. The main objective was to determine if stocks of the species are under or over exploited in the fishery. A sampling area (S 11° 19' 24.6" and E 029° 34' 16.9") that represented the main landing sites was selected. The fish samples were procured from the local fisher's catches for seven months from March 2019 to September 2019. Length measurements were taken from each fish specimen using a fish measuring board. Weight was measured using an electronic balance to the nearest one gramme. The reproductive biology were investigated by examining fish sex and maturity stages of the gonads. Length frequency histograms were also used to determine spawning seasonality. Growth parameters L_{∞} and k of the species were determined using the Ford-Walford plot. Mean lengths representing each peak from peaks of length frequency histograms plotted for all the specimens were collected. Analysis of Variance was performed on all quantitative data using GenStat software, 2019. It was found that this species of fish is a seasonal breeder, different peaks were observed on the length frequency histogram graphs plotted from specimens collected during each month an indication of the presence of breeding seasonality in this species. The asymptotic length, L_{∞} was estimated at 348mm and k was found to be 0.837. Total mortality coefficient (Z) was found to be 1.87, natural mortality coefficient (M) was estimated at 0.03, fishing mortality coefficient (F) was 1.84 and exploitation rate was 0.98. *T. bangwelensis* in the fishery is being exploited beyond optimum level since exploitation rate is above 0.50.

Therefore, the study recommended that fisheries management plan should not aim at increasing the catch of *T. bangwelensis* stock from the fishery since it is already diminishing.

Keywords: *Reproductive biology, Exploitation, growth, mortality, T. bangwelensis, Bangweulu Lakes and Swamps Complex Fishery*

DEDICATION

I am indebted to my wonderful family for the moral support they rendered to me, not only through the completion of this dissertation but throughout my life. I therefore dedicate this dissertation to my caring and loving father Mr. Moses Kabundula; mother Mercy Nawa; sister, Ruth, my wife Sandra Ngalasa and brothers, Chrispin, Mwiya, Vincent, Pelekelo, Misheck, Kabundula, Nalishebo, and Brian who helped me so much and gave me their fullest understanding by foregoing the attention and support they needed most from me and believed in diligence and pursuit of academic excellence.

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LIST OF SYMBOLS

$^{\circ}\text{C}$	Degree Centigrade (Degree Celsius)
EXP	Exponential
L_{∞}	Asymptotic Length
Lc	Smallest Length among the Measured Total Lengths of the Fish Specimens.
LM	Mean Length
LT	Predicted Length at different Time
T	Time
To	The Hypothetical Age at Which Length is Zero

LIST OF ABBREVIATION

ANOVA	Analysis of Variance
D F	Degree of freedom
E	Exploitation
F	Fishing mortality
FAO	Food and Agriculture Organisation
FWP	Ford-Walford plot
IN	Natural Logarithm
K	Growth coefficient
M	Natural mortality
ML	Mean length
T	Temperature
TL	Total length
Z	Total mortality

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

The fishery of the Bangweulu Lakes and Swamps Complex, in Luapula Province, Northern Zambia (Fig. 1), is a multi-species fishery. It is an important fishery ranking second after Lake Tanganyika in terms of fish output as it produces an average catch of about 15,000 metric tonnes of fish annually which is approximately 24.4% of the total catch for the whole country. As a result of high fishing pressure from both the large number of permanent residents in the Swamps as well as from the seasonally migrating fishermen from surrounding areas, the total fish catches have as a result been decreasing as recorded by the Department of Fisheries (2010).

The fishery is characterized by generally small mesh sizes (mode at 38 mm). This causes the fishing mortality to rise sharply on most species from around 14-16 TL. This supports the general impression that people have that the fish trade is based on small species. As the commercial market seems indiscriminate towards fish sizes, and as the small mesh sizes are indeed catching significantly 'more' fish, the necessary incentives of changing the fishing pattern may not be existing at present. It is feared that the fishery of the Bangweulu system has undergone some alarming changes in recent years, indicated by a decrease in the mean size of fish caught and a general decline in catch per unit effort (Musonda and Ngosa, 2010).

This fishery plays a vital role in contributing to national food security about 30% of the animal protein intake in Zambia is from fish. Furthermore, the fishery, particularly due to its mainly rural setting and open access, makes a contribution to rural welfare in terms of alleviating poverty and provision of affordable protein.

The fishery is, however, currently experiencing heavy resource exploitation that directly affect fish stocks and fish production. This is evident from a general decline in fish catch per unit effort as a result of intense fishing pressure and unsustainable fishing methods. As a consequence, the ability of the fishery and associated wetlands supports some 15,000 fishers and a large number of people, mostly women, who earn their livelihood from artisanal fish processing and trade, there

For instance, in 1990, this fishery produced a total catch of 16,383 metric tonnes but in 1999, this fishery recorded a total catch of 9,101 metric tonnes only. This is in contrast with some scholars such as Kolding et al. (2003); Kolding (2011); Kolding and van Zwieten (2011) who argued and presented evidence as they postulated that, the Bangweulu lakes and swamps complex fishery is being under exploited. In 2011, the fishery recorded a total catch of 14,000 metric tonnes which implies that there was an increase in the yield. It remains unknown whether the stock of fish in Bangweulu lakes and swamps complex fishery is being under exploited or over exploited.

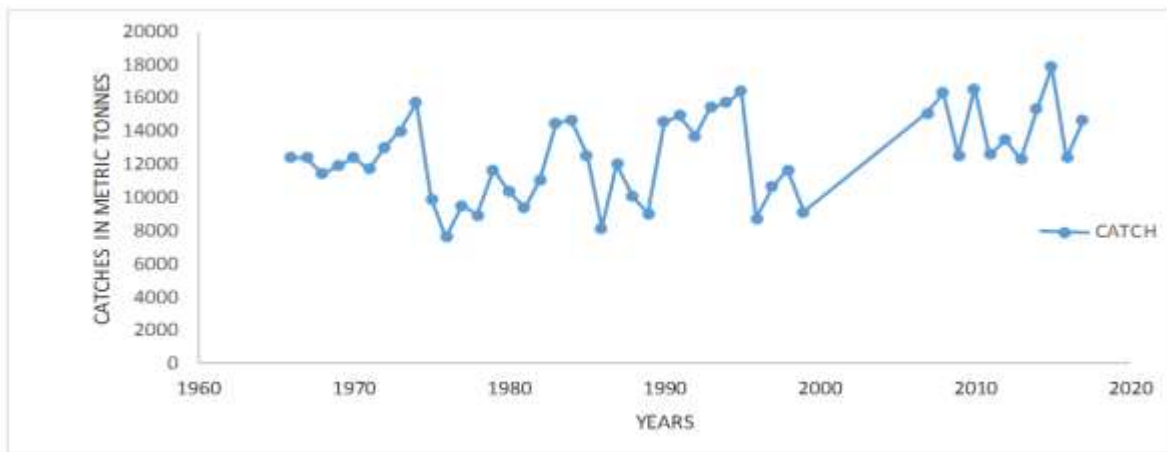


Figure 2: Fish catches from Bangweulu Lakes and Swamps Complex Fishery from 1966 to 2017 (source: FAO Fisheries report, 2010, appendix B).

Figure 2 shows fish catches in Bangweulu Lakes and Swamps Complex Fishery from 1966 to 2017. It further indicates that the catches were decreasing in the fishery due to increase in fishing pressure and unsustainable use of fishing methods.

1.2 Fishes of the Bangweulu Lakes and Swamps Complex Fishery

The Bangweulu Lakes and Swamps Complex Fishery is endowed with numerous fish species. A total of 87 fish species have been recorded in the Bangweulu lakes and swamps complex out of which 33 species are of economic importance (Evans, 1978). The Cichlids, *Oreochromis macrochir* (Green head tilapia), *Coptodon rendalli* (Red breast bream), *Tilapia sparmanii* (Banded Tilapia), and *Serranochromis angusticeps* (Thin face largemouth) are very common. Characids particularly, *Alestes machropthalmus* and *Hydrocynus vittatus* are also very abundant.

Mortimer (1965) adds that other fish species present are *Serranochromis robustus*, *Serranochromis macrocephalus*, *Serranochromis melandi*, *Clarias gariepinus*, *Clarias theodore*, *Brycinus lateralis*, *Mesobola brevianalis*, *Schilbe mystus*, *Schilbe bangwelensis*, *Mormyrops deliciosus*, *Synodontis nigromaticulatus*, *Marcusenius macrolepidotus*, *Petrocephalus catostoma*, *Auchenoglanis occidentalis* and *Barbus spp* and *Tylochromis bangwelensis*.

The pelagic environment of the Bangweulu complex is occupied by a small clupeid, *Angraulicypris sp* locally known as Chisense. Stocks of this species are not yet fully exploited as is the case with other inshore fish stocks in the Bangweulu system (Evans, 1978). Appendix C shows some of the species found in Bangweulu Lakes and Swamps Complex Fishery including their common names.

1.3 Artisanal fishing in Bangweulu lakes and swamps complex

The latest frame surveys of 2007 and 2011 results recorded 15, 113 and 15, 676 fishers respectively as actively involved in fishing activities (Mbamwai, 2007). Increased fisher's population and fish demand in the fishing communities has exacerbated the dwindling of fish stocks in Lake Bangweulu fishery see table 1.

Table 1: Number of different types of fishing craft, fishing villages and fishers between 2007 and 2011 recorded on the Bangweulu Lakes and Swamps Complex Fishery

	Numbers of fishing craft, fishing villages and fishers				
Year	Canoes	Plank Boats	Fibre Glass Boats	Metal Boats	Fishing Villages
2007	10,534	6	720	21	787
2011	11,585	16	502	0	789

Source: Department of Fisheries, 2010: Reports of the Statistics Unit

Table 1 reveals that canoes are the most used boat type in the entire Bangweulu “Complex” followed by fibre-glass boats. Metal boats are almost non-existent in this fishery as their representation is only 0.05%. This is logically due to the fact that canoes are better to navigate in the swamps, but unsafe in open lakes where bigger boats are more preferred (Evans, 1978).

It is estimated that there are approximately 15,676 fishers in 2011 operating on the lakes and swamps complex. Fishers still use mostly dugout canoes or fibre glass “banana boats” and multifilament gillnets. Although illegal, large hand-drawn seine nets, of more than 100metres in length and mesh sizes less than 1mm, are also common. Other types of fishing gear used in the Bangweulu Lakes and Swamps Complex Fishery include; Long lines (to catch *Hepsetus odoe* and *Clarias* in floodplains), Spears (to catch Barbels in lagoons), Traps and weirs used in drainages to catch *Tilapia sparmanii* (Mortimer 1965). Fishing is also commonly associated with beating of water to drive fish into gillnets, a method locally called kutumpula fishing' (a technique which drives the fish into surrounding gillnets by beating into the water in the Bangweulu Lakes and Swamps Complex Fishery (Mortimer 1965).

The fishery has produced an average catch of 15,000 tonnes of fish during the last twenty years. Available data indicates that the catch per boat has decreased from over 4 kg per boat per day in 2007 to approximately 2.5 kg in 2011. The inshore areas of the Bangweulu complex were at one time important for the highly valued breams such as *Coptodon rendalli* (Red breasted bream). This is not the case at present as the catch is dwindling due to high fishing pressure (Evans, 1978)

Table 2: Trends in fishing effort, number of different types of fishing and catch in the Bangweulu Fishery between 1965 and 2011

	1965	1971	1973	1975	1983	1992	2007	2011
Fish production (t)	13,111	11,728	14,032	9,881	14,467	10,629	15,098	13,471
No. of boats	6,437	5,475	8,739	4,500	–	6,154	11,281	10,158
No. of fishers	5,015	5,198	-	7,696	7,969	5,134	15,113	14,265
No. of gill nets	-	878	-	-	3,247	21,485	47,130	21,334
CPUE- boats	2.04	2.14	1.61	2.20	13.24	1.73	1.34	1.33

Source: Department of Fisheries: Reports of the Statistics Unit, 2011.

According to the records provided by the Department of Fisheries, the last comprehensive frame surveys of the Bangweulu Lakes and Swamps Complex Fishery were conducted in 2007 and

2011 (see Table 3). The surveys indicate that gill nets are the most commonly used fishing gear in the fishery some of which are small mesh size. However other fishing gears, some of which are destructive and illegal are common in the fishery. Baskets and seines fishing gears are illegal fishing equipment according to the Fisheries Act but are very common in the fishery as shown in table 3. Records have shown that the fishery has undergone drastic changes indicated by a decrease in production output from an average 12, 000 metric tonnes in 1970 to 6, 000 metric tonnes in 2007 (Mbamwai, 2007).

Unfortunately, with the exception of gill nets, no information is available on the type of gears used in 2012 Frame Survey, and thus reference is made to numbers in the 2007 survey (see table 3 below). The dominant fishing gear used in the Bangweulu Fishery is gillnets, but baskets/traps, long lines and seine nets are commonly used (Mbamwai, 2012).

Gill net fishing is common throughout the fishery in the open lakes, lagoons and swamps. Mesh sizes of 1, 1^{1/2}, 1^{3/4}, 2, 2^{1/2}, 3, 3^{1/2}, 4, 4^{1/2}, 5, 5^{1/2}, 6, and 6^{1/2} inches (25 – 165mm) are most common. In general gillnets of mesh sizes up to 63mm (2^{1/2}) and of ply 2 are used more than the larger mesh sizes (76-165mm, i.e. 3-6^{1/2}inches). Stratum II has the majority of the new trawl (cutter) found in this fishery (Kolding, 2011).

Table 3: Number of different types of fishing gears recorded on the Bangweulu Lakes and Swamps Complex Fishery in 2007 and 2012

	2007	2011
Fishing gear	Number	Number
Gill nets	47,130	21,334
Seine nets	3020	-
Chisense nets 8mm	113	-
Chisense ITN	445	-
Tilley Lamps	310	-
Cutter ½ trawl nets	309	-
Long line and hooks	7,386	-
Baskets and traps	792	-

Source: Department of Fisheries: Reports of the Statistics Unit, 2007 and 2011.

There is a general impression with people in the District that the fish stocks are most heavily utilized at present. Total yields however, although fluctuating, seem not to have fallen

significantly see figure 2 above. People attribute the changes to an intensified utilization of small meshed gillnets, seining, as well as 'kutumpula fishing' (a technique which drives the fish into surrounding gillnets by beating into the water (Mortimer 1965).

1.4 *Tylochromis bangwelensis* (Regan, 1920)

Tylochromis bangwelensis (Regan, 1920) is one of the most common fish species in Bangweulu lakes and swamps complex fishery. This fish species is found in the whole Luapula River, Lake Bangweulu, the Chambeshi (upper Congo River basin) in Democratic Republic of Congo, upper Lualaba and lakes Mweru and Upemba River and its swamps (Musonda and Ngosa, 2010). It is a hump-back bream freshwater fish species that occupies the benthopelagic regions. Nsangula is the local name for this species and belongs to the family cichlidae. Studies by Griffith (1977) have shown that *T. bangwelensis* is mainly a zooplankton feeder. The species' predominant food is the lake-fly in its larval aquatic stages and also feeds on plants.



Figure 3: *Tylochromis bangwelensis* from Bangweulu Lakes and Swamps Complex fishery

T. bangwelensis is a maternal mouth brooder that does not pair-bond and has Maximum length of 27.5cm. The female *T. bangwelensis* breeds during the rainy seasons and the young are favorite prey for the tiger fish. For the purpose of offering parental care, *T. bangwelensis* keeps closer

inshore among *Eleocharis* sp and other vegetation. Young fish still attached to the yolk sac can be found in the mouth of a parent which is at the verge of spawning again. At high water, the fish move from the lake to their breeding grounds in adjacent swamps to spawn (Griffith, 1975).

The Cichlid *T. bangwelensis* of the Bangweulu Lakes and Swamps Complex fishery is being targeted in this study because it is the most abundant in the fishery and targeted species by the community as it is considered a taste fish and an important component of a large artisanal and recreational fishery in this region. On average, *T. bangwelensis* species contributes about 58% of the fishers' catches (Musonda and Ngosa, 2010).

1.5 Statement of the problem

There are two contradicting views regarding fish stock sizes and exploitation of fish stocks of the Bangweulu Lakes and Swamps Complex Fishery.

Musonda and Ngosa (2010); Mbamwai (2012) and Evans (1978) argued that fish stocks are considered over-exploited due to high fishing pressure which has resulted to the total fish catches decreasing in the area as recorded by the Department of Fisheries, 2010 (see appendix B). On the other hand, Kolding et al. (2003); Kolding (2011); Kolding and van Zwieten (2011) presented evidence as they contended that, the Bangweulu Lakes and Swamps Complex Fishery is being under exploited. This is based on the premise that the fishery, like other tropical wetland fisheries, is highly resilient to exploitation pressures due to natural protection by aquatic vegetation and that fishers use a multitude of gears to exploit all sizes and species of fish in a balanced harvesting strategy of all trophic levels.

This implies that there has not been any regular monitoring of reproductive biology, growth and mortality of *T. bangwelensis* in the Bangweulu Lakes and Swamp Complex Fishery. This study therefore aimed at finding out if *T. bangwelensis* stocks in the Bangweulu Lakes and Swamps Complex Fishery are over or under exploited using length-based fish stock assessment methods. Such methods are reliable if the species have spawning season and this was one of the reasons for investigating some aspects of the reproductive biology of the species *T. bangwelensis*.

1.6 Objectives

1.6.1 General objective

To study selected aspects of the population biology of *T. bangwelensis* in Bangweulu Lakes and Swamps Complex Fishery.

1.6.2 Specific objectives

The specific objectives of this research are:

- i. To determine spawning seasonality of *T. bangwelensis* in Bangweulu Lakes and Swamps Complex.
- ii. To examine growth rate of *T. bangwelensis* in Bangweulu Lakes and Swamps Complex.
- iii. To determine the levels of exploitation of *T. bangwelensis* in Bangweulu Lakes and Swamps Complex.

1.7 Hypotheses of the Study

This study tested the hypotheses that:

- i. *T. bangwelensis* has no spawning seasonality in Bangweulu Lakes and Swamps Complex Fishery.
- i. There are no length frequency histogram peaks for *T. bangwelensis* in Bangweulu Lakes and Swamps Complex Fishery suggesting no spawning peaks.
- ii. *T. bangwelensis* in Bangweulu Lakes and Swamps Complex Fishery is not over exploited.

1.8 Significance of the Study

The Bangweulu lakes and swamps complex fishery is one of the most important Fisheries in Zambia. It has been ranked second largest producer of fish from Lake Tanganyika in Zambia. This Fishery has in the past produced catches of about 15,000 metric tonnes of fish annually which is approximately valued at K 300,000,000 or USD 20, 689, 655 per year for the whole country (Zambia Department of Fisheries, 2010).

As a wetland, the Bangweulu lakes and swamps complex fishery has many values and functions. Some values of the Bangweulu lakes and swamps complex are: ground water recharge, ground water discharge, flood control, removal of toxic substances from the surface, nutrient retention as well as food chain support and tourism (Chabwela, 1992 and Debenham, 1952). All these roles that are played by the Bangweulu lakes and swamps complex fishery maintain the ecosystem of the Luapula River and surrounding areas in good state and provide a good habitat for the many living organisms that the ecosystem supports.

The high aesthetic values of the Bangweulu Lakes and Swamps Complex that range from natural vegetation such as floating mats over deeper water, and rooted Phragmites, reed beds and sedges in shallower water. There are open pools and lagoons covered with water lilies, and other aquatic plants, beautiful beaches and presence of some endemic species of birds and the black Lechwe (*Kobus leche smithemani*) all promote tourism (Grimsdell and Bell, 1975).

This study will improve on the understanding of the present status of the Bangweulu lakes and swamps complex fishery and will recommend measures that can be used in management and conservation of fish species in the Bangweulu system.

It is also envisaged that the findings of this study may be of great value to policy makers in the Ministry of Fisheries and Livestock and other stakeholders as it will enlighten them on the reproductive biology, growth, mortality of *T. bangwelensis* in Bangweulu Lakes and Swamps Complex Fishery. *T. bangwelensis* is considered a spot fish and is an important component of the artisanal and recreational fisheries in this region (Griffith, 1975). As a cichlid, the species is the most important in Zambia's aquaculture (Mudenda *et al*, 2005).

1.9 Limitations of the study

This study could not be conducted without limitations. Whereas the sampling methods were good, the coverage of the data from March to September meant that some of the critical months such as October and November left out.

December, January and February were not sampled due to fishing ban and the other limitation of this study could be the use of fishers' catches as a result of gear selectivity.

CHAPTER TWO

LITERATURE REVIEW

2.1 Reproductive biology of fish

Griffith (1977) demonstrated that cichlids in Bangweulu Swamps, bred during summer. Breeding fish were caught in baited experimental fish traps in the pool in front of Chikuni and fish with ripe eggs were also seen at the end of the rainy season. This, and the large size range caught throughout the year, indicated that the breeding season extended over many months in summer. Fish sampled from October to November were found to be maturing, and none of the gonads were ripe yet. Fish sampled in March had finished spawning, though some showed freshly spent gonads. A large size range of juveniles were observed in April, from fish that had already reached 100mm to some tiny 20mm long fish that could only have been spawned a few weeks earlier, perhaps after late rains in March.

