The Population Structure of the Orange River mudfish (Labeo capensis) in Allemanskraal Dam and Its Potential as a Fishery Species

Animal Sciences

Research Question

Can the Orange River mudfish Labeo capensis be utilized as a potential fishery species in Allemanskraal Dam?

Methodology

STUDY SITE:

The study site of this investigation is Allemanskraal Dam in the Free State province. It is a large, 61-year-old impoundment surrounded by the Willem Pretorious Nature Reserve. The Dam's main purpose is the irrigation via canals. Sport and recreational fisheries make use of the dam. Allemanskraal Dam is 22 kilometres away from its nearest town, Ventersburg.

The Allemanskraal Dam has a surface area of 2 667 hectares and a capacity of 178 136 000 cubic metres. The average depth at full supply level (FSL) is 6.7 metres, and its catchment area is 3 628 square kilometres. The Dam's wall type is Earthfall & Gravity and stands at a height of 37.7 metres with a crest length of 1 347 metres. During the sampling period of 9th April 2021 to 10th April 2021, Allemanskraal Dam was at 100% capacity.

Methodology

FISH SAMPLING METHODS:

This research was conducted using three types of nets: gill nets, seine nets and fyke nets.

GILL NETS

Three fleets of multifilament, green nylon gill nets were used. The nets were each 100 metres in length with 5 x 20 metre panels of varying mesh sizes of 44mm, 50mm, 75mm, 100mm and 144mm in numerical order.

1. Three fleets of the gill nets were set at 10:00 on Thursday the 8th of April 2021, parallel to the shore.
2. On Friday the 9th of April 2021, one fleet was lifted and the fish were collected by hand at 15:00.
3. The two remaining fleets were lifted on Saturday the 10th of April 2021 at 09:30 and the fish were collected by hand.

Methodology

SEINE NETS

A 10m x 2m multifilament, green nylon seine net was used to collect the fish in the littoral zone of the study site.

1. On Saturday the 10th of April 2021, a distance of 10 metres from the shore was measured.

2. Two researchers stood at each end of the net. The top line of the net was held in-hand, and the bottom line was tied around the researchers' ankles.

3. The net was pulled for 10 metres within the littoral zone, after which the researcher in the deeper end moved in a semi-circle such that the researchers and the net were parallel to the shore. The researchers made sure to maintain the bag in the middle of them.