Griffith (1977) further stated that cichlids in Bangweulu Swamps appeared to have an extended breeding season with a summer spawning peak being the highest, their mouth brooding reproductive method probably made them less dependent on flooding for successful breeding, though juvenile survival and growth were highest when the plains flooded. Breeding adults seemed to remain in deeper water and that a distinct breeding peak was identified during the rainy season (December to February) for all non-cichlid species and most of the cichlids only *C. rendalli* and *Serranochromis. mellandi* showed an extended breeding season (van Zwieten and Kapasa, 1996). The above study did not critically look at the reproductive biology, growth and mortality of *T. bangwelensis* the parameters that have been covered in the current study.

In a study by Peña-Mendoza *et al* (2005) on reproductive biology of *Oreochromis niloticus* (Perciformes: Cichlidae) at Emiliano Zapata dam, Morelos, Mexico was carried out. The reproductive season of tilapia was studied by monthly samplings from February 1999 through February 2000. A sample of 50 fish was taken from the commercial catch (castnet, 6.5 cm of mesh size). The study further found that rainy (August) and dry (February) seasons were the breeding period. The study was done in Mexico, it largely focused on reproductive biology of *O. niloticus*. The study did not take into consideration the reproductive biology, growth and mortality of *T. bangwelensis*, hence the need for the study.

2.2 Growth of Fish

Montcho *et al* (2015) carried out a study on population parameters of *Oreochromis niloticus*, introduced in Lake Toho in 1995. The study presented useful information on the population parameters of *O. niloticus* but did not present information on the reproductive biology, growth and mortality of *T. bangwelensis* which was highly valued in the current study.

A study by Uneke and Nwani (2014) on stock assessment of *Tilapia zilli* in a Nigerian tropical river basin was studied. While the aforementioned study focused on the stock assessment of *T. zilli* in a Nigerian tropical river and results demonstrated that *T. zilli* had a small asymptotic length of 214mm. In Zambia with different water systems and fish species, it was not known whether the earlier results would be evident.

Adeyemi and Akombo (2012) carried out a study on age, growth and mortality of two dominant cichlids collected from an ox-bow lake on the tributary of River Benue in Nigeria were studied between October 2006 and September 2008. Sixty samples of fish species comprising thirty *Tilapia zilli* and thirty *Oreochromis niloticus* were obtained from the artisanal fishers from the common landing site along the lake. The aforementioned study was insightful in that it demonstrated how the age, growth and mortality of two cichlids. However, while the reviewed study focused on age, growth and mortality of two dominant cichlids collected from an ox-bow lake on the tributary of River Benue in Nigeria, the current study concentrated on the reproductive biology, growth and mortality of *T. bangwelensis* Bangweulu lakes and swamps complex Fishery particularly in Samfya District.

Similarly, Makeche *et al* (2017) carried out a study on growth and mortality of *Oreochromis andersonii*, *Oreochromis macrochir* and *Oreochromis niloticus* of the Kafue Floodplain fishery between September, 2015 and November, 2015. This study was aimed at investigating the growth and mortality of mouth brooding tilapiines of the Kafue Floodplain fishery. The study found that the decrease in fish catches in the Kafue Floodplain fishery cannot be attributed to over-fishing due to natural mortality such as predation, disease and competition. Therefore, the current study differs from Makeche's study as it specifically focused on the reproductive biology, growth and mortality of *T. bangwelensis* in Bangweulu Lakes and Swamps Complex Fishery.

Emilio *et al* (2010) carried out a study on growth, mortality and reproduction of the blue tilapia *Oreochromis aureus* (Perciformes: Cichlidae) in the Aguamilpa Reservoir, Mexico. Tilapia production has increased in Aguamilpa Reservoir, in Nayarit, Mexico, in the last few years and represented a good economic activity for rural communities and the country. Growth parameters, mortality and reproductive aspects for 2413 specimens of blue tilapia *Oreochromis aureus* in this reservoir were determined. The growth parameters L_{∞} , k , and t_0 of the von Bertalanffy equation were estimated using frequency distribution of length through ELEFAN-I computer program in which the study reviewed that the asymptotic length was large. The reproductive cycle and size of first maturity were established using the morph chromatic maturity scale.

A study by Kolding and Van Zwieten (2006) found that flooding of the marginal areas and increased river flows result in access for fish to optimal spawning habitats on the flood plains and better conditions for growth and survival of juveniles. It is also argued that, the gill nets that fishers are using become ineffective due to floods since mean water levels of the Bangweulu lakes and swamps complex Fishery increase.

In addition, oligotrophic environments, such as the Bangweulu Wetlands, seasonal rains bring nutrient inputs from rivers and the flooded marginal areas, which are important in promoting fish production. This is largely because of decomposition of flooded terrestrial vegetation and decaying organic matter such as dung, terrestrial grass, shrubs and trees which results in increased plankton coupled with fish production (Kolding, 2011). Furthermore, flooding of the marginal areas and increased river flows result in access for fish to optimal spawning habitats on the flood plains and better conditions for growth and survival of juveniles. It is also argued that, the Gill nets that fishers are using become ineffective due to floods since mean water levels of the Bangweulu lakes and swamps complex Fishery increase (Kolding *et al.* 2003).

Griffith (1978) further established that, since detritus and algae (especially periphyton) are available throughout the year, food might not be a limiting factor to the growth of cichlids especially *T. bangwelensis* that also feeds on macrophytes, zooplanktons and aquatic insects. Bangweulu lakes and swamps complex like other tropical wetland fisheries, is highly resilient to exploitation pressures due to natural protection by aquatic vegetation, and that fishermen use a

multitude of gears to exploit all sizes and species of fish in a balanced harvesting strategy of all trophic levels.

Griffith (1978) also demonstrated that wet season flooding in the Bangweulu Swamps stimulates greater primary and secondary production thereby promoting growth among fish in this fishery. The fast growth of aquatic flora in the Bangweulu Swamps in rainy season creates good habitats for fish.

Lusenga (2012) found that increase in rainfall during the rainy season promotes the growth of algae, phytoplankton, zooplanktons and diatoms that provide food resources to the fish of the Bangweulu Lakes and Swamps Complex fishery. Lusenga (2012) further demonstrated that by the end of the dry season the few remaining adult fish are able to breed when the floods arrive. The offspring they produce are spawned into an ideal environment, the newly flooded plains provide warm, oxygenated and nutrient-rich water. With the abundance of food, growth is rapid, and with so much habitat and predators few and far between, survival is very high. While at the beginning of the floods it seemed there were no fish, with adults being few and dispersed, and juveniles tiny, the end of the floods see the plains teeming with masses of young fish.

Valdesalici and Wildekamp (2005) explained that individual growth of fish in the Bangweulu Lakes and Swamps Complex fishery is affected by food availability, temperature, sex of fish, fish reproductive status, fish density and variable allocation to growth, among other factors. Food availability promotes fish growth while food scarcity, especially in the dry season months of April to November, retards fish growth. Juveniles that hatch at the beginning of the rainy season when food is available grow faster than juveniles that hatch at the end of the rainy season (Zambia Department of fisheries, 2008). Griffith (1978) found that sex affects fish growth because male fish grow faster than female fish. Fish that is in its ripe state of reproduction grows slower than a fish that is in immature reproductive status.

Mwape (2003) also demonstrated that wet season flooding in the Bangweulu Lakes and Swamps Complex fishery stimulates greater primary and secondary production thereby promoting growth among fish species in this fishery. Deeper water refuges are critical for the fish population in that fish can take shelter under vegetation and able to escape some fishing pressure, predation, heat, desiccation and exhaustion.

2.3 Mortality of fish

Musonda and Ngosa (2013) explain that industrial activities in the area of Bangweulu Wetlands Complex are negligible. The region has few other resources that can be exploited and thus economic development and livelihood opportunities are minimal. This has considerable implications for alternative livelihoods and regional development. There is considerable use of illegal gears and fishing practices that puts heavy pressure on the juvenile fish stocks.

Musonda and Ngosa (2013) further put it that fisheries are a key economic sector in Luapula Province, contributing to food security, poverty reduction and rural-based employment. Lake Bangweulu and associated wetlands support some 15,000 fishers and a large number of people, mostly women, who earn their livelihood from artisanal fish processing and trade (Musonda and Ngosa, 2013). Other beneficiaries include fish transporters and suppliers of boats, nets, hooks, lamps, kerosene and other fishing inputs. Unfortunately, as a result of rapid population growth, few alternative income opportunities and ever increasing demand for fish, there is tremendous pressure on the fisheries of the Bangweulu system, which raises concerns over sustainability of the fish stocks, both around Bangweulu and elsewhere in Zambia.

Both biotic and abiotic factors contribute to mortality among fish of the Bangweulu Lakes and Swamps Complex fishery. Biotic factors include competition, predation and fluctuation of water levels. Some abiotic factors that contribute to mortality among fish of Bangweulu Lakes and Swamps Complex fishery are food shortages and fishing pressure (FAO- Fisheries report, 2010).

Competition is both intraspecific and interspecific among fishes of the Bangweulu Lakes and Swamps Complex fishery. Competition among cichlids fish species (intraspecific competition) and interspecific competition (competition between different species) is most common during the dry season when food resources are scarce (Appelvan and Meerendonk, 1980). The dry season (April to November) is closely associated with a decrease in plankton concentration which reduces food resources for fish in the Bangweulu Lakes and Swamps Complex fishery. Decrease in rainfall activities also promotes competition for nesting sites because cichlids are adapted to living in well-sheltered habitats (Schwank, 1994).

A study by Debenham (1952) found that when the waters of the plains begin to recede, the ideal conditions for the young fish are over. The fishermen may as well harvest the great majority of

what comes off the plain, for when this water is receded, the fish will find themselves in crowded conditions in deep water. The study also established that relative food scarcity frequently occurs during the dry seasons (April to mid-November) in the Bangweulu Lakes and Swamps Complex resulting in fishes concentrating themselves in river channels of Luapula, Chambeshi and floodplain pools. Here challenges of predation, primarily larger fish such as characids particularly, *Alestes machropthalmus* and the (Tiger fish) *Hydrocynus vittatus* and birds in the natural state, competition, parasites and stranding in drying pools become a reality.

Brelsford (1946) demonstrated that all through the dry season, lowering water levels increase the pressure on the fish population. This is the bottleneck that a few adults will have to survive in order to breed the following year. The pressure stimulates the fish of the Bangweulu to mature earlier than their counterparts living in more stable lakes and rivers.

Toews and Griffith (1979) also ascertained that fish become stranded in the vast expanse of the swamps that has few channels and pools. This exposes them to predation. Catfish, for example, have to deposit their eggs in the very shallowest, newly flooding water. The dangers posed by predators, heat, desiccation and exhaustion have led them to have a very short breeding season:

Evans (1978) reported that presently fish stocks are considered over-exploited due to high fishing pressure from both the large numbers of permanent residents in the swamps as well as from the seasonally migrating fishermen coming from surrounding areas. This was evident from the decrease in the total fish catches in the area as recorded by the Department of Fisheries, 2010 (refer to table 1 in appendix B).

Mbamwai (2007)'s frame survey demonstrated that increased fisher's population and fish demand in the fishing communities had exacerbated the dwindling of fish stocks fishery. Catch records have shown that the fishery has undergone drastic changes indicated by a decrease in production output from an average 12, 000 metric tonnes in 1970 to 6, 000 metric tonnes in 2007 (refer to appendix B).

Imai (1987) conducted a study on Fishing Life in the Bangweulu Swamps: A Socio-ecological Study of the Swamp Fishermen in Zambia. The study reported that, swamp fishermen entered into the Bangweulu swamp in the dry season when the water level decreased thereby exerting

pressure on the fish population. The swamp fishermen carried their fishing not only in the day time, but also engaged in night fishing, by which they could get nocturnal fishes effectively. They formed the production units called nsanga mainly through their affinity for fishing and selling their catch. The fishing methods selected by them differed from nsanga to nsanga in a fishing camp, accordingly, the fishing period, time and caught species also varied. Such utilization of the swamps could have contributed to high mortality of fish species in the fishery.

Ichikawa (1985) carried out a study entitled a comparison of Fishing Strategies in the Bangweulu Swamps. The study reported that the fishing strategies in the Bangweulu Swamps had no significant effect on fishing efficiency among the different fishing units in the Bangweulu Swamps. For ukusakila (fish-driving method), comparisons of efficiencies were made between the two variations of ukusakila method, among various sizes of co-fishing group, and among fishing units, none of which showed a significant difference.

It is suggested that overall fishing efficiencies were leveled out in the long run by the fishermen who dispersed their effort to different strategies and cooperated in using a small fishing ground so as not to reduce efficiencies. In group fishing, a social factor based on kinship ties was also important, although it could not be directly relevant to the optimization of fishing efficiency. The current study departed from Ichikawa (1985)'s study as it invoked on reproductive biology, growth, mortality of *T. bangwelensis* population in Bangweulu lakes and swamps complex fishery.

Another study by (Ticheler *et al.* 1996) on length based stock assessment on selected fish species was carried out in the Bangweulu swamps system. A newly proposed sampling design, involving local fishermen to carry out the majority of the test fishing, as well as recording their own commercial catches was implemented. The study found that the fishery was being depleted as more fishers were involved in the fishing activities.

The study further revealed that illegal fishing gears were used in the fishery. Data from 13 commercially important species: *Marcusenius macrolepidotus*, *Hydrocynus vittatus*, *Clarias gariepinus*, *Oreochromis macrochir*, *Tilapia rendalli*, *Serranochromis angusticeps*, *Serranochromis robustus*, *Serranochromis mellandi*, *Barbus paludinosus*, *Barbus trimaculatus*, *Petrocephalus catostoma*, *Schilbe mystus*, *Tylochromis bangwelensis* and *Tilapia sparmanii* have

been analysed in this report with respect to gear selectivity, growth rates, spawning frequency, mortality rates, and present and long-term yield assessment. The yield analysis concentrated on gillnets and seines, which are the most important fishing gear in the swamps. The study also found that fishing weirs which are mainly found in the seasonal floodplains might have an impact on the swamp fish stocks. However, for various reasons weirs could not be included in this study and therefore remain an unexplored field up to present.

Another study by Ticheler *et al* (1998) on the feasibility of participation by local fishermen in scientific fisheries data collection for stock assessment was carried out. The study revealed that, artisanal fishermen from the Bangweulu Swamps, collected length-frequency data for 1 year from their catch using the main fishing methods employed in the swamps as well as experimental gears. The study showed that it was possible to obtain large quantities of reliable and relatively cheap length-frequency data that allowed for a full length-based stock assessment, including cohort analysis. There were also indications that with a proper feedback of the findings by the research institutions to the fishing communities, the sampling method might enhance the awareness of exploitation patterns and the management consequences. This may be seen as a first step in preparing the communities to take up their role in a community-based approach in the management of the fish resources.

CHAPTER THREE

MATERIALS AND METHODS

3.1 Study location

This research was conducted in the Bangweulu lakes and swamps complex fishery (figure 4), which had an area up to 2,000 km², and was located in Luapula Province of Zambia (10 15' -12 30'S and 29 30'-30 30'E). It lied in the hollow depression in the centre of an ancient cratonic platform (Evans, 1978).

The Bangweulu Lakes and Swamps Complex consist of five principle lakes: Bangweulu; Walilupe; Chifunauli; Kampolombo; Kangwena; and a vast papyrus swamps with fringing flood plains (Figure, 1). The total area of the entire complex is 15,000 square kilometres. The Bangweulu and adjoining lakes account for 2,735 square kilometres, (18 % of the entire complex). The entire Lakes and Swamps Complex is drained in the south by the Luapula River. The Lakes and Swamps Complex contains small amounts of dissolved ions attributed to low mineralization in the lake which puts severe constraints on biological productivity of the entire system (Evans, 1978).

The region has three seasons namely the rainy season, a cool and dry season and the dry and hot season. However, because of the large water bodies, temperatures are moderated substantially. The average day temperature during the coldest month (June) is approximately 16°C whilst temperature rarely goes beyond 28°C during the hottest month (October). Rainfall is amongst the highest in Zambia, approximately 1200 mm per annum, which occurs almost entirely between April and November (Kolding, 2010).

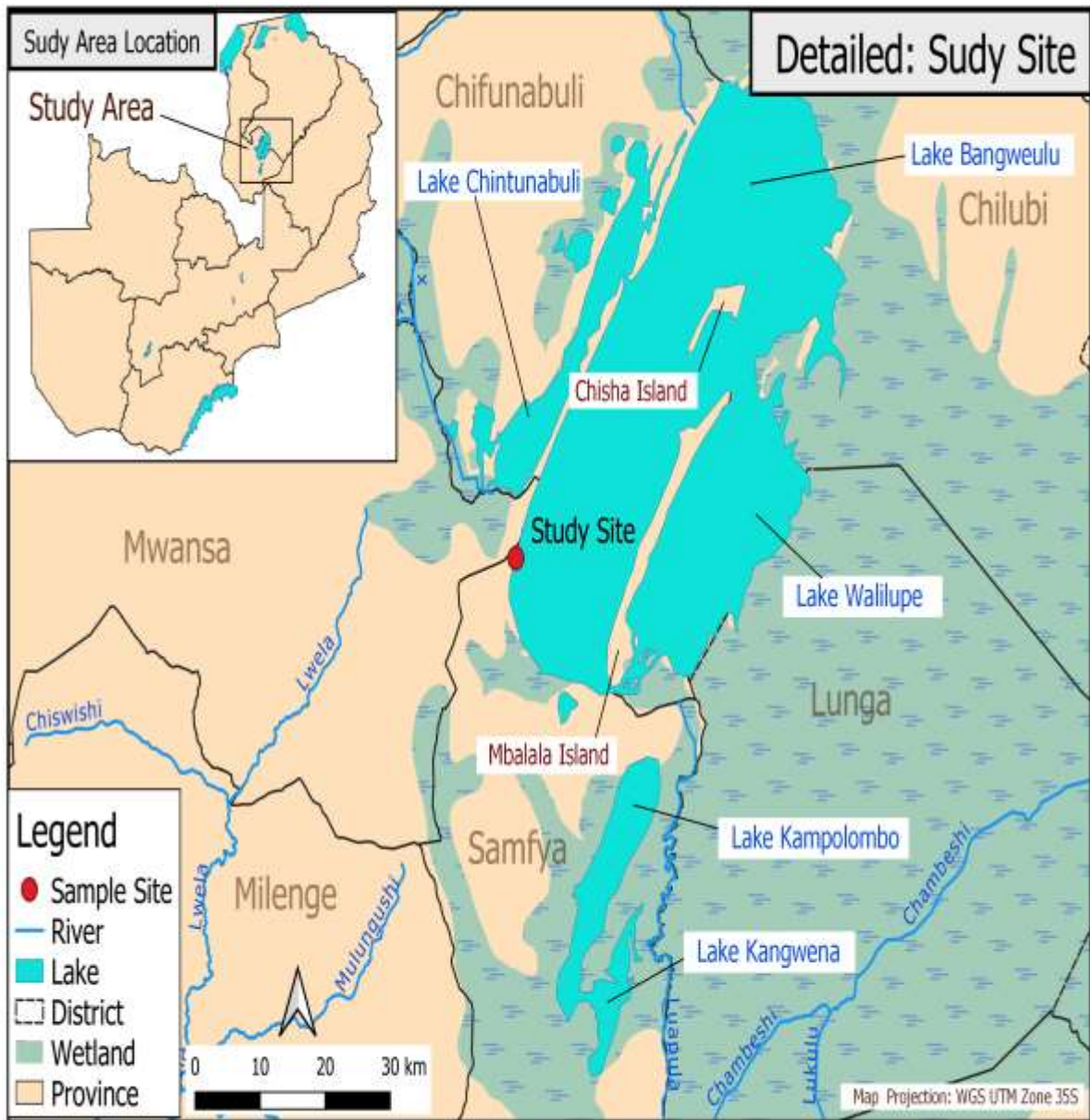


Figure 4: A map of the Bangweulu lakes and swamps complex fishery showing sampling area (Adopted from Evans, 1978).

Bangweulu Lakes and Swamps Fishery covers a total area of about 7,500 square kilo metres, of which the open waters constitute 2,500 square kilometres and the swamps about 5,000 square kilometres. The main inflow is from the Chambeshi River, the longest tributary of the Congo River (Debenham 1952), feeding a vast perennial Swamp area comprised of Lakes, Swamplands,

seasonally flooded grasslands and shallow water bodies formed by rivers such as the Lukulu, Munikashi, Lulimala, Luitikila, Lwitichila and Lumbatwa rivers.

The large number of water bodies is linked by a network of channels. Surplus water is drained through the Luapula River, which links with Lake Mweru in the north and subsequently connects with the Congo River system. The lake is relatively shallow, with a maximum depth of 6.3 metres in open waters and 4.6 metres in the swamps.

The fishery is situated in a high rainfall area with an annual precipitation of 1, 200mm to 1, 400mm per annum and collects water from the 109, 469km² catchment area. The bottoms are muddy in the open lakes and sandy in the fast flowing channels. Sandy bottoms are also found in island areas and within 200m from the shoreline (Evans, 1978).

The mean water level variation between the two peaks is 1.39m. The fishery has a low level of Total Dissolved Solids (TDS) resulting in low conductivity (5 μ s/m³). It is one of the least productive lakes in Africa (Welcome, 1972). The open waters have pH values around 7.0 which may rise up to 8.7-9.0 during warm days when the photosynthetic process uses up most of carbon dioxide in the system. The swamps have pH values around 6.4. (Evans, 1978).

The altitude of the Bangweulu Lakes and Swamps Complex Fishery is about 1,100 metres above the sea and it is up to 6.3 metres in depth (Mortimer, 1965). The swamp is dotted with small and flat islands and several rivers flow into the swamp area besides the Chambeshi River. There are canals and channels dug, which tie the dotted lagoons to each other and facilitate communication among the people. In the dry season, the mean monthly temperature is around 16-17° C during May through July, and it gradually rises through September to reach a maximum of 23-24° C in October. The rains begin in early November and continue until late April with temperatures gradually falling to around a mean of 21 ° C. The surface temperature varies between 18° C and 26° C (with a mean value of 22° C) (Mortimer, 1965). The main dissolved solids in the water include sodium ions, calcium ions, potassium ions, magnesium ions, chlorides and sulphates (Ricardo, 1939).

The fishery covers three districts; Samfya, Lunga and Milenge. Samfya, on the western shore of the lake, is the biggest town and the executive centre of Samfya district. The great swamp which

stretches widely to the south and south-east of Lake Bangweulu is about 5,000km² in extents at the end of the rainy season. The fishery is situated in a high rainfall area with an annual precipitation of 1, 200mm to 1, 400mm per annum and collects water from the 109, 469km² catchment area. The bottoms are muddy in the open lakes and sandy in the fast flowing channels. Sandy bottoms are also found in island areas and within 200m from the shoreline (Evans, 1978).

3.2 Sampling design

Marine landing site was selected from the Bangweulu lakes and swamps complex as it was the main landing site (S 11° 19' 24.6" and E 029° 34' 16.9"), where samples were collected since the stock was the same. Sampling was conducted in three consecutive days in each month from March, 2019 to September, 2019. Sampling during this period coincided with observed periods of rapid growth and reproductive activities (Chapman *et al*, 1971). All the specimens used in this study were procured from local fishers.

3.3 Sample size

The sample size for this study constituted 1,852 individuals of *T. bangwelensis* collected from March 2019 to September, 2019 which was picked on the basis of the researcher's convenience and accessibility.

3.4 Data Collection

Data for this research was collected from both the field and in the laboratory. Field techniques were used to collect fish species from fisher's catches while laboratory techniques were used to collect length (mm), weight (g) and examination of the gonads on each fish species. The variables that were collected from each fish specimen were used to estimate: reproductive biology, growth and mortality of *T. bangwelensis*.

3.4.1 Field techniques

The fish samples of *T. bangwelensis* were obtained from the local fishermen's catches. The fish obtained were identified using standard keys (Skelton, 2001) for the species being studied and verification by pictures and detailed published description. Then, the specimens were transported to Samfya District Research Station for measurements in the laboratory.

3.4.2 Laboratory techniques

Total length of each fish sample was measured to an accuracy of one millimetre (1.0 mm) using measuring board. The Total length (TL) of each fish was measured from the tip of the anterior part of the mouth to the posterior end of the caudal fin.



Figure 5: Length measurements using fish measuring board

The weight of individual *T. bangwelensis* fish species was measured to the nearest one gram (1.0 g) with an electronic balance, after removing moisture and debris from the body surface using blotting papers. Weight and length measurements were used to determine growth rates of *T. bangwelensis*.



Figure 6: Measuring weight using an electric balance

3.4.3 Fish Gonad Examination

Each *T. bangwelensis* fish species was dissected, their internal parts exposed and their gonad maturity status determined by examination of the gonads.



Figure 7: Gonad determination by dissecting each fish

The information collected was recorded in the fishery data field recording sheets (appendix A). The gonad maturity status was identified based on the Nikolsky (1963) classification of the fish gonad maturity stages as summarized in table 4 below.

Table 4: Fish Gonad stages as described by Nikolsky (1963)

Maturity stage	Gonad state	Description
I	Immature	Young individuals which have not engaged in reproduction; gonads of very small size.
Q	Inactive	Sexual products have not yet begun to develop; gonads of very small size, eggs not distinguishable to the naked eye.
A	Active	Eggs distinguishable to the naked eye; a very rapid increase in weight of the gonad is in progress, testes change from transparent to pale rose color.
R	Ripe	Sexual products ripe; gonads achieved maximum weight.
K	Ripe-running	Sexual products are extended in response to very light pressure on the belly; Weight of gonads decrease rapidly.
SP	Spent	The sexual products have been discharged; genital aperture inflamed; gonads have the appearance of deflated sacs, the ovaries usually containing a few left over eggs and the testes some residual sperm.

3.5 Data Analysis

3.5.1 Reproductive biology

The gonad maturity stage data collected were converted to percentages of gonad maturity stages. Then length frequency histograms were constructed to determine if there was seasonality in the spawning of *T. bangwelensis* and analysis of variance (ANOVA) in GenStat, 2019 was used to determine if the gonad maturity stages for data collected during each month were different. If they were, it proved that there was spawning seasonality in *T. bangwelensis*. The use of length frequency method in the estimation of growth parameters is only possible if the species being investigated has peaks on the length frequency histogram graphs.

3.5.2 Growth parameters.

Fish growth rate was assumed to follow the von Bertalanffy (1938) growth curve, which was expressed as: $L_t = L_\infty (1 - e^{-k(t-t_0)})$; where L_t was the predicted length at different ages, L_∞ was asymptotic length, t_0 was the hypothetical age at which length is zero and k was the growth

constant. This growth model was chosen as it provided for simple description of growth, and could be used to easily determine population growth (Ricker, 1971). In months where more than two peaks in the length frequency graph could be identified, L_{∞} and k were obtained using the Ford (1933) and Walford (1946) plot based on Gulland (1983). This was done from the intersection sample point of the 45° diagonal where $L_t = L_{(t+1)}$.

3.5.3 Mortality parameters

Total mortality coefficient of the *T. bangwelensis* fish species that was studied was determined using Beverton and Holt equation of 1957.

3.5.3.1 Estimation of Total Mortality Coefficient using Mean Length Method

The Beverton and Holt equation (1957) was based on the mean lengths and it was given below;

$$Z = \frac{k(L_{\infty} - L_m)}{L_m - L_c}$$

Where k and L_{∞} were parameters of the von Bertalanffy growth equation, L_m was the mean length of the catch samples and L_c was the length of the fish samples that were fully represented in the sample catches. It is the smallest length among the measured total lengths of the fish specimens. Total mortality (Z) was made up of two components: F which was mortality attributed to fishing and M the natural mortality.

The equation was expressed as follows: $Z = M + F$.

The fishing mortality F was found by rearranging the equation above. The natural mortality coefficient, M was estimated using Pauly (1983) equation expressed as follows:

$M = 0.8 \exp(-0.0152 - 0.279 \ln L_{\infty} + 0.6543 \ln K + 0.4634 \ln T)$, Where L_{∞} was the asymptotic length for the species, k was the growth coefficient and T was the mean water temperature of the water body where fish was found. The mean annual water temperatures used was 23° C.

Fishing mortality (F) was obtained as $F = Z - M$ following Beverton and Holt (1956) equation.

3.5.3.2 Exploitation ratio

The exploitation rate (E) was calculated as a ratio of the fishing mortality rate (F) to total mortality rate (Z) as $E = F/Z$ according to Beverton and Holt (1957).

Where F was the Fishing mortality while Z was the natural mortality. This helped determine if *T. bangwelensis* stock of the Bangweulu lakes and swamps complex were over exploited or under exploited. The optimum exploitation level is at 0.5, under exploitation level is the exploitation below 0.5 while over exploitation level is the exploitation above 0.5.

CHAPTER FOUR

RESULTS

4.1 Reproductive biology of *T. bangwelensis*

Seasonal breeding patterns related to the general ecology of *T. bangwelensis* were observed in the Bangweulu Lakes and Swamps Complex fishery. The results show that *T. bangwelensis* is a seasonal spawner. (See figure 8 to 14).

The Reproductive biology of *T. bangwelensis* from March 2019 to September, 2019 in the Bangweulu Lakes and Swamps Complex fishery are shown in figures 8 to 14 below. A total of 289 fish species of *T. bangwelensis* were collected and studied in March, 2019.

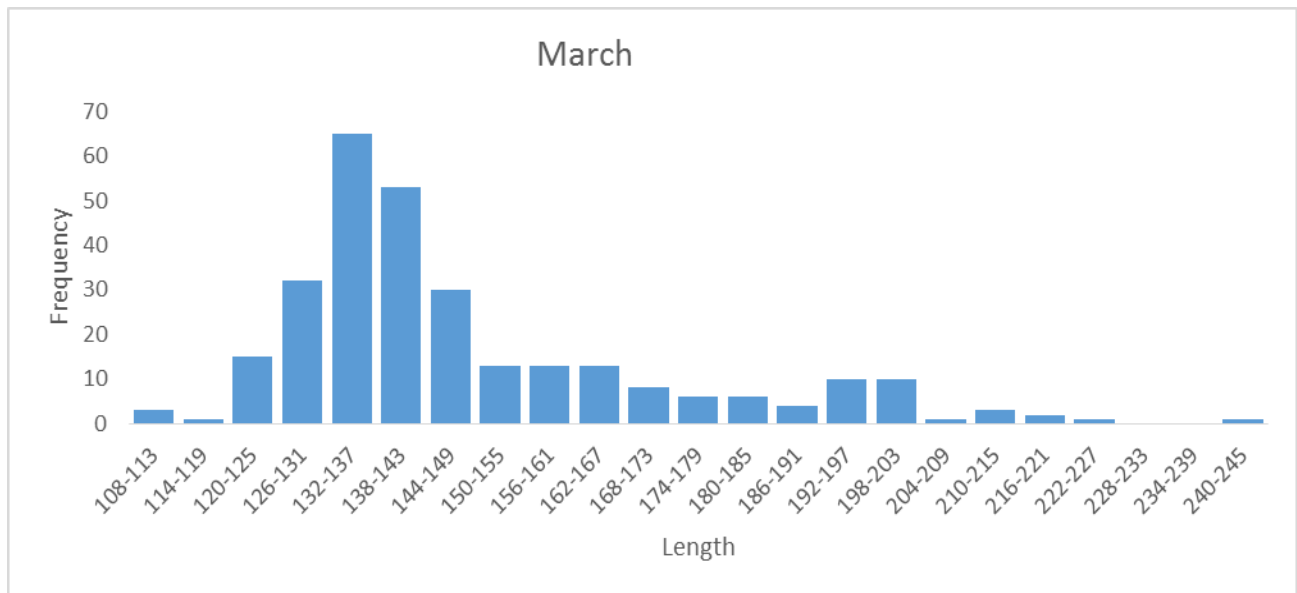


Figure 8: Length frequency histogram showing breeding seasonality of *T. bangwelensis* in March.

Figure 8 shows length frequency histogram showing breeding seasonality of *T. bangwelensis* in March. The length frequency histogram constructed above indicates breeding seasonality of *T. bangwelensis* for the month of March that represents the rainy season. It also shows three main distinct peaks, each peak represents different age group of fish born at a particular time of the year.

The Reproductive biology of *T. bangwelensis* in April in the Bangweulu Lakes and Swamps Complex fishery are shown in figure 9. A total of 229 fish species of *T. bangwelensis* were collected and studied in April, 2019.

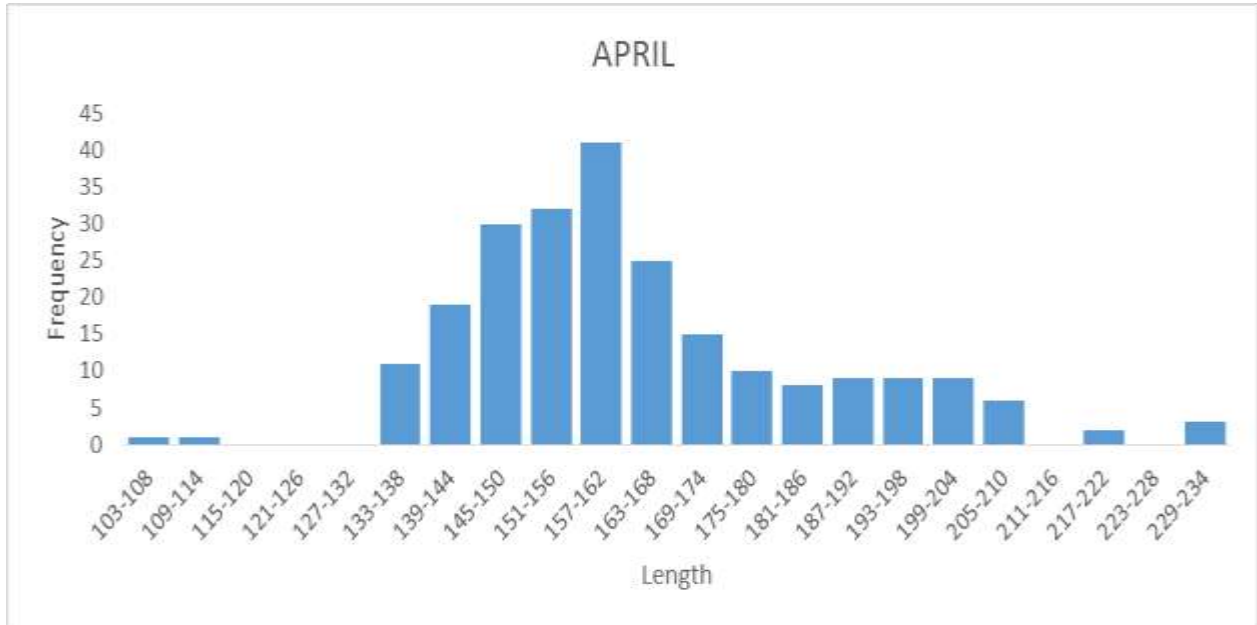


Figure 9: Length frequency histograms showing breeding seasonality of *T. bangwelensis* in April.

Figure 9 shows breeding seasonality of *T. bangwelensis* for month of April that represents the rainy season. It also shows three different peaks representing different age group of *T. bangwelensis* growing at different time.

The Reproductive biology of *T. bangwelensis* in May in the Bangweulu Lakes and Swamps Complex fishery are given shown in figure 10. A total of 301 fish species of *T. bangwelensis* were collected and studied in May, 2019

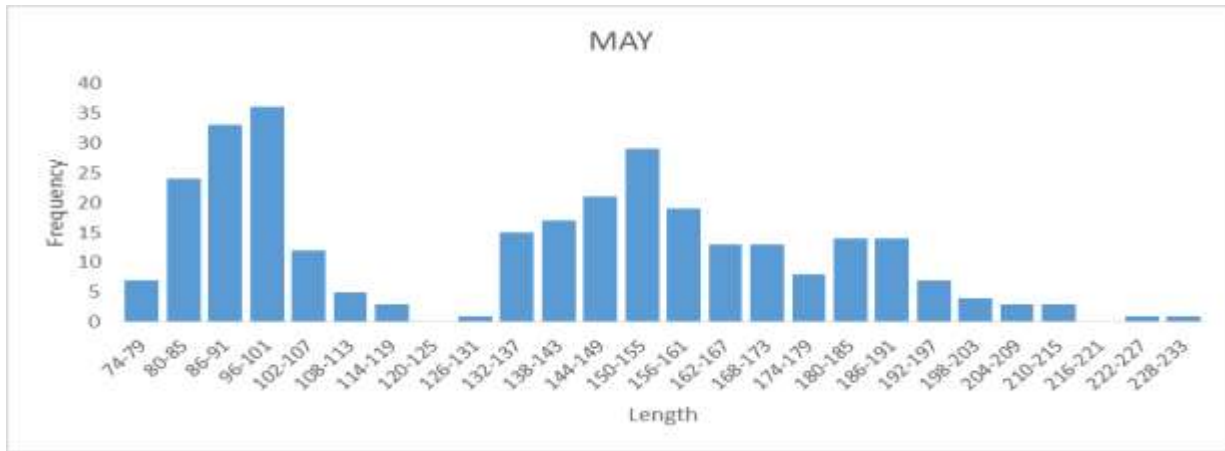


Figure 10: Length frequency histograms showing breeding seasonality of *T. bangwelensis* in May.

Figure 10 shows length frequency histograms showing breeding seasonality of *T. bangwelensis* in May. Three pronounced peaks were seen on the length frequency histogram plotted. An indication that *T. bangwelensis* is a seasonal breeder.

The Reproductive biology of *T. bangwelensis* in June in the Bangweulu Lakes and Swamps Complex fishery are given shown in figure 11. A total of 308 fish species of *T. bangwelensis* were collected and studied in June, 2019.

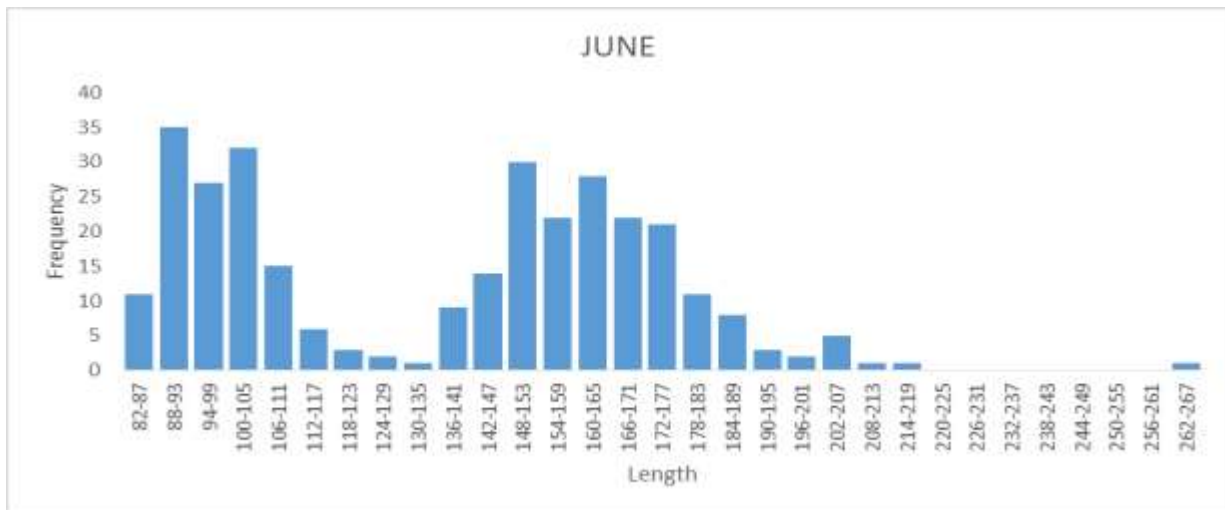


Figure 11: Length frequency histograms showing breeding seasonality of *T. bangwelensis* in June.

Figure 11 shows the length frequency histograms showing breeding seasonality of *T. bangwelensis* for the month of June that represents the cold season. Further, it shows two pronounced and one unpronounced peak. An indication that the species is a seasonal breeder.

The Reproductive biology of *T. bangwelensis* in July in the Bangweulu Lakes and Swamps Complex fishery are given shown in figure 12. A total of 238 fish species of *T. bangwelensis* were collected and studied in July, 2019.

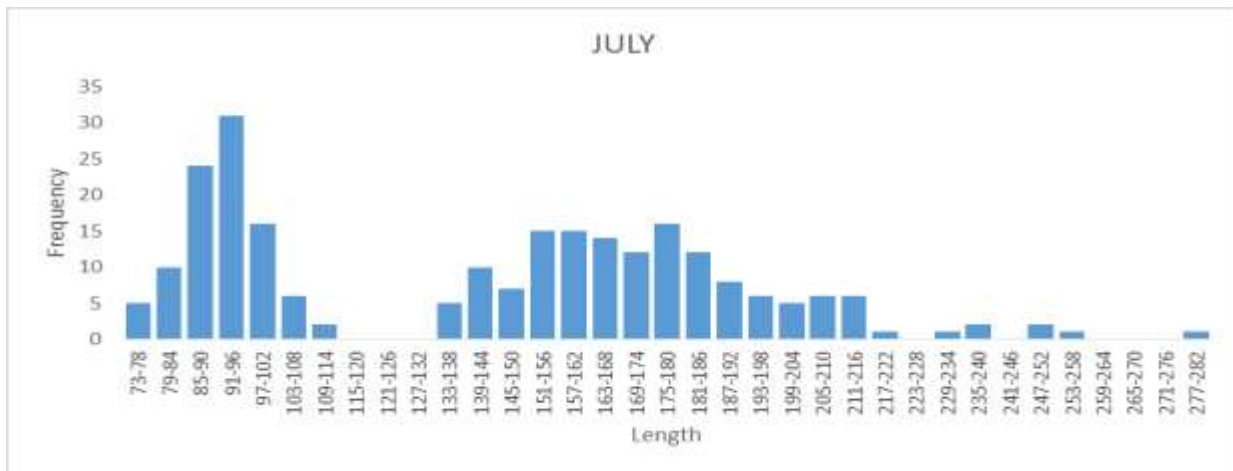


Figure 12: Length frequency histograms showing breeding seasonality of *T. bangwelensis* in July.