4. The net was then pulled towards the shore of the dam.

5. The fish were collected by hand and put into buckets.

6. This procedure was repeated four times.

Methodology

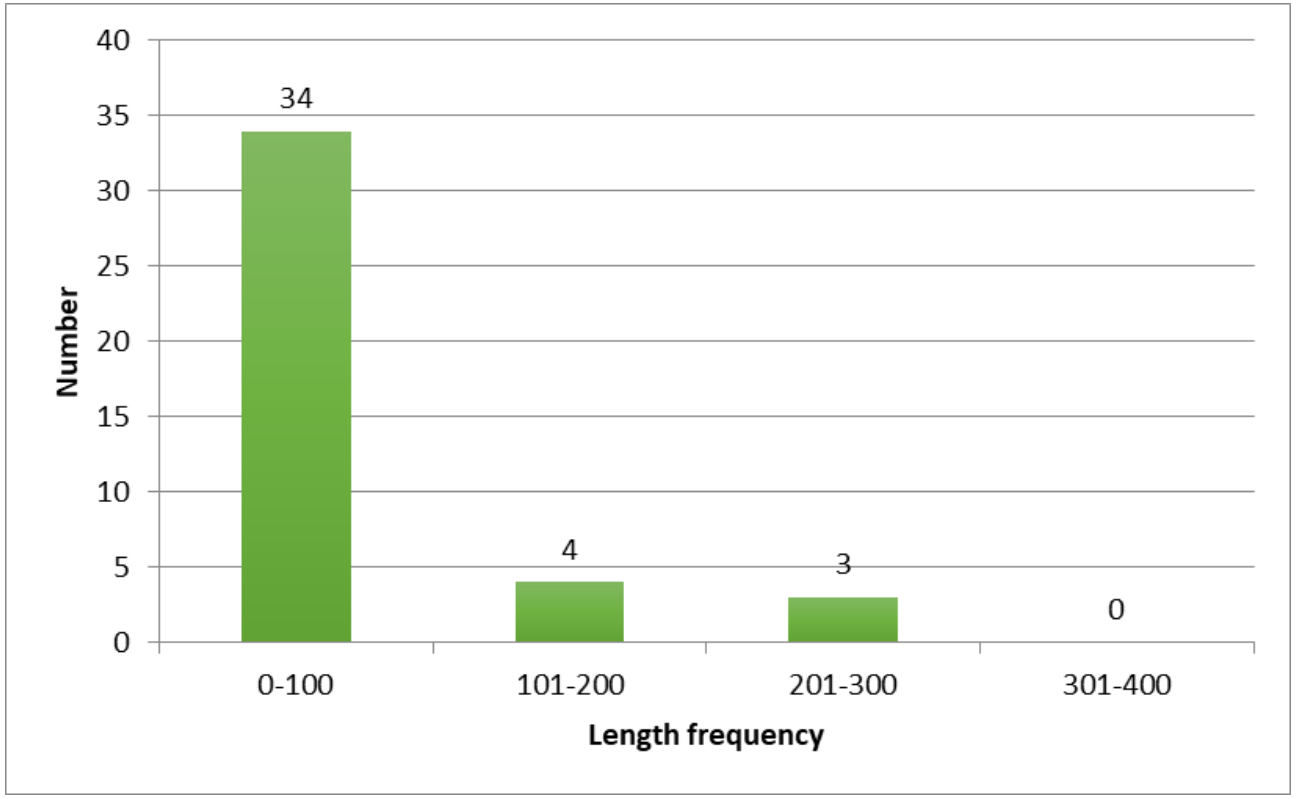
FYKE NETS

Four double-ended brown multifilament fyke nets were used. The nets had nine hoops on either side, forming a cone-shaped.

1. The fyke nets were set parallel to the shore on Friday the 7th of April 2021 at 10:00 and were left for two nettings nights.

2. The nets were lifted on Saturday 10th April 2021 at 11:00 and the fish were collected by hand into buckets.

Results



The majority (34/41) of the fish caught were within the 0-100 mm size class. The 101-200mm and 201-300mm size class contain similar numbers of fish (4/41 and 3/41 respectively), while no fish were caught in the 301-400mm size class.

The 0-100mm size class contained 82.93% of the fish caught, while the 101-200mm and 201-300mm size classes contained 9.76% and 7.32% of fish caught respectively. The 301-400mm size class contained 0%.

Interpretation of Results

Due to the fact that there were individuals of the Orange River mudfish Labeo capensis species found in most of the size classes (although some substantially more than others), it can be concluded that the population of Labeo capensis in Allemanskraal is established.

The results of the research show that 82.93% of the L. capensis caught had a fork length of between 0 and 100mm. According to literature research done, sexually mature individuals of the L. capensis species tend to be around 200-300mm SL (Skelton, 2001; Barkhuizen, 2015). Furthermore, their age of sexual maturity is 4-6 years. As their breeding season is spring-summer (Winker et al., 2011), it is almost certain that the population of L. capensis in Allemanskraal Dam had made use of the suitable environmental conditions to reproduce. This means that during the study period of 9th April 2021 to 10th April 2021, the majority of the population of L. capensis would be young-of-the-year.

A study done by L.M. Barkhuizen (2015) displays a similar set of results as the April 2021 study. This study resulted in a substantial number of L. capensis individuals found in every size class, up to 500mm fork length. The size class of 0-100mm held the highest percentage of individuals of this species at Allemanskraal Dam (42.73%). This shows that the population of L. capensis at the Allemanskraal Dam at that time was slightly more mature than what was observed during the April 2021 study.

Therefore, although the results of the practical research done during the period of 9th April 2021 to 10th April 2021 suggest that the population of L. capensis in Allemanskraal Dam consists of mostly young-of-the-year, historical data – such as that of Skelton- motivate that the largely-immature population of L. capensis in Allemanskraal Dam will grow into a sexually mature population within the next 4-6 years if the suitable conditions are maintained.

Conclusions

This study's hypothesis has been accepted.

According to the practical research done during the study period of 9th – 10th April 2021, majority of the Orange River mudfish Labeo capensis individuals caught were within their young-of-the-year stage of life, as they were mostly between the 0-100mm fork length frequency.

Allemanskraal Dam, as of the study period, has a very small juvenile fish population of L. capensis, as only 7 out of 41 fish individuals caught were within the 101- 300mm fork length size class.

These results would therefore show that the population of L. capensis is not established as of yet, as the research done was right after their breeding season. However, historical research has shown that sexually mature individuals of the L. capensis species tend to be a minimum of 300mm SL, 4-6 years after hatching.

Therefore, if suitable conditions are maintained, the population of L. capensis in Allemanskraal Dam would be established within 3-4 years (after sexual maturity) (Winkler et al., 2011), which would make this species a suitable fishery species. Establishing this species' potential will therefore allow economically viable fisheries to utilise them sustainably and to their full economic potential, thus making an effort to combat food and job insecurity.

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