Figure 12 shows the breeding seasonality of *T. bangwelensis* for the month of July which also represents the cold season. The length frequency histogram plotted shows three pronounced and one unpronounced peak. This shows that the species has a breeding seasonality

The Reproductive biology of *T. bangwelensis* in August in the Bangweulu Lakes and Swamps Complex fishery are shown in figure 13. A total of 248 fish species of *T. bangwelensis* were collected and studied in August, 2019

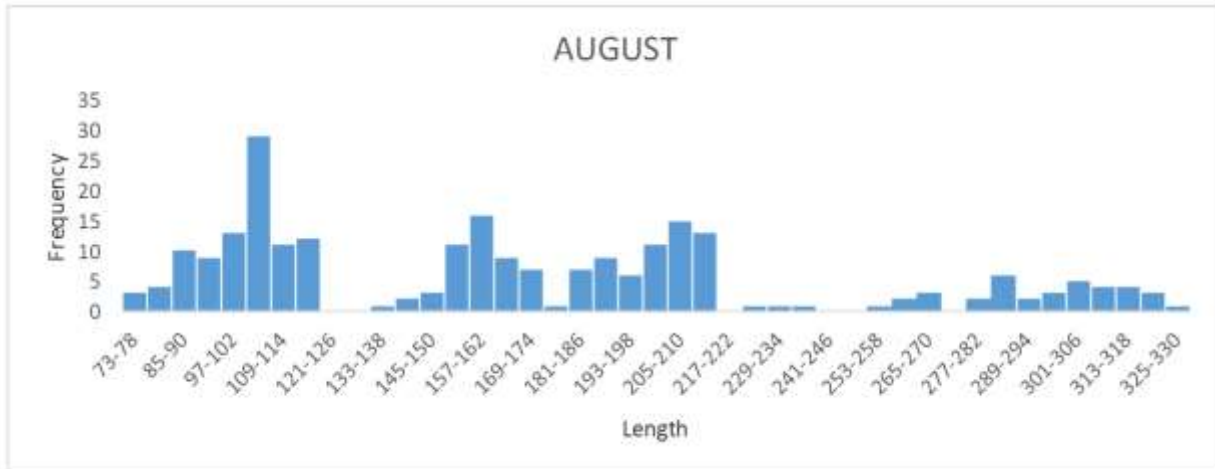


Figure 13: Length frequency histograms showing breeding seasonality of *T. bangwelensis* in August.

Figure 13 shows the breeding seasonality of *T. bangwelensis* for the month of August which also represents the hot season. The length frequency histogram plotted shows ten pronounced and one unpronounced peaks. This implies that *T. bangwelensis* is a seasonal breeder.

The Reproductive biology of *T. bangwelensis* in September in the Bangweulu Lakes and Swamps Complex fishery are given shown in figure 14. A total of 241 fish species of *T. bangwelensis* were collected and studied in September, 2019.

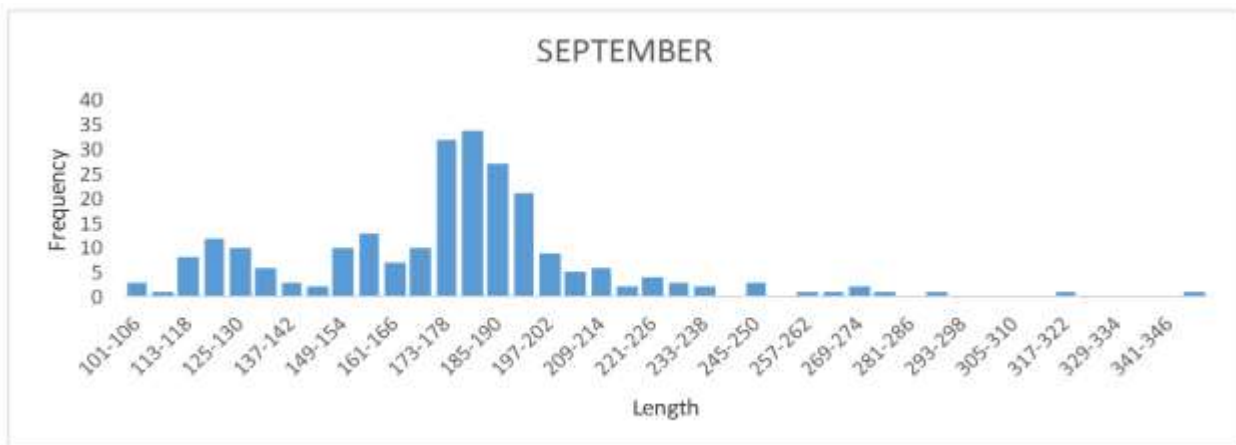


Figure 14: Length frequency histograms showing breeding seasonality of *T. bangwelensis* in September

Figure 14 above shows breeding seasonality of *T. bangwelensis* for month of September that represents the hot season. It also shows five different pronounced and two unpronounced peaks representing different age group of *T. bangwelensis* growing at different time of the year. This indicates that the species has breeding seasonality.

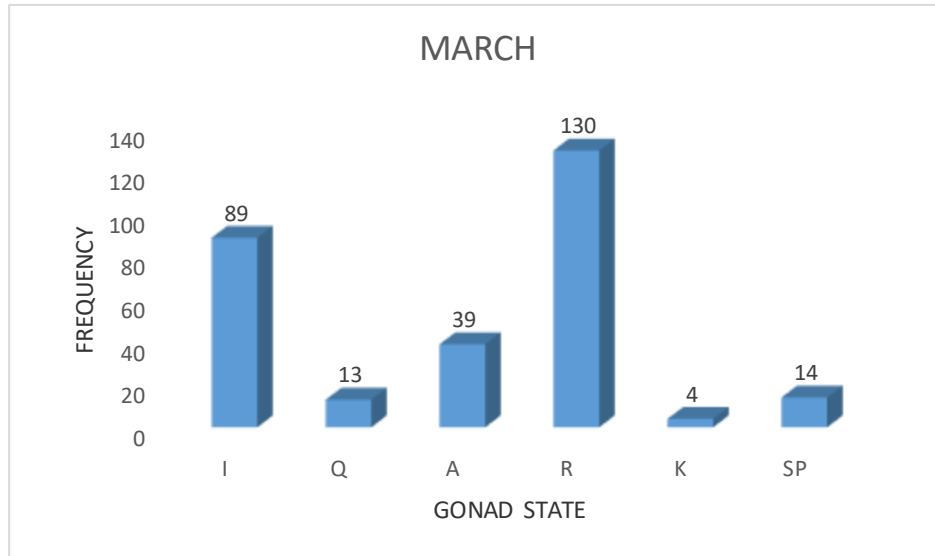


Figure 15: Frequency of gonad maturity status of *T. bangwelensis* in March

Figure 15 shows frequency of gonad maturity status of *T. bangwelensis* species for the month of March. The figure above indicates that, a total of 130 *T. bangwelensis* species were relatively ripe followed by 89 that were immature. It further indicates that 39 of the sample were in an active state then followed by 14 that were spent, 13 were inactive and 4 ripe running. This shows that ripe was the highest gonad maturity state in March as compared to active, Immature, inactive spent and ripe running. Ripe running was the least of all the gonad maturity states sampled in March.

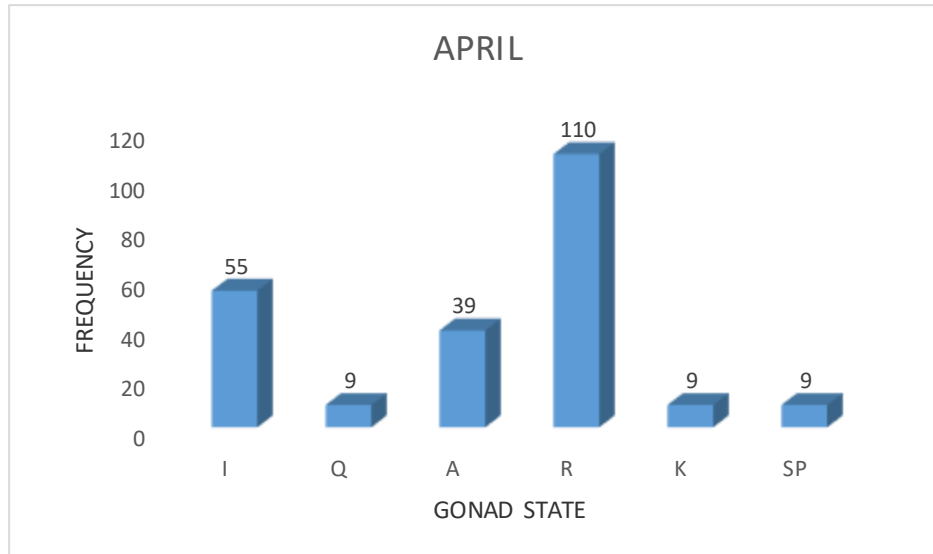


Figure 16: Frequency of gonad maturity status of *T. bangwelensis* in April

Figure 16 shows frequency of gonad maturity states of *T. bangwelensis* species for the month of April. According to the figure 16 above, it is clear that indicates that, a total of 110 *T. bangwelensis* species that were sampled in March were relatively ripe followed by 55 that were immature. It further indicates that 39 of the sample were in an active state then followed by 9 that were spent, 9 were inactive and another 9 were ripe running. This shows that ripe was the highest gonad maturity state in April as compared to active, Immature, inactive spent and ripe running.

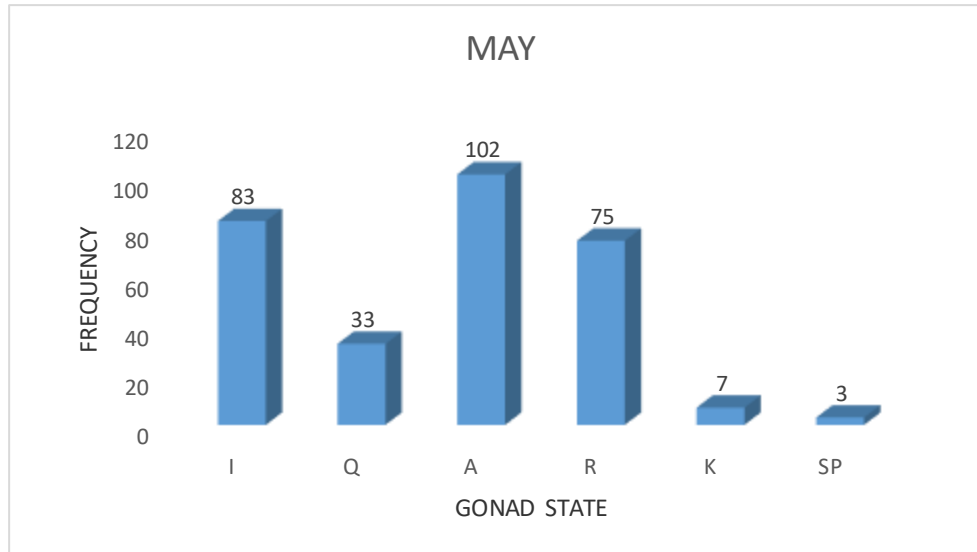


Figure 17: Frequency of gonad maturity status of *T. bangwelensis* in May

Figure 17 shows frequency of gonad maturity states of *T. bangwelensis* species for the month of April. From the figure above, it is clear that indicates that, 102 *T. bangwelensis* species that were sampled in May were relatively active followed by 82 that were immature. It further indicates that 75 of the sample were ripe then followed by 33 that were inactive, 7 were ripe running and 3 were spent. This shows that active was the highest gonad maturity state in March while spent was the least.

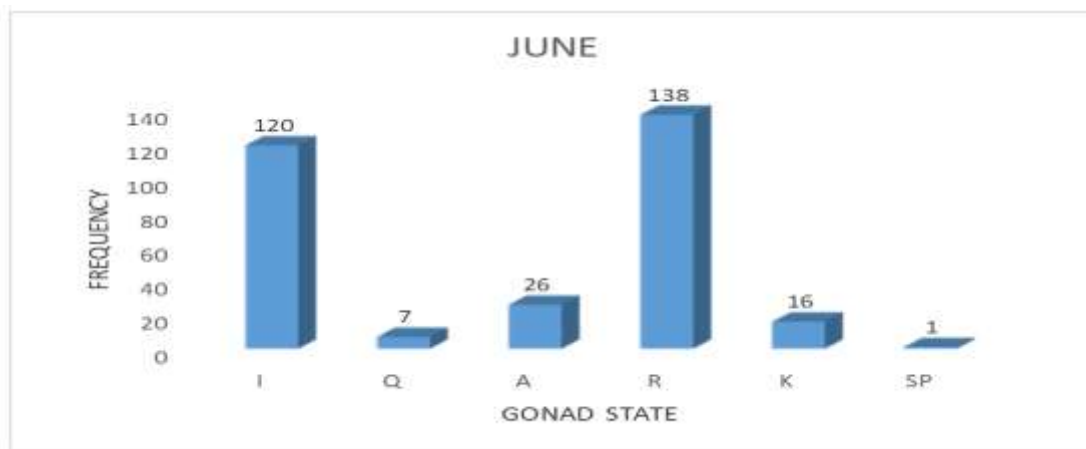


Figure 18: Frequency of gonad maturity status of *T. bangwelensis* in June

According to figure 18, 138 *T. bangwelensis* species that were sampled in June were relatively ripe followed by 120 that were immature. It further indicates that 26 of the sample were active

then followed by 16 that were ripe running, 7 were inactive while 1 was spent. This shows that most of the *T. bangwelensis* species that were sampled in June were ripe.

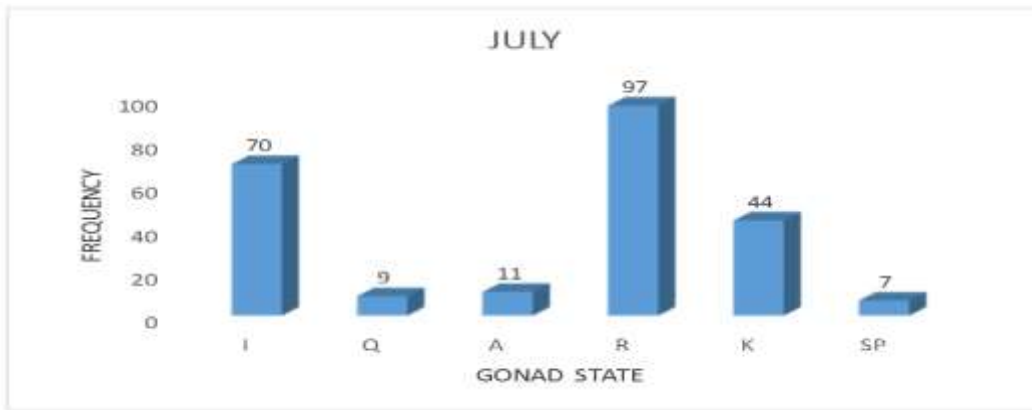


Figure 19: Frequency of gonad maturity states of *T. bangwelensis* in July

According to figure 19, 97 *T. bangwelensis* species that were sampled in July were ripe followed by 70 that were immature. It further indicates that 44 of the sample were ripe running (K) then followed by 11 that were active, 9 were inactive while 7 were spent. This shows that most of the *T. bangwelensis* species that were sampled in July were ripe.

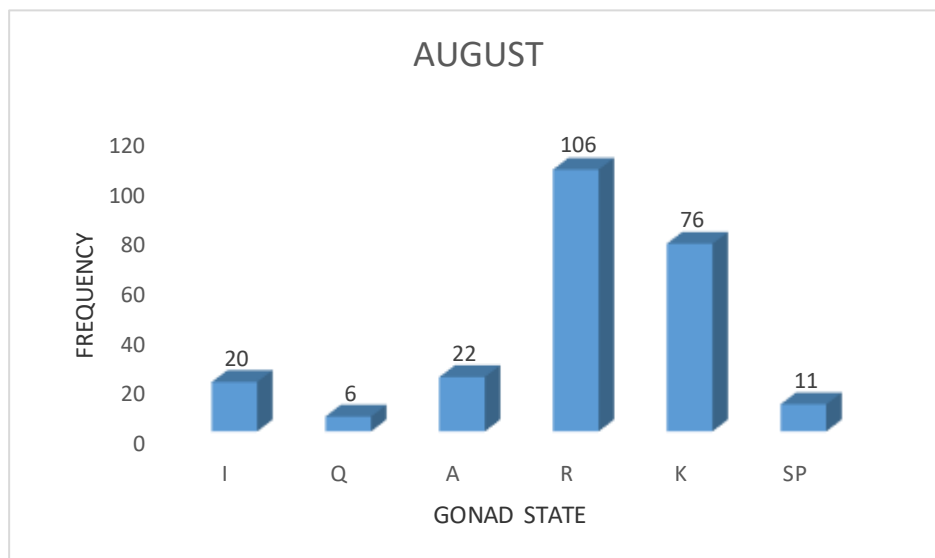


Figure 20: Frequency of gonad maturity status of *T. bangwelensis* in August

Figure 20 shows frequency of gonad maturity states of *T. bangwelensis* species for the month of August. From the figure above, it is clear that indicates that, 106 *T. bangwelensis* species that

were sampled in August were relatively ripe followed by 76 that were ripe running. It further indicates that 22 of the sample were active then followed by 20 that were immature, 11 were spent while 6 were inactive. This shows that active *T. bangwelensis* species for the month of August was the highest gonad maturity state while inactive was the least.

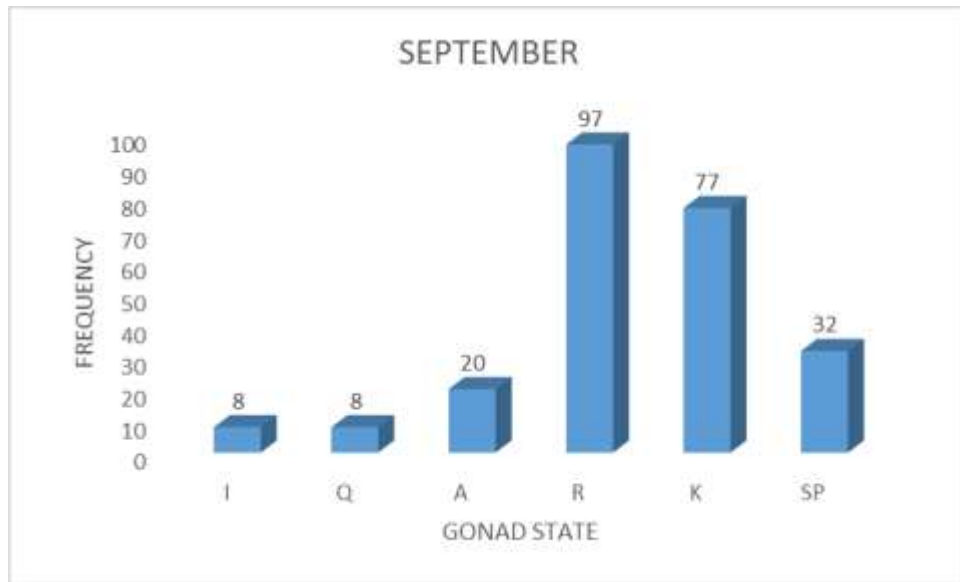


Figure 21: Frequency of gonad maturity status of *T. bangwelensis* in September

From the figure above, a total of 97 *T. bangwelensis* species that were sampled in September were relatively ripe followed by 77 that were ripe running. It further shows that 32 of the sample were spent then followed by 20 that were active, immature and inactive gonad maturity states had 8 *T. bangwelensis* species each. This shows that ripe *T. bangwelensis* species for the month of September were the highest as compared to those that were active, spent, ripe running, immature and inactive.

Table 5: Percentages of gonad maturity stages of *T. bangwelensis* in Bangweulu Lakes and Swamps Complex Fishery

	I	Q	A	R	K	SP
March	31	5	13	45	1	5
April	24	4	17	47	4	4
May	27	11	34	25	2	1
June	39	2	9	45	5	0
July	29	4	5	41	18	3
August	8	2	9	44	32	5
September	4	3	8	40	32	13

Table 5 shows percentages of gonad maturity stages from which the analysis of variance was conducted to determine if there was variation in the gonads maturity stages.

Table 6: ANOVA results on percentages of gonad maturity stages of *T. bangwelensis* in Bangweulu Lakes and Swamps Complex Fishery

Analysis of variance
Variate: YIELD

Source of variation	d.f.	s.s.	m.s.	v.r.	f. pr.
Rep stratum	6	0.0	0.0	0.00	
Rep					
Gonads	5	6675.6	1335.1	12.56	<.001
Residual	30	3189.7	106.3		
Total	41	9865.3			

Tables of means
Variate: YIELD

GONADS	A	I	K	Q	R	SP
	13.6	23.1	13.4	4.4	41.0	4.4

Least significant differences of means (LSD) (5% level)

Table	GONADS
Rep.	7
D.f.	30
L.S.D.	11.26

There was a significant difference at ($P < 0.001$) probability, in the Percentages of gonad maturity stages of *T. bangwelensis* in Bangweulu Lakes and Swamps Complex fishery. This implies that the gonad maturity stages of *T. bangwelensis* are statistically different and that this species of fish spawns with seasonality. The data that were used for general Analysis of Variance using GenStat, 2019 software is given in table 4.2 above.

4.2 Growth parameters of *T. bangwelensis*

Table 7: Summary of L_t and L_{t+1} derived from the mean length of *T. bangwelensis* of Bangweulu Lakes and Swamps Complex Fishery.

L_t (mm)	96.5	159.5	189.5	207.5	231.5	261.5	285.5	341.5
L_{t+1} (mm)	159.5	189.5	207.5	231.5	261.5	285.5	341.5	401.5

The mean lengths were calculated from each peak or cohort of the length frequency histogram graphs that were plotted for all the specimens of *T. bangwelensis* collected from which growth parameters L_∞ and k were determined using the mean lengths on Ford-Walford plot. The asymptotic length L_∞ and the growth coefficient k of the species estimated from the mean length ML of the length classes using the Ford-Walford plot were as shown in figure 22 below.

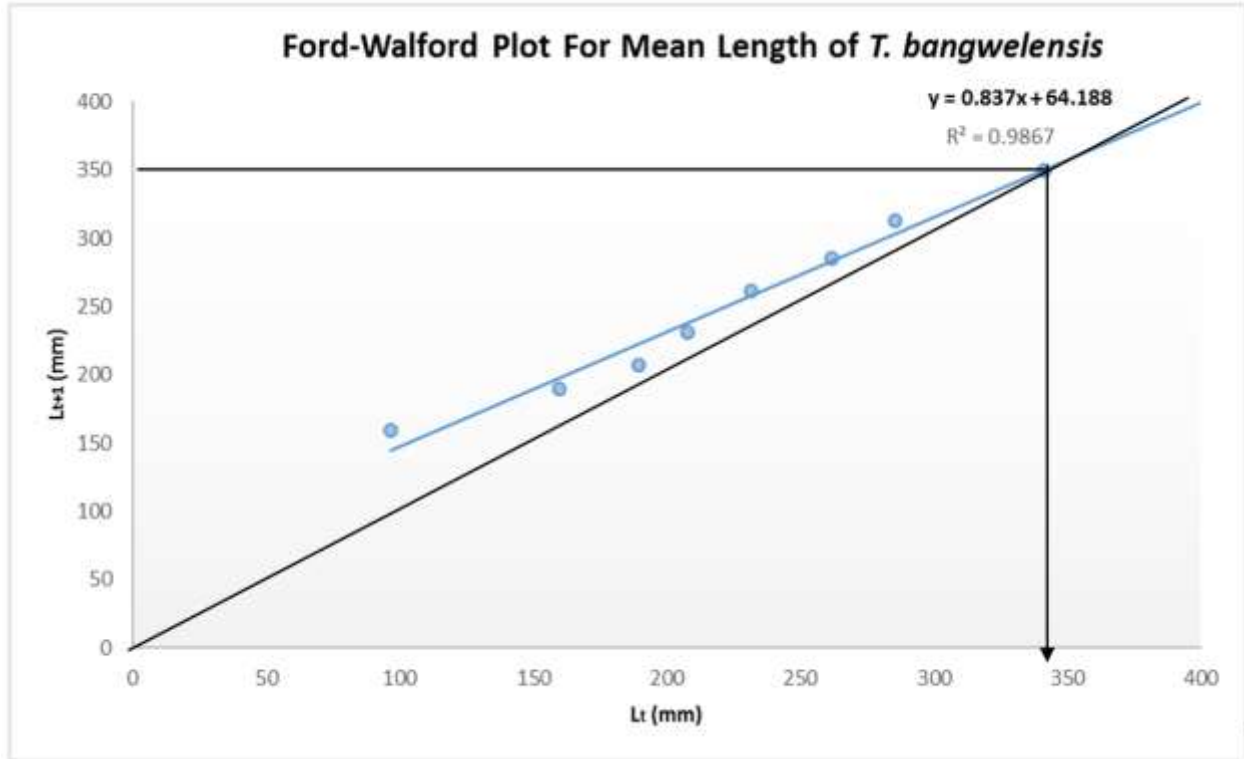


Figure 22. Ford-Walford plot: estimation of L_{∞} and k of *T. bangwelensis*

Figure 22 shows Ford-Walford plot for estimating growth parameters L_{∞} and k of *T. bangwelensis* from mean length data. This plot of $L_t + 1$ versus L_t is a linear one with a slope equal to k .

Table 8. Summary of growth parameters L_{∞} and k for of *T. bangwelensis* of Bangweulu Lakes and Swamps Complex Fishery.

Parameter	Mean value of the Ford-Walford Values.
k	0.837
L_{∞}	348mm

FWP= Ford- Walford plot, L_{∞} = asymptotic length (mm) and k = growth coefficient

Table 8 shows growth parameters L_{∞} and k that were found to be 0.837 and 384mm respectively of *T. bangwelensis* in Bangweulu Lakes and Swamps Complex Fishery (see table, 8) using Ford-Walford plot above. Asymptotic length L_{∞} (384mm) is the maximum length *T. bangwelensis* could have attained if it lived for ever and 0.837 is the rate at which the maximum length is attained.

4.3 Fish mortality variables of *T. bangwelensis* of the Bangweulu Lakes and Swamps Complex Fishery.

The total mortality coefficient (Z) that was obtained using the Beverton-Holt method was found to be 1.87. Natural mortality coefficient (M) was found to be 0.03. The exploitation rate (E) was found to be 0.98 (see table, 9).

Table 9. Summary of mortality parameters for *T. bangwelensis* in Bangweulu Lakes and Swamps Complex Fishery.

Total mortality coefficient (Z)	Natural mortality (M)	Fishing mortality coefficient(F)	Exploitation rate (E)
1.87	0.03	1.84	0.98

Table 9 shows mortality parameters for *T. bangwelensis* in Bangweulu Lakes and Swamps Complex Fishery. From the table, total mortality coefficient was 1.87, natural mortality was 0.03, fishing mortality coefficient was 1.84 and exploitation rate was found to be 0.98.

CHAPTER FIVE

DISCUSSION

5.1 Reproductive biology

In the current study, the seasonal spawning patterns of *T. bangwelensis* were studied in Bangweulu Lakes and Swamps Complex Fishery. The study found that *T. bangwelensis* was a seasonal spawner. Although the data were collected at monthly intervals for only seven months of the year from March, 2019 to September, 2019 which only included the hot season that was characterized by dry and wet periods. However, the gonad maturity stages greatly varied with the change from dry to rainy season and were also observed to be dependent on the availability of food. This compared well with studies by Barnabe (1994) and Bromage (1995) noted that under natural conditions, reproduction in fish is timed by changes in the external environment.

It was clear that there was seasonality in the spawning behaviour of the stock of *T. bangwelensis* in Bangweulu Lakes and Swamps Complex Fishery. As confirmed by the results, the ripe and ripe running fish were observed in mostly during the months of August and September which are warm and are characterized by increase in phytoplankton biomass creating favourable conditions for the offspring to grow better and survive. This was also observed by (Admassu, 1996) who concluded that most cichlids breed in warm and/or rainy periods in Lake Awassa (Ethiopia Rift Valley).

Marshall (1979) observed that *O. macrochir* in Lake Micilwaine was a seasonal spawner and that presence of phytoplankton helped in the growth of juveniles. Therefore, though *O. macrochir* focuses a lot of energy on spawning, the juveniles are spawn into conditions that are unfavourable and the weight of female ripe gonads were low indicating that the proportion of energy that goes to spawning females is reduced and thus decreasing the potential to spawn in high numbers.

The finding of the current study was in contrast with the study by Griffith (1975) whose findings revealed that the fishes of the Bangweulu Lakes and Swamps Complex Fishery, have no spawning migrations. Lack of distinct spawning or pronounced peaks in some months even when all the fish sampled had attained sexual maturity did not imply lack of a distinct spawning

period. In the present study, all the samples were purchased from the fishers' catches. It is therefore most likely that lack of distinct spawning peaks in some months, was due to the fact that fishers used same types of fishing methods for instance same mesh sizes and most likely that the fishers were not fishing in the spawning grounds. The spawning periods observed compared favourably, both in time and duration, with that reported by Griffith (1975) in the Bangweulu Lakes and Swamps Complex Fishery.

Peña-Mendoza et al (2005) in their study noted that cichlid *O. niloticus* spawn throughout the year in Emiliano Zapata dam, Morelos, Mexico. The study observed that intensive breeding activity was in August and February and this coincided with phytoplankton biomass increase. The study noted that tilapia reached maturity at 151.3 mm (females) and 152.0 mm (males) of total length. The study further observed that rainy (August) and dry (February) seasons were the breeding period this species. Fecundity variation was better correlated with length ($r=0.7473$; $p<0.002$) than with weight ($r=0.7395$; $p<0.002$). The fecundity ranged between 243 and 847 oocytes per fish, with egg diameter from 300 to 3 700 μm . Intensive breeding activity in August and February coincide with phytoplankton biomass increase. This differs with the finding in the current study that found that *T. bangwelensis* is a seasonal spawner in Bangweulu Lakes and Swamps Complex Fishery.

There was also differences in the gonad maturity stages in the current study for *T. bangwelensis* at $p < 0.001$ probability also an indication of spawning seasonality, *T. bangwelensis* had distinct spawning peaks that showed age group of fish that were growing at a particular period in almost all the months which is evident enough that it is a seasonal spawner. This was not the case in a study by de Graaf *et al.*, (2005) who reported that *O. niloticus* spawn throughout the year in the ponds of Congo Brazzaville, and migrates from the littoral zone to the floodplains during inundation. The current study also found that, there were a representation for each of the six maturity stages in each months.

The study found that, *T. bangwelensis* is a seasonal breeder, different peaks were observed on the length frequency histogram graphs plotted for all the specimens collected for seven months from March 2019 to September 2019. These different peaks observed represented different cohorts which is an indication of the presence of breeding seasonality in this species. Furthermore, their

gonad maturity stages were also analysed and indicated that there were variations in maturity stages discovered for all the seven different months the fish were collected, these variations also indicate the presence of breeding seasonality. These results are in conformity with the studies of Griffith (1975), Zambia Department of Fisheries report (2008) and Admassu, 1996) which revealed that there is seasonality in the fishes of Bangweulu Lakes and Swamps Complex Fishery.

In other literature, Lowe McConnell (1958) reported that *O. niloticus* was found to breed throughout the year and slightly higher in the wet season in the East African waters and in Mexico, it was noted that the GSI mean values of both sexes of *O. niloticus*, varied significantly among the months. (Gomez *et al.*, 2005).

5.2 Growth

Assuming that the fish grows throughout its life, asymptotic length coefficient L_{∞} is the largest theoretical mean length that it could attain in its natural habitat and k is the speed with which it grows towards this final size (Admassu, 1996). Against this background, both the growth coefficient (k) and the asymptotic length L_{∞} of the species were taken into consideration from the parameters estimated from the Ford-Walford plot. It was noted that the asymptotic length L_{∞} of *T. bangwelensis* was estimated at 348mm and the growth coefficient k at 0.837.

This high asymptotic length obtained in the present study implies that *T. bangwelensis* in the Bangweulu Lakes and Swamps Complex Fishery has a lot of food that promote attainment of high growth in terms of length. This could be attributed to climatic conditions such as temperature that can affect the rate of growth of fish in any water body. In agreement with this, Griffith (1978) elucidated that wet season flooding in the Bangweulu Swamps stimulates greater primary and secondary production thereby promoting growth among fish in this fishery. The fast growth of aquatic flora in the Bangweulu Swamps in the rainy season creates good habitats for fish in the Bangweulu Lakes and Swamps Complex fishery. Griffith further added that, increase in rainfall during the rainy season promotes the growth of algae, phytoplankton, zooplanktons and diatoms that provide food resources to the fish of the Bangweulu Lakes and Swamps Complex fishery.

The results of this study on the growth parameters of *T. bangwelensis* relative to other cichlids are different from international studies in major African lakes of East and West Africa such as Uneke and Nwani (2014) who obtained asymptotic length L_{∞} of 278.3mm in a cichlid *Tilapia zilli*. This indicates that asymptotic length L_{∞} and growth coefficient k are different for different species of fish and water systems. In other literature, Montcho et al (2015) in their study found that the asymptotic length L_{∞} was 415mm in *O. niloticus* which was larger than that noted in the current study for *T. bangwelensis*.

The growth coefficient and asymptotic length of cichlid *T. bangwelensis* that were found in this research were slightly lower than those that were revealed by Chikopela, *et al.*, (2012), owing to the different species of fish in which the study was concentrated. The results of Chikopela, *et al.*, (2012) obtained asymptotic length L_{∞} 350mm, 400mm and 480mm in *Oreochromis andersonii*, *Oreochromis macrochir* and *Oreochromis niloticus* respectively. Further, Adeyemi and Akombo (2012) in their study revealed that the asymptotic length L_{∞} was 345.2mm in *T. zilli* and 438.2mm in *O. niloticus*. The values of the maximum length for *O. niloticus* were noted in other literature as 500mm by Skelton (1993) and 390mm in natural waters (Froese and Pauly, 2010).

In some research studies of cichlids in other water systems, lower values of asymptotic lengths were observed such as those in the Okavango Delta, Mosepele and Nengu (2003), which was noted as 215.24mm in *O. macrochir* and Moreau *et al* (1986) in the Kafue Floodplains with a value of 251mm were both lower than those found in *T. bangwelensis* in this study. The differences in asymptotic lengths could further be explained by the differences in fishing pressure where higher fishing pressure causes a reduced asymptotic length and also differences in species. Higher values of asymptotic length than in this study were observed in Lake George, Uganda, a tropical, Gwahaba (1978) which recorded the maximum length of 640mm TL in *O. niloticus*. Further studies in Lake Kainji, Nigeria had estimates of 532mm in *O. macrochir*.

The results of growth coefficient k of *T. bangwelensis* obtained in this study is in disagreement with some of the international studies such as Adeyemi and Kombo (2012) in Gbedikere Lake. The study's findings revealed that *T. zilli* and *O. niloticus* had 0.44 and 0.32 respectively. Uneke and Nwani (2014) in their study observed that 0.46 was noted in *T. zilli* in a Nigerian tropical

river basin. Chikopela, *et al.*, (2011) in Kafue floodplains obtained growth coefficient k of 0.836, 0.784 and 0.728 in *O. niloticus*, *O. macrochir* and *O. andersonii* respectively.

Growth coefficient k of 0.33 was observed in *O. niloticus* by Montcho *et al* (2015) in Lake Toho, Benin. This was smaller than that found in the current study and this could be as a result of different species and water systems that the studies concentrated on.

Another study by Emilio *et al* (2010) in the Aguamilpa Reservoir, Mexico found that growth parameter L_{∞} and growth coefficient k of Tilapia *Oreochromis aureus* were 433.3mm and 0.36 respectively. These were inconsistent with the finding in the current study, this could be attributed to the different fish species and water bodies that the studies concentrated on.

The current findings are not in tandem with Makeche *et al* (2017) who found that *O. niloticus*, an exotic mouth brooding tilapiine showed the largest growth coefficient (k) of 0.22 while *O. macrochir* had the smallest growth coefficient of 0.10. *O. andersonii* had a growth coefficient of 0.11. The large growth coefficient in *O. niloticus* relative to the other mouth brooding tilapiines of the Kafue Floodplain fishery shows that *O. niloticus* attains asymptotic length the fastest.

5.3 Mortality

Fishing mortality coefficient (1.84) obtained were generally larger than natural mortality coefficient (0.03). The larger contribution of high fishing mortality can be attributed to high fishing pressure on the species considering the fact that, *T. bangwelensis* species were previously known to dominate catches in the entire Bangweulu Lakes and Swamps Complex Fishery, as reported by Evans (1978).

The fishing mortality variable (1.84) of *T. bangwelensis* were larger than natural mortality (0.03). This finding is comparable with Mbamwai (2007) who conducted a frame survey and reported that 15, 113 fishers were actively involved in fishing activities in Bangweulu Lakes and Swamps Complex Fishery. The study further demonstrated that increased fisher's population and fish demand in the fishing communities had exacerbated the dwindling of fish stocks in the fishery. Catch records have also shown that the fishery has undergone drastic changes indicated by a decrease in production output from an average 12, 000 metric tonnes in 1970 to 6, 000 metric tonnes in 2007.

It should, however, be noted that 98% of the estimated mortality was due to fishing causes ($Z=1.87$, $M=0.03$ and $F=1.84$), and thus suggesting that the high mortalities of the *T. bangwelensis* population in the Bangweulu Lakes and Swamps Complex Fishery is not necessary as result of natural but rather due to fishing causes. A look at the exploitation rate of 0.98 on *T. bangwelensis* populations in the Bangweulu Lakes and Swamps Complex Fishery during the period of the study confirms this over fishing or high fishing pressure assertion of the species.

The high fishing mortality coefficient results (1.84) relative to natural mortalities results (0.03) confirm the high fishing pressure reported by Evans (1978) who stated that, the fish stock of Bangweulu Lakes and Swamps Complex Fishery are over exploited due to the high fishing pressure from both the large numbers of permanent residents in the swamps as well as from the seasonally migrating fishermen coming from surrounding areas. This was evident from the decrease in the total fish catches from 15,098 to 13,471 in the area as recorded by the Department of Fisheries, 2010.

Smardon (2009) observed that industrial activities and agricultural activities in the Kafue Floodplain catchment area were responsible for a water concentration of 68mg/l to 220mg/l of dissolved solids in the Kafue Floodplain fishery which increased natural mortality of fishes in the Kafue Floodplain fishery. The results of the study however, differs in that the current study established that the main contribution to mortality was fishing.

Makeche *et al* (2017) in their study found that *O. macrochir* had the largest fishing mortality coefficient (F) of 1.24 while *Oreochromis andersonii* showed the smallest fishing mortality coefficient of 0.21. *Oreochromis niloticus* had a fishing mortality coefficient of 0.45. Exploitation ratios in the Kafue Floodplain fishery were found to be below the optimum value (0.5) except for *O. macrochir* (0.7).

In other literature, Montcho *et al* (2015) in their study observed that total mortality (Z), natural mortality (M), fishing mortality (F) and exploitation ratio (E) in *O. niloticus* were 1.10, 0.74, 0.36 and 0.33 respectively. Uneke and Nwani (2014) on the other hand found that total mortality (Z), natural mortality (M), fishing mortality (F) and exploitation ratio (E) in *T. zilli* were 3.16, 1.14, 2.02 and 0.64 respectively. *T. zilli* was exploited beyond the maximum sustainable yield, hence over exploited like *T. bangwelensis*. Emilio *et al* (2010) in their study on growth, mortality

and reproduction of the blue tilapia *O. aureus* (Perciformes: Cichlidae) in the Aguamilpa Reservoir, Mexico found that natural (M) and fishing mortality (F) coefficients were 0.83 and 1.10, respectively. The estimated exploitation rate (0.57) suggested that during the study period the fishery showed signs of overfishing. This compared well with the finding in the current study that observed that *T. bangwelensis* was over exploited and that the estimated mortality was as a result of fishing and not natural.

The study observed that natural and fishing mortality coefficients were 0.83 and 1.10, respectively. The estimated exploitation rate (0.57) suggested that during the study period the fishery showed signs of overfishing. The total (Z), natural (M) and fishing (F) mortalities were 1.10, 0.74 and 0.36 respectively. The Z/K ratio was 3.7, the exploitation rate (E) 0.33 and the relative yield/biomass per recruit E_{max} 0.65. The fishing effort was slow with a dominance of small size individuals in the captures. There was growth-overfishing and an increase in the mesh size of fishing gears should go along with that of fishing effort to preserve the population on the species.

Debenham (1952) stated that when the waters of the plains begin to recede, the ideal conditions for the young fish are over. The fishermen may as well harvest the great majority of what comes off the plain, for when this water is gone, the fish will find themselves in crowded conditions in deep water.

5.4 Exploitation

The present results suggest that the stock of *T. bangwelensis* in Bangweulu Lakes and Swamps Complex Fishery is being exploited beyond optimum exploitation level (0.50) as defined by Gulland (1969), where the current exploitation rate was 0.98.

Over-exploitation is consistent with studies done by Evans (1978), Mbamwai (2007) and Food and Agriculture Organization Fisheries report (2010) that showed that most fishes of the Bangweulu Lakes and Swamps Complex Fishery are being over-exploited.

In other literature, Makeche *et al* (2017) noted that *O. andersonii* had an exploitation ratio of 0.3 while *O. niloticus* had an exploitation ratio of 0.4. The above study found that, the decrease in fish catches in the Kafue Floodplain fishery could not be attributed to fishing pressure but may

be due to natural mortality. This was in disagreement with the finding of the current study that noted that the decrease in fish catches in the Bangweulu Lakes and Swamps Complex fishery could be attributed to fishing pressure.

Exploitation rate of *T. bangwelensis* at the study site was above the optimum value (0.50). This is consistent with the results of (Mortimer 1965) who correlated increase in exploitation to more fishing pressure as a result of bad fishing methods such as intensified utilization of small meshed gillnets, seining and kutumpula fishing' (a technique which drives the fish into surrounding gillnets by beating into the water in the Bangweulu Lakes and Swamps Complex Fishery. These fishing gears that were common in the fishery are destructive and illegal fishing equipment according to the Fisheries Act.

The high exploitation rate ($E = 0.98$) is also agreeable with Mbamwai (2007) who recorded 15, 113 fishers as actively involved in fishing activities. Increased fisher's population and fish demand in the fishing communities had exacerbated the dwindling of fish stocks in Bangweulu Lakes and Swamps Complex Fishery.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

This research yielded information regarding *T. bangwelensis* species in the Bangweulu Lakes and Swamps Complex Fishery, based on reproductive biology, growth and mortality.

The reproductive biology of *T. bangwelensis* in Bangweulu Lakes and Swamps Complex Fishery was studied and it was found that this species of fish is a seasonal breeder, different peaks were observed on the length frequency histogram graphs plotted for all the specimens collected for seven months from March 2019 to September 2019. These peaks are indication of the presence of breeding seasonality in this species.

Growth parameters L_{∞} and k of *T. bangwelensis* of the Bangweulu Lakes and Swamps Complex Fishery were determined using the mean lengths on Ford- Walford plot from peaks on length frequency histogram graphs. It was found that L_{∞} was 348mm and k was found to be 0.837.

Mortality variables of *T. bangwelensis* of the Bangweulu Lakes and Swamps Complex Fishery were established. Total mortality coefficient (Z) was found to be 1.87, natural mortality coefficient (M) was found to be 0.03, fishing mortality coefficient (F) was 1.84 and exploitation rate was 0.98. *T. bangwelensis* in Bangweulu Lakes and Swamps Complex Fishery is being exploited beyond optimum exploitation level (0.50) as defined by Gulland (1969), where the current exploitation rate was 0.98. From the results above, it can be concluded that *T. bangwelensis* in Bangweulu Lakes and Swamps Complex Fishery is over exploited.

6.2 Recommendations

The following are the recommendations based on the results of the study:

There is seasonality in the spawning behaviour of *T. bangwelensis* stock in Bangweulu Lakes and Swamps Complex Fishery therefore maintaining the closed fishing season is an appropriate fishery management regulation.

Fisheries management plan should not aim at increasing the catch of *T. bangwelensis* stock from the fishery since it is already diminishing.

Future studies on reproductive biology, growth and mortality of *T. bangwelensis* species in the Bangweulu Lakes and Swamps Complex Fishery should be conducted over a long period of time in order to study reproductive biology, growth and mortality of *T. bangwelensis* species in different seasons and age groups.

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APPENDICES

Appendix A. Fish data recording sheet

Fishery Data Field Data Recording Sheet

Fishery Area.....

Station.....Data.....

Fish Sampling Method.....

Depth.....

Secchi Disk Reading.....

Observations.....

No.	Species	Total length (mm)	Weight (g)	Sex	Gonad State

Appendix B: Annual fish production for major fisheries in Zambia from 1966 to 1999
(metric tonnes) Source: FAO Fisheries Department (2010).

YEARS	BANGW	M/LUA	M/WAN	TANG	KAFUE	KARI	LUKA	U/ZAM	LUSI	L/ZAM	TOTAL
1966	12408	9479	1672	6500	10709	1436	658	1000	0	0	43862
1967	12394	7543	2865	11968	3441	980	955	1000	0	0	41146
1968	11430	7617	3704	10104	6183	1410	1602	1000	0	0	43050
1969	11894	7717	4125	7066	9938	1345	1366	1000	0	0	51139
1970	12375	7326	4216	10835	9582	2581	1724	2500	0	0	46841
1971	11728	8342	3825	6988	8247	2311	1900	3500	0	0	49894
1972	13034	9068	5812	6281	7874	1955	2370	3500	0	0	50352
1973	14032	8031	8113	5488	6289	3098	1801	3500	0	0	46929
1974	15715	8135	5992	4522	5177	2181	1707	3500	0	0	57464
1975	9881	8483	16765	7440	7266	0	1802	5827	0	0	54267
1976	7598	10680	13330	6501	9307	0	856	5995	0	0	54267
1977	9496	9534	12513	7866	9830	0	1005	3490	0	0	53734
1978	8942	7629	10352	6474	8634	0	786	4475	277	0	47569
1979	11648	9438	7878	3119	10851	0	763	5559	255	0	49511
1980	10367	7663	9094	8256	7741	407	549	6572	339	0	50988
1981	9343	2744	5734	1983	9619	875	669	6694	0	0	37661
1982	11006	7907	10979	8010	8907	2601	776	5200	423	0	55809
1983	14467	7624	8765	8522	3605	6227	926	3301	430	308	54175
1984	14715	11050	9676	11783	4317	6769	1204	4309	600	199	64622
1985	12533	10758	9220	14900	5008	9092	1120	3864	999	238	67732
1986	8125	6284	7000	12978	4262	9657	794	5235	943	157	55437
1987	11993	7707	9497	12452	5955	8666	1572	4491	936	296	63565
1988	10059	6996	8249	10629	4440	8661	1183	9200	547	620	60584
1989	9019	7190	7039	14386	8569	10409	1401	8358	218	141	66730
1990	14569	8978	3082	15418	5946	9185	1509	6578	2135	605	68005
1991	14962	8566	3147	14113	6311	9258	1623	6614	2176	558	67328
1992	13734	8964	3018	13829	6137	8658	1554	6992	2106	602	65594
1993	15419	8920	2950	14233	6316	9722	0	6785	2173	543	67061
1994	15732	7815	3474	15927	6479	8910	1691	6064	2248	528	68868
1995	16383	7925	3138	15967	6293	8674	2508	5763	1537	470	68658
1996	8725	6426	3405	13437	8724	7593	3318	9243	1029	333	62233
1997	10629	6398	8939	12719	7601	7813	0	9605	1143	623	65470
1998	11639	6987	7220	14041	5362	9822	1870	8403	523	490	66357
1999	9101	7522	8490	12709	7335	8955	2613	4213	403	201	61542
TOTAL	404094	405095	273446	233278	347444	242255	169251	46175	173330	21440	6912

Appendix C: Some fish species found in Bangweulu Lakes and Swamps Complex Fishery and their common names

SCIENTIFIC NAME	COMMON NAME
<i>Serranochromis robustus</i>	Yellow belly bream
<i>Serranochromis macrocephalus</i>	Purple faced bream
<i>Serranochromis melandi</i>	Green bream
<i>Clarias gariepinus</i>	Sharp- toothed barbel
<i>Clarias theodore</i>	Snake barbel
<i>Brycinus lateralis</i>	-
<i>Mesobola brevianalis</i>	-
<i>Marcusenius macrolepidotus</i>	-
<i>Schilbe mystus</i>	Silver barbell
<i>Schilbe bangwelensis</i>	-
<i>Mormyrops deliciosus</i>	Carnish jack
<i>Synodontis nigromaticulatus</i>	Spotted squeaker
<i>Petrocephalus catostoma</i>	Churhill
<i>Auchenoglanis occidentalis</i>	-
<i>Barbus spp</i>	Pied barb
<i>Tilapia rendalli</i>	Red breasted bream
<i>Oreochromis macrochir</i>	Green headed bream
<i>Tilapia sparmanii</i>	Banded tilapia
<i>Serranochromis anguisticeps</i>	Thin- face large mouth
<i>Alestes machroptalmus</i>	Torpedo robber
<i>Hydrocynus vittatus</i>	Tiger fish
<i>Angraulicypris sp</i>	Chisense
<i>Tylochromis bangwelensis</i>	Hump- backed beam

Appendix D. Data collected for *Tylochromis bangwelensis* from March 2019 to September 2019 from Bangweulu Lakes and Swamps Complex Fishery.

Date	SPECIES	Total length (mm)	weight (g)	Sex	Gonad status
17/03/19	<i>Tylochromis bangwelensis</i>	193	111	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	201	146	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	192	114	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	195	116	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	192	104	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	195	139	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	185	108	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	155	62	F	Q
17/03/19.	<i>Tylochromis bangwelensis</i>	175	86	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	200	139	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	156	57	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	198	119	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	157	70	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	171	86	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	161	72	F	K
17/03/19.	<i>Tylochromis bangwelensis</i>	183	103	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	162	71	M	I

17/03/19.	<i>Tylochromis bangwelensis</i>	125	27	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	144	47	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	156	61	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	164	74	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	164	74	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	183	106	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	170	84	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	183	106	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	158	66	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	160	69	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	170	78	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	203	156	F	SP
17/03/19.	<i>Tylochromis bangwelensis</i>	142	45	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	146	55	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	122	28	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	137	41	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	134	41	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	137	38	F	Q
17/03/19.	<i>Tylochromis bangwelensis</i>	199	123	M	Q

17/03/19.	<i>Tylochromis bangwelensis</i>	136	38	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	162	73	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	129	33	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	131	34	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	129	35	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	157	68	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	137	41	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	130	34	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	143	48	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	153	65	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	160	68	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	162	65	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	159	71	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	173	88	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	163	77	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	174	101	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	163	78	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	131	36	M	A
17/03/19.	<i>Tylochromis bangwelensis</i>	137	41	M	I

17/03/19.	<i>Tylochromis bangwelensis</i>	125	30	M	A
17/03/19.	<i>Tylochromis bangwelensis</i>	127	33	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	122	27	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	122	28	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	132	36	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	136	41	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	135	36	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	128	30	F	A
17/03/19.	<i>Tylochromis bangwelensis</i>	127	32	M	A
17/03/19.	<i>Tylochromis bangwelensis</i>	135	36	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	122	30	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	140	42	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	146	48	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	129	35	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	138	41	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	131	38	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	135	39	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	132	33	M	A
17/03/19.	<i>Tylochromis bangwelensis</i>	135	36	F	A

17/03/19.	<i>Tylochromis bangwelensis</i>	128	30	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	122	29	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	126	31	F	Q
17/03/19.	<i>Tylochromis bangwelensis</i>	127	31	F	A
17/03/19.	<i>Tylochromis bangwelensis</i>	132	37	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	120	28	F	A
17/03/19.	<i>Tylochromis bangwelensis</i>	122	103	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	202	140	M	K
17/03/19.	<i>Tylochromis bangwelensis</i>	222	192	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	178	98	M	K
17/03/19.	<i>Tylochromis bangwelensis</i>	196	132	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	185	113	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	167	84	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	173	86	M	SP
17/03/19.	<i>Tylochromis bangwelensis</i>	187	97	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	160	72	M	SP
17/03/19.	<i>Tylochromis bangwelensis</i>	245	278	F	SP
17/03/19.	<i>Tylochromis bangwelensis</i>	192	125	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	211	184	F	SP

17/03/19.	<i>Tylochromis bangwelensis</i>	170	81	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	132	212	M	SP
17/03/19.	<i>Tylochromis bangwelensis</i>	176	94	MF	R
17/03/19.	<i>Tylochromis bangwelensis</i>	166	70	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	165	76	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	173	95	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	131	226	F	SP
17/03/19.	<i>Tylochromis bangwelensis</i>	154	60	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	171	93	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	162	78	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	163	75	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	112	183	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	200	182	F	SP
17/03/19.	<i>Tylochromis bangwelensis</i>	110	176	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	108	169	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	220	183	F	SP
17/03/19.	<i>Tylochromis bangwelensis</i>	139	238	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	215	174	F	SP
17/03/19.	<i>Tylochromis bangwelensis</i>	156	64	F	R

17/03/19.	<i>Tylochromis bangwelensis</i>	185	117	F	SP
17/03/19.	<i>Tylochromis bangwelensis</i>	194	127	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	209	151	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	219	155	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	191	124	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	167	82	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	210	172	F	SP
17/03/19.	<i>Tylochromis bangwelensis</i>	175	97	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	202	149	F	SP
17/03/19.	<i>Tylochromis bangwelensis</i>	203	141	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	202	152	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	194	142	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	191	130	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	189	119	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	193	138	F	SP
17/03/19.	<i>Tylochromis bangwelensis</i>	141	47	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	141	48	M	A
17/03/19.	<i>Tylochromis bangwelensis</i>	135	38	M	A
17/03/19.	<i>Tylochromis bangwelensis</i>	141	49	F	A

17/03/19.	<i>Tylochromis bangwelensis</i>	144	53	M	A
17/03/19.	<i>Tylochromis bangwelensis</i>	144	49	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	143	47	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	136	43	M	A
17/03/19.	<i>Tylochromis bangwelensis</i>	135	40	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	136	40	F	Q
17/03/19.	<i>Tylochromis bangwelensis</i>	151	55	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	128	36	M	A
17/03/19.	<i>Tylochromis bangwelensis</i>	158	59	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	146	50	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	137	43	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	131	38	F	Q
17/03/19.	<i>Tylochromis bangwelensis</i>	152	61	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	134	39	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	127	35	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	134	50	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	134	39	F	A
17/03/19.	<i>Tylochromis bangwelensis</i>	132	37	M	A
17/03/19.	<i>Tylochromis bangwelensis</i>	139	47	F	I

17/03/19.	<i>Tylochromis bangwelensis</i>	144	50	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	157	53	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	131	40	F	A
17/03/19.	<i>Tylochromis bangwelensis</i>	146	50	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	129	33	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	125	31	M	A
17/03/19.	<i>Tylochromis bangwelensis</i>	132	37	M	A
17/03/19.	<i>Tylochromis bangwelensis</i>	150	59	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	143	47	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	153	53	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	144	46	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	149	57	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	136	40	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	119	27	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	133	38	F	Q
17/03/19.	<i>Tylochromis bangwelensis</i>	152	56	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	132	38	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	126	32	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	142	43	F	R

17/03/19.	<i>Tylochromis bangwelensis</i>	131	37	F	Q
17/03/19.	<i>Tylochromis bangwelensis</i>	124	29	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	145	55	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	145	43	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	125	32	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	140	45	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	136	43	F	A
17/03/19.	<i>Tylochromis bangwelensis</i>	123	27	F	A
17/03/19.	<i>Tylochromis bangwelensis</i>	137	40	F	A
17/03/19.	<i>Tylochromis bangwelensis</i>	141	46	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	150	55	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	141	42	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	133	37	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	140	45	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	131	36	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	143	48	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	137	44	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	135	45	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	133	37	M	A

17/03/19.	<i>Tylochromis bangwelensis</i>	135	51	M	A
17/03/19.	<i>Tylochromis bangwelensis</i>	141	45	M	A
17/03/19.	<i>Tylochromis bangwelensis</i>	147	52	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	153	63	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	136	41	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	153	60	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	138	44	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	136	46	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	143	50	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	145	55	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	133	35	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	141	43	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	141	47	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	146	43	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	145	51	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	145	53	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	153	42	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	125	41	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	141	47	F	A

17/03/19.	<i>Tylochromis bangwelensis</i>	136	40	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	146	53	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	135	38	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	136	41	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	139	45	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	138	39	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	133	42	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	130	36	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	130	38	M	A
17/03/19.	<i>Tylochromis bangwelensis</i>	145	55	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	137	41	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	144	52	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	138	38	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	130	41	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	132	42	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	140	47	F	A
17/03/19.	<i>Tylochromis bangwelensis</i>	138	46	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	140	47	F	Q
17/03/19.	<i>Tylochromis bangwelensis</i>	138	46	F	A

17/03/19.	<i>Tylochromis bangwelensis</i>	140	47	M	A
17/03/19.	<i>Tylochromis bangwelensis</i>	132	42	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	143	50	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	137	45	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	151	62	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	136	44	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	136	55	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	138	45	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	147	57	F	A
17/03/19.	<i>Tylochromis bangwelensis</i>	137	42	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	142	49	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	130	36	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	148	53	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	129	36	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	125	21	M	A
17/03/19.	<i>Tylochromis bangwelensis</i>	134	41	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	130	35	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	149	54	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	139	45	F	I

17/03/19.	<i>Tylochromis bangwelensis</i>	135	39	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	141	46	F	A
17/03/19.	<i>Tylochromis bangwelensis</i>	134	40	F	Q
17/03/19.	<i>Tylochromis bangwelensis</i>	148	53	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	140	43	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	141	48	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	145	46	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	145	50	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	132	38	F	A
17/03/19.	<i>Tylochromis bangwelensis</i>	147	40	F	A
17/03/19.	<i>Tylochromis bangwelensis</i>	140	42	F	A
17/03/19.	<i>Tylochromis bangwelensis</i>	140	43	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	142	46	F	K
17/03/19.	<i>Tylochromis bangwelensis</i>	146	55	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	143	46	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	129	33	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	134	38	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	135	43	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	139	40	M	R

17/03/19.	<i>Tylochromis bangwelensis</i>	146	53	M	Q
17/03/19.	<i>Tylochromis bangwelensis</i>	129	31	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	144	43	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	138	41	F	R
17/03/19.	<i>Tylochromis bangwelensis</i>	130	35	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	135	42	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	136	43	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	139	43	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	140	48	F	A
17/03/19.	<i>Tylochromis bangwelensis</i>	139	40	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	133	37	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	132	37	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	130	34	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	137	41	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	138	46	M	R
17/03/19.	<i>Tylochromis bangwelensis</i>	135	42	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	134	37	M	Q
17/03/19.	<i>Tylochromis bangwelensis</i>	138	47	F	I
17/03/19.	<i>Tylochromis bangwelensis</i>	135	40	F	I

17/03/19.	<i>Tylochromis bangwelensis</i>	136	40	F	A
17/03/19.	<i>Tylochromis bangwelensis</i>	137	43	M	A
17/03/19.	<i>Tylochromis bangwelensis</i>	138	42	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	139	35	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	140	43	M	I
17/03/19.	<i>Tylochromis bangwelensis</i>	143	46	M	Q
Date	SPECIES	Total length(mm)	Weight(g)	Sex	Gonad status
3/4/2019	<i>Tylochromis bangwelensis</i>	152	60	M	R
3/4/2019	<i>Tylochromis bangwelensis</i>	155	62	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	141	47	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	152	57	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	133	39	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	149	55	M	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	150	59	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	138	46	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	139	45	M	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	137	47	M	I

3/4/2019.	<i>Tylochromis bangwelensis</i>	144	52	F	Q
3/4/2019.	<i>Tylochromis bangwelensis</i>	166	82	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	140	46	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	136	41	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	157	63	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	150	52	M	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	151	56	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	150	58	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	154	65	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	136	41	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	145	49	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	157	72	F	Q
3/4/2019.	<i>Tylochromis bangwelensis</i>	148	53	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	136	41	F	K
3/4/2019.	<i>Tylochromis bangwelensis</i>	155	61	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	161	73	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	145	51	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	152	55	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	160	69	F	R

3/4/2019.	<i>Tylochromis bangwelensis</i>	156	63	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	140	46	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	176	52	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	146	53	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	147	52	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	160	73	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	141	49	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	161	69	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	155	53	M	Q
3/4/2019.	<i>Tylochromis bangwelensis</i>	157	70	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	167	84	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	150	74	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	155	64	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	144	50	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	153	60	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	136	41	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	159	70	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	154	62	M	K
3/4/2019.	<i>Tylochromis bangwelensis</i>	159	68	M	I

3/4/2019.	<i>Tylochromis bangwelensis</i>	157	65	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	165	73	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	149	55	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	161	73	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	145	54	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	155	67	F	K
3/4/2019.	<i>Tylochromis bangwelensis</i>	151	57	F	K
3/4/2019.	<i>Tylochromis bangwelensis</i>	168	78	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	152	46	F	K
3/4/2019.	<i>Tylochromis bangwelensis</i>	170	86	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	155	69	M	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	146	54	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	148	51	F	Q
3/4/2019.	<i>Tylochromis bangwelensis</i>	145	49	F	Q
3/4/2019.	<i>Tylochromis bangwelensis</i>	143	48	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	184	121	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	161	75	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	179	99	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	194	125	M	K

3/4/2019.	<i>Tylochromis bangwelensis</i>	208	162	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	189	124	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	193	139	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	198	137	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	165	73	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	184	107	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	199	144	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	103	57	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	167	79	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	200	134	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	191	117	F	K
3/4/2019.	<i>Tylochromis bangwelensis</i>	200	139	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	167	80	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	169	88	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	163	75	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	188	150	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	201	153	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	203	148	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	193	130	F	R

3/4/2019.	<i>Tylochromis bangwelensis</i>	204	160	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	170	85	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	166	80	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	158	63	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	165	83	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	171	85	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	159	72	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	156	65	M	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	170	84	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	156	62	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	153	64	M	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	167	89	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	194	143	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	207	150	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	190	116	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	170	95	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	171	89	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	165	79	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	180	101	F	R

3/4/2019.	<i>Tylochromis bangwelensis</i>	197	133	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	150	61	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	165	78	M	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	160	73	F	Q
3/4/2019.	<i>Tylochromis bangwelensis</i>	167	81	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	160	70	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	189	127	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	185	114	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	160	73	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	187	125	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	195	130	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	199	133	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	194	113	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	183	114	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	178	94	M	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	164	79	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	163	77	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	159	77	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	209	153	M	R

3/4/2019.	<i>Tylochromis bangwelensis</i>	189	107	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	181	87	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	169	115	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	185	60	M	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	151	58	M	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	154	59	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	162	68	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	158	50	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	144	67	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	159	85	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	169	98	M	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	180	47	M	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	144	51	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	145	99	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	175	79	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	165	77	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	164	114	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	190	80	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	170	72	F	A

3/4/2019.	<i>Tylochromis bangwelensis</i>	162	54	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	149	64	F	Q
3/4/2019.	<i>Tylochromis bangwelensis</i>	154	74	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	163	59	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	149	69	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	160	59	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	146	67	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	159	84	M	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	177	126	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	193	75	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	164	77	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	165	67	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	159	64	M	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	155	69	M	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	164	77	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	165	91	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	170	75	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	165	59	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	152	69	M	Q

3/4/2019.	<i>Tylochromis bangwelensis</i>	154	60	M	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	157	45	M	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	140	157	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	206	71	M	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	160	67	FF	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	158	90	M	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	169	47	M	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	140	66	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	156	52	M	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	146	204	F	S
3/4/2019.	<i>Tylochromis bangwelensis</i>	230	207	F	S
3/4/2019.	<i>Tylochromis bangwelensis</i>	230	189	F	S
3/4/2019.	<i>Tylochromis bangwelensis</i>	219	182	M	K
3/4/2019.	<i>Tylochromis bangwelensis</i>	220	173	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	208	57	F	S
3/4/2019.	<i>Tylochromis bangwelensis</i>	109	158	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	201	159	F	S
3/4/2019.	<i>Tylochromis bangwelensis</i>	206	95	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	181	92	F	R

3/4/2019.	<i>Tylochromis bangwelensis</i>	175	74	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	162	71	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	161	66	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	160	95	M	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	176	60	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	150	45	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	134	62	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	159	101	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	181	76	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	161	67	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	151	80	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	169	48	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	169	70	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	161	65	M	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	155	61	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	151	57	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	159	48	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	144	40	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	136	52	F	A

3/4/2019.	<i>Tylochromis bangwelensis</i>	149	53	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	150	43	M	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	144	51	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	147	49	M	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	141	64	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	156	92	F	SP
3/4/2019.	<i>Tylochromis bangwelensis</i>	173	159	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	204	79	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	157	73	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	153	70	M	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	160	80	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	168	52	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	149	50	F	S
3/4/2019.	<i>Tylochromis bangwelensis</i>	144	117	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	188	54	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	145	57	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	157	37	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	134	66	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	162	68	M	I

3/4/2019.	<i>Tylochromis bangwelensis</i>	159	56	M	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	140	71	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	156	50	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	149	52	F	Q
3/4/2019.	<i>Tylochromis bangwelensis</i>	149	42	F	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	136	61	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	158	49	F	R
3/4/2019.	<i>Tylochromis bangwelensis</i>	143	92	M	I
3/4/2019.	<i>Tylochromis bangwelensis</i>	177	47	F	A
3/4/2019.	<i>Tylochromis bangwelensis</i>	145	55	F	K
3/4/2019.	<i>Tylochromis bangwelensis</i>	142	54	M	SP
3/4/2019	<i>Tylochromis bangwelensis</i>	231	97	F	SP
DATE	SPECIES	Total length	Weight(g)	Sex	Gonad maturity
16/05/19.	<i>Tylochromis bangwelensis</i>	105	18	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	96	15	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	90	11	F	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	90	11	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	101	16	F	Q

16/05/19.	<i>Tylochromis bangwelensis</i>	109	21	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	95	14	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	83	9	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	84	9	F	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	102	15	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	80	8	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	87	11	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	82	9	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	100	17	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	93	13	F	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	90	11	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	87	11	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	100	15	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	93	13	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	101	20	M	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	94	13	F	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	89	11	M	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	85	10	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	94	14	F	I

16/05/19.	<i>Tylochromis bangwelensis</i>	85	10	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	101	15	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	109	19	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	94	14	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	95	13	M	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	106	19	F	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	103	17	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	94	12	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	92	12	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	99	16	M	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	99	13	M	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	76	20	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	105	18	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	89	10	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	88	11	F	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	75	7	F	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	82	8	F	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	83	11	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	86	9	F	I

16/05/19.	<i>Tylochromis bangwelensis</i>	86	10	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	91	18	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	74	7	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	85	9	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	81	8	F	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	83	9	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	111	21	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	101	15	F	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	96	14	F	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	91	7	F	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	78	8	M	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	86	10	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	92	13	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	78	9	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	90	12	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	90	13	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	86	11	F	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	109	21	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	96	16	F	I

16/05/19.	<i>Tylochromis bangwelensis</i>	84	10	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	85	11	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	85	11	F	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	92	9	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	89	11	F	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	101	16	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	96	16	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	96	12	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	82	8	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	103	16	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	89	10	F	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	97	15	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	102	15	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	83	7	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	114	21	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	105	18	F	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	104	17	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	93	12	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	86	10	F	Q

16/05/19.	<i>Tylochromis bangwelensis</i>	85	9	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	85	8	F	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	86	8	F	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	106	17	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	85	13	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	83	14	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	86	14	F	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	96	18	F	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	90	16	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	91	17	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	96	23	F	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	91	15	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	93	16	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	84	13	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	90	14	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	90	16	M	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	100	19	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	88	14	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	75	10	M	I

16/05/19.	<i>Tylochromis bangwelensis</i>	78	11	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	89	8	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	80	8	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	97	14	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	85	9	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	89	11	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	90	12	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	98	14	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	92	15	F	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	92	12	M	Q
16/05/19.	<i>Tylochromis bangwelensis</i>	102	17	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	90	12	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	88	10	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	87	11	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	85	10	M	I
16/05/19.	<i>Tylochromis bangwelensis</i>	98	14	F	I
16/05/19.	<i>Tylochromis bangwelensis</i>	171	90	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	181	107	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	161	74	M	A

16/05/19.	<i>Tylochromis bangwelensis</i>	165	75	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	160	69	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	169	84	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	155	61	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	164	74	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	161	67	M	K
16/05/19.	<i>Tylochromis bangwelensis</i>	161	71	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	165	76	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	165	75	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	151	57	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	155	68	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	155	62	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	187	116	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	169	81	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	160	65	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	165	74	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	166	65	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	170	82	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	210	169	M	SP

16/05/19.	<i>Tylochromis bangwelensis</i>	153	56	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	199	119	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	163	70	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	168	75	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	185	113	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	167	70	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	201	133	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	170	85	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	169	72	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	171	85	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	159	59	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	155	62	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	164	67	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	116	65	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	175	84	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	188	87	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	165	72	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	195	118	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	173	85	M	R

16/05/19.	<i>Tylochromis bangwelensis</i>	209	167	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	179	100	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	183	103	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	175	85	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	156	63	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	194	126	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	190	113	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	185	108	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	164	69	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	180	90	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	161	62	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	158	64	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	202	135	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	178	90	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	185	96	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	180	96	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	170	77	M	S
16/05/19.	<i>Tylochromis bangwelensis</i>	231	185	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	215	152	F	R

16/05/19.	<i>Tylochromis bangwelensis</i>	191	109	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	162	66	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	159	51	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	182	94	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	189	107	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	186	94	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	178	80	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	183	91	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	204	141	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	167	80	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	173	87	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	195	123	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	213	199	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	187	131	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	168	82	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	180	100	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	155	64	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	190	125	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	188	107	F	R

16/05/19.	<i>Tylochromis bangwelensis</i>	189	117	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	200	135	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	194	124	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	193	127	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	155	60	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	178	93	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	183	89	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	173	20	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	186	55	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	206	147	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	191	112	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	190	124	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	194	133	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	185	117	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	194	117	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	134	36	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	156	62	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	179	102	F	SP
16/05/19.	<i>Tylochromis bangwelensis</i>	112	69	M	R

16/05/19.	<i>Tylochromis bangwelensis</i>	146	52	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	174	98	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	137	35	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	156	52	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	223	202	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	185	117	M	K
16/05/19.	<i>Tylochromis bangwelensis</i>	186	114	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	155	65	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	143	47	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	156	59	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	181	116	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	145	53	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	155	68	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	149	59	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	133	47	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	150	53	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	144	57	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	144	56	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	139	43	M	A

16/05/19.	<i>Tylochromis bangwelensis</i>	151	58	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	147	55	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	135	41	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	141	45	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	156	62	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	135	46	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	137	24	M	K
16/05/19.	<i>Tylochromis bangwelensis</i>	141	46	F	K
16/05/19.	<i>Tylochromis bangwelensis</i>	139	47	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	141	45	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	144	46	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	144	33	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	140	41	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	132	36	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	150	55	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	140	40	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	150	52	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	146	53	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	158	41	F	A

16/05/19.	<i>Tylochromis bangwelensis</i>	148	52	F	K
16/05/19.	<i>Tylochromis bangwelensis</i>	145	49	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	153	55	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	145	50	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	155	65	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	136	43	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	150	57	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	127	45	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	144	49	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	134	42	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	155	63	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	142	52	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	147	59	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	152	61	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	157	84	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	144	45	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	141	46	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	136	42	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	150	53	M	R

16/05/19.	<i>Tylochromis bangwelensis</i>	149	53	F	K
16/05/19.	<i>Tylochromis bangwelensis</i>	150	56	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	148	55	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	149	55	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	142	45	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	140	48	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	151	61	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	139	41	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	140	44	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	132	36	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	137	67	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	138	41	F	K
16/05/19.	<i>Tylochromis bangwelensis</i>	114	43	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	152	53	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	154	62	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	155	53	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	145	45	F	R
16/05/19.	<i>Tylochromis bangwelensis</i>	160	70	M	R
16/05/19.	<i>Tylochromis bangwelensis</i>	151	59	F	A

16/05/19.	<i>Tylochromis bangwelensis</i>	157	67	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	153	61	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	157	61	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	150	49	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	139	48	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	144	49	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	153	58	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	136	41	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	147	51	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	139	44	F	A
16/05/19.	<i>Tylochromis bangwelensis</i>	135	40	M	A
16/05/19.	<i>Tylochromis bangwelensis</i>	133	40	F	A
Date	Species	Total length (mm)	Weight (g)	Sex	Gonad status
17/06/19.	<i>Tylochromis bangwelensis</i>	112	23	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	93	13	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	95	11	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	105	21	M	I

17/06/19.	<i>Tylochromis bangwelensis</i>	90	11	F	Q
17/06/19.	<i>Tylochromis bangwelensis</i>	105	20	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	94	13	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	82	10	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	104	19	F	Q
17/06/19.	<i>Tylochromis bangwelensis</i>	98	15	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	89	11	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	91	11	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	111	17	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	99	14	M	Q
17/06/19.	<i>Tylochromis bangwelensis</i>	95	14	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	98	16	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	90	12	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	109	18	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	106	14	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	88	18	M	Q
17/06/19.	<i>Tylochromis bangwelensis</i>	90	9	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	102	16	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	92	7	F	I

17/06/19.	<i>Tylochromis bangwelensis</i>	89	8	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	111	23	F	Q
17/06/19.	<i>Tylochromis bangwelensis</i>	105	19	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	100	16	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	93	11	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	95	12	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	85	18	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	100	14	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	94	12	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	105	17	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	105	21	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	82	9	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	89	12	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	150	58	F	A
17/06/19.	<i>Tylochromis bangwelensis</i>	154	59	M	A
17/06/19.	<i>Tylochromis bangwelensis</i>	170	77	F	A
17/06/19.	<i>Tylochromis bangwelensis</i>	160	69	M	A
17/06/19.	<i>Tylochromis bangwelensis</i>	141	42	F	A
17/06/19.	<i>Tylochromis bangwelensis</i>	140	43	M	A

17/06/19.	<i>Tylochromis bangwelensis</i>	158	66	F	A
17/06/19.	<i>Tylochromis bangwelensis</i>	165	84	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	178	96	F	K
17/06/19.	<i>Tylochromis bangwelensis</i>	125	29	M	A
17/06/19.	<i>Tylochromis bangwelensis</i>	160	72	M	A
17/06/19.	<i>Tylochromis bangwelensis</i>	171	82	F	A
17/06/19.	<i>Tylochromis bangwelensis</i>	140	44	M	A
17/06/19.	<i>Tylochromis bangwelensis</i>	149	58	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	158	63	M	A
17/06/19.	<i>Tylochromis bangwelensis</i>	176	95	F	K
17/06/19.	<i>Tylochromis bangwelensis</i>	161	70	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	173	93	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	158	67	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	185	121	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	154	59	F	A
17/06/19.	<i>Tylochromis bangwelensis</i>	168	79	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	178	85	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	152	57	M	A
17/06/19.	<i>Tylochromis bangwelensis</i>	168	79	M	R

17/06/19.	<i>Tylochromis bangwelensis</i>	139	43	F	A
17/06/19.	<i>Tylochromis bangwelensis</i>	140	46	F	A
17/06/19.	<i>Tylochromis bangwelensis</i>	160	69	M	A
17/06/19.	<i>Tylochromis bangwelensis</i>	152	63	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	145	53	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	150	54	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	145	52	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	142	48	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	149	54	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	153	62	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	167	72	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	148	51	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	140	50	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	167	74	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	186	108	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	190	118	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	170	84	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	171	85	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	153	64	M	R

17/06/19.	<i>Tylochromis bangwelensis</i>	190	131	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	160	78	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	173	90	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	164	78	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	175	96	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	165	78	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	175	89	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	174	91	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	165	72	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	175	86	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	158	70	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	179	102	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	159	73	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	161	70	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	188	108	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	175	85	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	169	90	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	157	65	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	186	104	F	R

17/06/19.	<i>Tylochromis bangwelensis</i>	182	102	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	168	78	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	175	90	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	170	80	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	172	90	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	170	85	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	170	92	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	175	92	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	162	73	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	171	84	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	175	95	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	160	72	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	165	83	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	162	72	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	171	85	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	160	66	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	175	93	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	176	86	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	169	88	M	R

17/06/19.	<i>Tylochromis bangwelensis</i>	170	87	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	174	88	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	179	86	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	164	71	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	184	106	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	159	66	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	170	91	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	165	73	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	169	82	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	174	74	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	165	77	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	179	106	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	165	83	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	109	20	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	115	24	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	139	41	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	155	71	M	A
17/06/19.	<i>Tylochromis bangwelensis</i>	140	43	F	A
17/06/19.	<i>Tylochromis bangwelensis</i>	112	23	F	A

17/06/19.	<i>Tylochromis bangwelensis</i>	150	54	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	151	60	F	K
17/06/19.	<i>Tylochromis bangwelensis</i>	179	96	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	150	50	M	A
17/06/19.	<i>Tylochromis bangwelensis</i>	142	46	M	A
17/06/19.	<i>Tylochromis bangwelensis</i>	165	71	M	A
17/06/19.	<i>Tylochromis bangwelensis</i>	155	58	M	A
17/06/19.	<i>Tylochromis bangwelensis</i>	152	64	F	A
17/06/19.	<i>Tylochromis bangwelensis</i>	145	56	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	156	66	F	K
17/06/19.	<i>Tylochromis bangwelensis</i>	150	51	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	146	50	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	162	73	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	150	52	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	142	52	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	161	73	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	177	77	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	149	56	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	153	61	M	K

17/06/19.	<i>Tylochromis bangwelensis</i>	150	58	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	148	57	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	162	67	M	K
17/06/19.	<i>Tylochromis bangwelensis</i>	143	46	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	148	60	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	152	56	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	150	54	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	156	62	F	K
17/06/19.	<i>Tylochromis bangwelensis</i>	159	70	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	145	50	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	150	56	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	165	78	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	145	47	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	163	72	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	155	69	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	150	52	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	148	53	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	105	19	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	156	59	M	R

17/06/19.	<i>Tylochromis bangwelensis</i>	187	68	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	145	56	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	153	60	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	149	55	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	141	46	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	143	47	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	169	78	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	147	54	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	152	59	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	149	55	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	155	61	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	165	73	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	142	45	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	159	65	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	155	65	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	148	52	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	154	59	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	154	57	F	K
17/06/19.	<i>Tylochromis bangwelensis</i>	100	15	M	R

17/06/19.	<i>Tylochromis bangwelensis</i>	104	19	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	119	23	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	110	21	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	95	12	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	94	11	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	123	22	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	95	12	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	105	20	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	95	12	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	102	14	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	98	11	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	95	10	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	105	16	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	110	18	F	Q
17/06/19.	<i>Tylochromis bangwelensis</i>	90	8	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	100	15	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	105	15	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	119	24	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	105	17	F	I

17/06/19.	<i>Tylochromis bangwelensis</i>	90	10	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	103	16	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	135	43	F	Q
17/06/19.	<i>Tylochromis bangwelensis</i>	102	17	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	92	12	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	93	11	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	115	21	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	105	17	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	99	11	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	98	12	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	108	16	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	100	12	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	96	9	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	92	9	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	117	22	M	A
17/06/19.	<i>Tylochromis bangwelensis</i>	109	16	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	100	10	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	85	7	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	100	13	F	I

17/06/19.	<i>Tylochromis bangwelensis</i>	86	7	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	96	9	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	85	9	FF	I
17/06/19.	<i>Tylochromis bangwelensis</i>	111	18	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	86	10	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	90	11	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	100	16	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	100	17	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	95	13	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	90	11	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	89	11	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	106	18	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	99	17	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	92	11	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	98	14	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	103	16	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	115	21	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	102	16	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	92	11	F	I

17/06/19.	<i>Tylochromis bangwelensis</i>	92	10	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	93	12	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	101	32	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	111	43	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	111	32	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	95	13	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	100	14	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	85	10	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	100	15	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	89	11	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	88	9	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	92	10	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	93	11	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	95	14	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	83	8	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	95	13	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	101	16	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	90	12	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	89	10	M	I

17/06/19.	<i>Tylochromis bangwelensis</i>	107	18	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	98	13	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	92	12	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	95	12	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	93	14	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	95	13	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	88	10	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	89	10	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	93	12	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	111	19	F	I
17/06/19.	<i>Tylochromis bangwelensis</i>	90	11	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	85	9	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	85	10	M	I
17/06/19.	<i>Tylochromis bangwelensis</i>	265	335	F	K
17/06/19.	<i>Tylochromis bangwelensis</i>	200	142	F	K
17/06/19.	<i>Tylochromis bangwelensis</i>	180	166	M	K
17/06/19.	<i>Tylochromis bangwelensis</i>	175	92	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	180	106	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	205	150	M	R

17/06/19.	<i>Tylochromis bangwelensis</i>	202	154	M	K
17/06/19.	<i>Tylochromis bangwelensis</i>	211	184	F	K
17/06/19.	<i>Tylochromis bangwelensis</i>	215	199	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	199	144	F	K
17/06/19.	<i>Tylochromis bangwelensis</i>	175	186	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	175	102	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	203	154	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	207	161	F	K
17/06/19.	<i>Tylochromis bangwelensis</i>	170	91	F	K
17/06/19.	<i>Tylochromis bangwelensis</i>	205	170	F	SP
17/06/19.	<i>Tylochromis bangwelensis</i>	160	70	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	180	105	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	186	113	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	180	93	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	185	107	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	190	113	F	R
17/06/19.	<i>Tylochromis bangwelensis</i>	175	91	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	169	76	M	R
17/06/19.	<i>Tylochromis bangwelensis</i>	159	69	M	R

DATE	SPECIES	Total Length(mm)	Weight(g)	SEX	Gonad status
06/07/19.	<i>Tylochromis bangwelensis</i>	100	15	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	88	11	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	83	8	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	103	17	M	A
06/07/19.	<i>Tylochromis bangwelensis</i>	85	9	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	89	10	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	100	16	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	94	12	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	95	12	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	84	8	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	93	12	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	103	17	F	A
06/07/19.	<i>Tylochromis bangwelensis</i>	89	11	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	87	10	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	94	12	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	95	13	F	Q
06/07/19.	<i>Tylochromis bangwelensis</i>	73	6	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	76	6	F	I

06/07/19.	<i>Tylochromis bangwelensis</i>	112	16	F	A
06/07/19.	<i>Tylochromis bangwelensis</i>	83	8	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	81	12	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	87	9	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	94	13	F	Q
06/07/19.	<i>Tylochromis bangwelensis</i>	93	13	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	93	8	M	Q
06/07/19.	<i>Tylochromis bangwelensis</i>	85	9	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	89	7	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	95	11	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	75	7	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	80	7	M	Q
06/07/19.	<i>Tylochromis bangwelensis</i>	100	14	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	87	8	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	95	12	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	84	4	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	91	6	F	Q
06/07/19.	<i>Tylochromis bangwelensis</i>	83	6	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	97	9	F	I

06/07/19.	<i>Tylochromis bangwelensis</i>	95	8	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	103	9	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	95	8	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	106	8	M	Q
06/07/19.	<i>Tylochromis bangwelensis</i>	105	8	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	97	9	M	Q
06/07/19.	<i>Tylochromis bangwelensis</i>	97	7	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	98	6	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	94	6	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	97	5	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	96	4	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	92	3	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	106	8	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	92	8	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	94	5	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	97	8	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	90	6	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	95	9	F	Q
06/07/19.	<i>Tylochromis bangwelensis</i>	93	5	M	I

06/07/19.	<i>Tylochromis bangwelensis</i>	97	9	M	Q
06/07/19.	<i>Tylochromis bangwelensis</i>	102	9	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	85	2	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	97	5	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	87	5	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	87	18	F	A
06/07/19.	<i>Tylochromis bangwelensis</i>	87	9	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	84	8	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	89	11	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	91	11	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	100	14	F	A
06/07/19.	<i>Tylochromis bangwelensis</i>	86	10	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	86	8	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	81	8	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	96	14	M	A
06/07/19.	<i>Tylochromis bangwelensis</i>	96	14	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	85	9	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	87	8	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	99	14	M	A

06/07/19.	<i>Tylochromis bangwelensis</i>	80	8	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	94	13	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	211	179	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	172	84	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	203	153	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	170	82	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	212	171	F	SP
06/07/19.	<i>Tylochromis bangwelensis</i>	200	134	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	216	185	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	156	64	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	164	84	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	190	130	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	258	309	F	SP
06/07/19.	<i>Tylochromis bangwelensis</i>	203	149	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	158	66	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	140	43	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	203	151	F	SP
06/07/19.	<i>Tylochromis bangwelensis</i>	173	81	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	160	67	M	R

06/07/19.	<i>Tylochromis bangwelensis</i>	174	92	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	190	122	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	142	44	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	134	33	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	171	71	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	145	51	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	173	90	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	175	89	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	170	81	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	155	58	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	134	35	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	166	71	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	197	144	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	174	93	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	178	97	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	195	129	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	210	182	M	K
06/07/19.	<i>Tylochromis bangwelensis</i>	185	107	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	179	89	M	K

06/07/19.	<i>Tylochromis bangwelensis</i>	190	112	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	187	119	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	185	108	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	180	93	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	167	78	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	210	152	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	240	242	F	SP
06/07/19.	<i>Tylochromis bangwelensis</i>	196	137	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	175	74	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	165	71	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	144	44	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	165	75	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	178	89	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	142	41	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	152	56	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	180	111	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	163	70	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	152	52	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	180	102	M	R

06/07/19.	<i>Tylochromis bangwelensis</i>	142	48	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	180	95	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	158	67	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	191	113	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	176	93	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	140	39	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	110	16	F	A
06/07/19.	<i>Tylochromis bangwelensis</i>	143	40	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	182	100	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	176	92	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	152	54	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	146	41	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	165	67	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	153	48	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	184	111	M	SP
06/07/19.	<i>Tylochromis bangwelensis</i>	189	74	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	180	88	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	206	152	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	179	105	F	R

06/07/19.	<i>Tylochromis bangwelensis</i>	175	94	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	174	100	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	167	77	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	212	194	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	236	245	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	250	279	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	216	178	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	214	171	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	210	178	F	SP
06/07/19.	<i>Tylochromis bangwelensis</i>	208	155	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	234	226	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	282	403	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	221	201	F	SP
06/07/19.	<i>Tylochromis bangwelensis</i>	210	166	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	139	60	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	156	64	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	159	73	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	152	82	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	186	118	F	K

06/07/19.	<i>Tylochromis bangwelensis</i>	186	119	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	183	118	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	158	66	M	K
06/07/19.	<i>Tylochromis bangwelensis</i>	190	120	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	160	80	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	195	134	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	155	68	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	147	50	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	157	51	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	136	46	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	150	58	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	187	121	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	162	72	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	159	71	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	184	110	M	K
06/07/19.	<i>Tylochromis bangwelensis</i>	150	53	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	162	76	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	171	86	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	151	62	F	R

06/07/19.	<i>Tylochromis bangwelensis</i>	96	15	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	181	118	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	165	77	F	K
06/07/19.	<i>Tylochromis bangwelensis</i>	169	84	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	157	72	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	181	118	M	K
06/07/19.	<i>Tylochromis bangwelensis</i>	164	74	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	193	126	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	152	65	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	138	47	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	160	42	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	144	74	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	160	73	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	177	74	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	200	148	M	K
06/07/19.	<i>Tylochromis bangwelensis</i>	168	85	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	158	57	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	155	68	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	154	65	M	R

06/07/19.	<i>Tylochromis bangwelensis</i>	181	117	M	K
06/07/19.	<i>Tylochromis bangwelensis</i>	149	63	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	150	63	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	174	90	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	185	119	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	165	89	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	167	83	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	193	129	M	K
06/07/19.	<i>Tylochromis bangwelensis</i>	136	45	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	168	78	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	177	99	M	K
06/07/19.	<i>Tylochromis bangwelensis</i>	154	66	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	154	68	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	141	45	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	93	12	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	100	15	M	R
06/07/19.	<i>Tylochromis bangwelensis</i>	85	8	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	92	13	F	R
06/07/19.	<i>Tylochromis bangwelensis</i>	76	7	F	I

06/07/19.	<i>Tylochromis bangwelensis</i>	76	7	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	85	9	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	93	11	M	A
06/07/19.	<i>Tylochromis bangwelensis</i>	93	12	M	A
06/07/19.	<i>Tylochromis bangwelensis</i>	89	9	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	89	7	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	95	12	F	I
06/07/19.	<i>Tylochromis bangwelensis</i>	91	13	F	A
06/07/19.	<i>Tylochromis bangwelensis</i>	87	7	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	100	16	M	I
06/07/19.	<i>Tylochromis bangwelensis</i>	161	70	F	R
DATE	SPECIES	Total Length(mm)	Weight(g)	Sex	Gonad status
10/08/19.	<i>Tylochromis bangwelensis</i>	93	12	F	I
10/08/19.	<i>Tylochromis bangwelensis</i>	106	21	F	A
10/08/19.	<i>Tylochromis bangwelensis</i>	93	12	F	A
10/08/19.	<i>Tylochromis bangwelensis</i>	83	9	F	A
10/08/19.	<i>Tylochromis bangwelensis</i>	96	13	M	I

10/08/19.	<i>Tylochromis bangwelensis</i>	90	11	M	A
10/08/19.	<i>Tylochromis bangwelensis</i>	91	10	F	I
10/08/19.	<i>Tylochromis bangwelensis</i>	88	10	M	A
10/08/19.	<i>Tylochromis bangwelensis</i>	99	12	F	A
10/08/19.	<i>Tylochromis bangwelensis</i>	105	16	M	A
10/08/19.	<i>Tylochromis bangwelensis</i>	108	21	F	I
10/08/19.	<i>Tylochromis bangwelensis</i>	77	6	M	I
10/08/19.	<i>Tylochromis bangwelensis</i>	95	10	M	I
10/08/19.	<i>Tylochromis bangwelensis</i>	99	14	M	I
10/08/19.	<i>Tylochromis bangwelensis</i>	105	16	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	87	9	F	I
10/08/19.	<i>Tylochromis bangwelensis</i>	112	21	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	104	16	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	117	21	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	103	13	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	117	23	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	118	18	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	99	11	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	95	11	F	Q

10/08/19.	<i>Tylochromis bangwelensis</i>	105	15	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	88	5	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	100	14	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	87	7	M	I
10/08/19.	<i>Tylochromis bangwelensis</i>	103	13	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	75	3	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	103	19	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	106	21	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	100	11	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	95	13	M	I
10/08/19.	<i>Tylochromis bangwelensis</i>	105	10	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	104	19	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	97	13	M	Q
10/08/19.	<i>Tylochromis bangwelensis</i>	83	12	F	I
10/08/19.	<i>Tylochromis bangwelensis</i>	73	4	F	Q
10/08/19.	<i>Tylochromis bangwelensis</i>	98	2	M	A
10/08/19.	<i>Tylochromis bangwelensis</i>	84	11	M	A
10/08/19.	<i>Tylochromis bangwelensis</i>	109	5	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	120	15	F	A

10/08/19.	<i>Tylochromis bangwelensis</i>	85	22	F	Q
10/08/19.	<i>Tylochromis bangwelensis</i>	97	5	M	A
10/08/19.	<i>Tylochromis bangwelensis</i>	89	10	M	A
10/08/19.	<i>Tylochromis bangwelensis</i>	89	6	F	A
10/08/19.	<i>Tylochromis bangwelensis</i>	92	6	M	I
10/08/19.	<i>Tylochromis bangwelensis</i>	92	9	F	I
10/08/19.	<i>Tylochromis bangwelensis</i>	83	8	M	Q
10/08/19.	<i>Tylochromis bangwelensis</i>	103	4	M	I
10/08/19.	<i>Tylochromis bangwelensis</i>	86	13	M	I
10/08/19.	<i>Tylochromis bangwelensis</i>	97	5	M	Q
10/08/19.	<i>Tylochromis bangwelensis</i>	98	10	F	I
10/08/19.	<i>Tylochromis bangwelensis</i>	85	9	F	I
10/08/19.	<i>Tylochromis bangwelensis</i>	107	5	F	I
10/08/19.	<i>Tylochromis bangwelensis</i>	108	22	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	105	27	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	200	27	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	120	27	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	113	31	M	K
10/08/19.	<i>Tylochromis bangwelensis</i>	101	20	F	K

10/08/19.	<i>Tylochromis bangwelensis</i>	117	15	M	A
10/08/19.	<i>Tylochromis bangwelensis</i>	105	27	F	A
10/08/19.	<i>Tylochromis bangwelensis</i>	142	26	M	I
10/08/19.	<i>Tylochromis bangwelensis</i>	116	58	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	101	25	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	108	21	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	109	19	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	115	25	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	119	20	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	102	23	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	106	13	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	104	20	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	112	21	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	113	13	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	118	19	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	113	20	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	118	24	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	110	27	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	137	22	F	A

10/08/19.	<i>Tylochromis bangwelensis</i>	113	46	M	I
10/08/19.	<i>Tylochromis bangwelensis</i>	158	25	M	K
10/08/19.	<i>Tylochromis bangwelensis</i>	105	71	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	105	20	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	105	28	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	108	22	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	108	24	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	109	22	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	110	23	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	119	20	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	105	29	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	103	18	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	105	26	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	105	19	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	142	18	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	213	48	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	157	70	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	153	58	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	159	54	M	K

10/08/19.	<i>Tylochromis bangwelensis</i>	148	66	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	145	55	M	K
10/08/19.	<i>Tylochromis bangwelensis</i>	154	48	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	153	59	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	155	51	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	165	57	M	K
10/08/19.	<i>Tylochromis bangwelensis</i>	157	68	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	209	56	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	151	148	F	SP
10/08/19.	<i>Tylochromis bangwelensis</i>	160	48	M	K
10/08/19.	<i>Tylochromis bangwelensis</i>	157	62	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	150	71	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	161	59	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	156	73	F	A
10/08/19.	<i>Tylochromis bangwelensis</i>	165	66	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	165	72	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	168	77	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	169	79	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	215	85	M	SP

10/08/19.	<i>Tylochromis bangwelensis</i>	215	182	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	214	167	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	175	181	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	156	107	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	154	64	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	169	66	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	163	90	M	K
10/08/19.	<i>Tylochromis bangwelensis</i>	153	75	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	190	62	M	A
10/08/19.	<i>Tylochromis bangwelensis</i>	185	130	F	SP
10/08/19.	<i>Tylochromis bangwelensis</i>	170	116	M	K
10/08/19.	<i>Tylochromis bangwelensis</i>	181	86	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	198	98	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	213	146	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	192	169	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	204	146	M	K
10/08/19.	<i>Tylochromis bangwelensis</i>	205	147	M	K
10/08/19.	<i>Tylochromis bangwelensis</i>	202	157	M	SP
10/08/19.	<i>Tylochromis bangwelensis</i>	158	138	M	SP

10/08/19.	<i>Tylochromis bangwelensis</i>	167	67	M	A
10/08/19.	<i>Tylochromis bangwelensis</i>	163	57	F	A
10/08/19.	<i>Tylochromis bangwelensis</i>	153	80	F	A
10/08/19.	<i>Tylochromis bangwelensis</i>	186	61	F	A
10/08/19.	<i>Tylochromis bangwelensis</i>	188	110	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	162	114	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	161	69	M	K
10/08/19.	<i>Tylochromis bangwelensis</i>	161	70	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	153	74	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	164	58	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	200	74	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	198	137	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	208	147	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	182	169	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	191	110	M	K
10/08/19.	<i>Tylochromis bangwelensis</i>	170	128	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	201	88	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	183	163	F	SP
10/08/19.	<i>Tylochromis bangwelensis</i>	194	110	M	SP

10/08/19.	<i>Tylochromis bangwelensis</i>	157	148	F	SP
10/08/19.	<i>Tylochromis bangwelensis</i>	185	64	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	205	122	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	159	159	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	170	67	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	165	91	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	213	68	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	158	167	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	161	75	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	174	74	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	162	97	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	205	166	F	SP
10/08/19.	<i>Tylochromis bangwelensis</i>	206	170	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	201	163	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	199	160	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	207	171	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	198	168	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	199	169	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	208	171	F	K

10/08/19.	<i>Tylochromis bangwelensis</i>	265	221	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	260	220	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	259	219	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	285	189	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	208	170	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	198	98	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	190	110	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	170	90	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	181	92	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	301	201	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	301	200	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	309	202	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	285	199	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	209	132	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	300	189	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	289	115	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	228	110	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	201	138	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	296	159	F	K

10/08/19.	<i>Tylochromis bangwelensis</i>	316	204	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	287	201	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	203	149	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	216	185	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	211	178	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	258	187	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	200	133	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	197	123	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	240	242	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	205	170	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	215	199	F	SP
10/08/19.	<i>Tylochromis bangwelensis</i>	265	365	M	K
10/08/19.	<i>Tylochromis bangwelensis</i>	310	211	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	311	201	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	315	210	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	290	187	F	SP
10/08/19.	<i>Tylochromis bangwelensis</i>	296	188	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	267	172	M	K
10/08/19.	<i>Tylochromis bangwelensis</i>	216	170	M	K

10/08/19.	<i>Tylochromis bangwelensis</i>	210	176	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	205	136	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	230	191	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	215	128	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	210	115	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	210	116	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	211	120	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	216	130	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	302	201	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	306	198	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	304	190	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	307	190	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	320	215	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	319	2212	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	317	213	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	315	210	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	320	213	M	K
10/08/19.	<i>Tylochromis bangwelensis</i>	327	217	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	286	188	M	K

10/08/19.	<i>Tylochromis bangwelensis</i>	280	177	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	281	179	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	285	179	F	K
10/08/19.	<i>Tylochromis bangwelensis</i>	287	190	M	R
10/08/19.	<i>Tylochromis bangwelensis</i>	189	98	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	187	90	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	190	91	F	R
10/08/19.	<i>Tylochromis bangwelensis</i>	191	89	F	R
DATE	SPECIES	Total length(mm)	Weight(g)	Sex	Gonad status
04/09/19.	<i>Tylochromis bangwelensis</i>	190	50	M	K
04/09/19.	<i>Tylochromis bangwelensis</i>	188	66	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	176	64	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	175	86	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	151	61	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	153	64	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	150	60	M	K
04/09/19.	<i>Tylochromis bangwelensis</i>	156	65	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	153	62	M	K

04/09/19.	<i>Tylochromis bangwelensis</i>	151	64	M	A
04/09/19.	<i>Tylochromis bangwelensis</i>	165	84	M	K
04/09/19.	<i>Tylochromis bangwelensis</i>	158	66	M	K
04/09/19.	<i>Tylochromis bangwelensis</i>	176	94	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	156	70	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	165	83	M	A
04/09/19.	<i>Tylochromis bangwelensis</i>	159	71	M	K
04/09/19.	<i>Tylochromis bangwelensis</i>	159	67	M	I
04/09/19.	<i>Tylochromis bangwelensis</i>	150	58	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	158	70	F	A
04/09/19.	<i>Tylochromis bangwelensis</i>	160	71	F	A
04/09/19.	<i>Tylochromis bangwelensis</i>	154	66	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	162	74	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	155	66	F	A
04/09/19.	<i>Tylochromis bangwelensis</i>	151	54	M	A
04/09/19.	<i>Tylochromis bangwelensis</i>	155	66	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	152	64	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	152	62	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	155	66	M	R

04/09/19.	<i>Tylochromis bangwelensis</i>	210	153	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	225	195	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	205	152	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	195	195	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	230	220	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	218	179	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	210	163	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	269	348	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	272	345	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	245	285	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	280	370	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	268	312	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	223	187	M	K
04/09/19.	<i>Tylochromis bangwelensis</i>	189	118	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	229	204	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	193	135	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	199	124	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	192	140	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	187	117	F	R

04/09/19.	<i>Tylochromis bangwelensis</i>	199	129	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	188	119	M	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	188	131	M	K
04/09/19.	<i>Tylochromis bangwelensis</i>	212	161	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	169	88	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	182	102	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	183	104	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	182	122	M	K
04/09/19.	<i>Tylochromis bangwelensis</i>	182	104	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	181	105	M	K
04/09/19.	<i>Tylochromis bangwelensis</i>	176	111	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	185	88	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	207	108	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	175	155	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	207	99	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	175	90	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	175	114	M	K
04/09/19.	<i>Tylochromis bangwelensis</i>	190	115	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	182	178	F	SP

04/09/19.	<i>Tylochromis bangwelensis</i>	212	210	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	230	136	M	K
04/09/19.	<i>Tylochromis bangwelensis</i>	195	193	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	175	96	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	179	99	M	K
04/09/19.	<i>Tylochromis bangwelensis</i>	185	115	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	187	159	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	204	105	M	K
04/09/19.	<i>Tylochromis bangwelensis</i>	183	103	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	180	123	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	192	87	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	172	124	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	198	100	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	184	106	M	K
04/09/19.	<i>Tylochromis bangwelensis</i>	185	99	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	180	134	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	199	75	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	165	129	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	194	111	F	K

04/09/19.	<i>Tylochromis bangwelensis</i>	182	105	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	189	135	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	209	115	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	196	123	M	A
04/09/19.	<i>Tylochromis bangwelensis</i>	191	110	M	K
04/09/19.	<i>Tylochromis bangwelensis</i>	195	96	M	K
04/09/19.	<i>Tylochromis bangwelensis</i>	178	119	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	196	132	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	194	131	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	195	84	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	175	100	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	174	120	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	189	88	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	172	135	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	193	126	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	186	85	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	173	125	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	174	188	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	224	301	M	SP

04/09/19.	<i>Tylochromis bangwelensis</i>	250	125	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	192	111	M	K
04/09/19.	<i>Tylochromis bangwelensis</i>	136	246	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	245	242	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	236	220	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	238	108	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	187	303	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	262	173	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	221	198	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	226	100	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	178	117	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	191	102	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	173	118	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	187	108	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	181	111	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	186	75	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	175	119	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	186	122	M	K
04/09/19.	<i>Tylochromis bangwelensis</i>	185	128	F	R

04/09/19.	<i>Tylochromis bangwelensis</i>	189	115	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	185	128	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	193	124	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	188	153	M	K
04/09/19.	<i>Tylochromis bangwelensis</i>	202	125	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	191	123	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	187	91	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	177	149	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	196	95	M	K
04/09/19.	<i>Tylochromis bangwelensis</i>	178	107	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	180	107	M	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	179	92	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	205	156	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	184	103	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	197	116	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	184	87	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	174	90	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	200	141	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	183	106	F	K

04/09/19.	<i>Tylochromis bangwelensis</i>	172	93	M	K
04/09/19.	<i>Tylochromis bangwelensis</i>	175	93	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	173	102	M	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	179	89	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	200	151	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	186	105	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	182	108	M	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	213	172	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	194	142	M	K
04/09/19.	<i>Tylochromis bangwelensis</i>	184	95	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	182	106	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	180	110	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	185	116	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	184	111	M	K
04/09/19.	<i>Tylochromis bangwelensis</i>	174	109	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	181	95	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	180	110	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	168	91	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	199	84	F	R

04/09/19.	<i>Tylochromis bangwelensis</i>	187	124	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	180	114	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	171	96	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	195	82	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	177	118	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	186	99	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	178	104	F	SP
04/09/19.	<i>Tylochromis bangwelensis</i>	180	87	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	139	95	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	129	42	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	137	33	M	K
04/09/19.	<i>Tylochromis bangwelensis</i>	135	42	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	126	39	F	I
04/09/19.	<i>Tylochromis bangwelensis</i>	115	36	M	Q
04/09/19.	<i>Tylochromis bangwelensis</i>	116	22	M	I
04/09/19.	<i>Tylochromis bangwelensis</i>	129	24	M	I
04/09/19.	<i>Tylochromis bangwelensis</i>	138	45	M	Q
04/09/19.	<i>Tylochromis bangwelensis</i>	110	41	M	A
04/09/19.	<i>Tylochromis bangwelensis</i>	127	21	M	A

04/09/19.	<i>Tylochromis bangwelensis</i>	102	32	F	A
04/09/19.	<i>Tylochromis bangwelensis</i>	123	17	M	A
04/09/19.	<i>Tylochromis bangwelensis</i>	126	32	F	A
04/09/19.	<i>Tylochromis bangwelensis</i>	145	30	M	A
04/09/19.	<i>Tylochromis bangwelensis</i>	121	50	M	A
04/09/19.	<i>Tylochromis bangwelensis</i>	114	29	M	A
04/09/19.	<i>Tylochromis bangwelensis</i>	115	22	F	A
04/09/19.	<i>Tylochromis bangwelensis</i>	128	34	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	121	26	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	101	14	M	Q
04/09/19.	<i>Tylochromis bangwelensis</i>	122	30	F	I
04/09/19.	<i>Tylochromis bangwelensis</i>	117	26	M	Q
04/09/19.	<i>Tylochromis bangwelensis</i>	119	22	F	I
04/09/19.	<i>Tylochromis bangwelensis</i>	131	42	M	I
04/09/19.	<i>Tylochromis bangwelensis</i>	191	125	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	189	117	F	Q
04/09/19.	<i>Tylochromis bangwelensis</i>	177	93	F	Q
04/09/19.	<i>Tylochromis bangwelensis</i>	182	110	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	165	80	F	R

04/09/19.	<i>Tylochromis bangwelensis</i>	175	94	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	131	35	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	133	35	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	115	25	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	114	24	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	129	30	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	121	26	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	121	27	M	I
04/09/19.	<i>Tylochromis bangwelensis</i>	132	36	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	126	30	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	123	30	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	122	28	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	128	32	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	183	103	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	128	42	M	A
04/09/19.	<i>Tylochromis bangwelensis</i>	130	36	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	168	88	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	177	94	M	Q
04/09/19.	<i>Tylochromis bangwelensis</i>	181	98	F	K

04/09/19.	<i>Tylochromis bangwelensis</i>	155	62	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	123	30	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	122	30	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	121	26	F	A
04/09/19.	<i>Tylochromis bangwelensis</i>	180	110	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	173	102	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	177	94	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	166	80	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	103	23	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	116	24	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	189	120	M	A
04/09/19.	<i>Tylochromis bangwelensis</i>	136	39	F	A
04/09/19.	<i>Tylochromis bangwelensis</i>	171	89	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	166	76	F	Q
04/09/19.	<i>Tylochromis bangwelensis</i>	181	104	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	183	102	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	172	83	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	169	76	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	175	86	F	K

04/09/19.	<i>Tylochromis bangwelensis</i>	173	91	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	176	100	F	R
04/09/19.	<i>Tylochromis bangwelensis</i>	176	89	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	287	123	M	R
04/09/19.	<i>Tylochromis bangwelensis</i>	321	98	F	K
04/09/19.	<i>Tylochromis bangwelensis</i>	348	79	F	K