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TROPHIC SPECTRUM OF PARACHROMIS DOVII IN ``EL BORDO LA PALAPA``, MORELOS, MEXICO

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Abstract: When we talk about eating habits we are referring to a series of attitudes that an individual has at the time of feeding, referring to the way the fish feeds, that is, its behavior, search and ingestion. Sampling was carried out from March 2019 to February 2020, with the purpose of knowing the dietary aspects of P. dovii. Water samples were taken at a sampling station to determine some parameters of the water quality of the La Palapa shore. The fish were captured with a size 6 hook and the following biometry was performed on each of the organisms: Total length, pattern length, total weight and sex was determined. The digestive tract was separated, from the level of the gills to the end of the intestine, which was weighed with the help of an analytical balance (0.001 g) and preserved in 10% formalin. It was determined that P. dovii in the system aquatic La Palapa presents omnivorous eating habits since there is no preference regarding any food on a population basis. Juvenile individuals show a preference towards zooplankton and unidentified organic matter (MONI), while in adults a greater amount of phytoplankton and MONI was found.
Both sexes were considered to be generalists, although there are differences in their frequency of occurrence. When making the comparison between sexes, there seems to be a preference on the part of females towards phytoplankton, while males contain more MONI.
Keywords: Cichlids, feeding, trophic spectrum, Morelos

Cichlids are an essentially freshwater family, which belong to the order Perciformes, which currently includes around 1726 described species (Eschmeyer et al., 2020), and can be found in South and Central America (only one species reaches Texas), parts of Africa, southern India, Madagascar, Sri Lanka, Syria and the West Indies (Berra, 2001).

For Mexico, the Cichlidae family constitutes the second most diverse group of freshwater fish; with 57 species where its greatest diversity is located in the Mexican southeast, specifically in the Grijalva-Usumacinta basin, which is a system with more native and endemic cichlids (Miller, 1987; Miller et al., 2005). Some of them are abundant and common, so their distribution is well established while others are reported from imprecise and in some cases unknown locations. The diversity of the Cichlidae family of Mesoamerica (more than 100 species) contains some taxonomic and systematic problems (Miller, 1996). Most species remained within the genus for a long time.: *Cichlasoma* (Swainson, 1839).

Cichlids are bottom fish, from pools and from the banks of rivers or lagoons where they live near stones and weeds. They are oviparous and generally lay adhesive eggs on rocks and logs. Generally both parents participate in caring for the eggs, hatchlings and juveniles. Both sexes look very similar, but during the reproductive season they differ more in their coloration, size, or the shape of their fins (Bussing, 2002).

Parachromis dovii (Günther, 1867) or guapote lagoonero is a piscivorous cichlid that is distributed in both sides of Central America (Atlantic and Pacific), from the middle of Honduras to Costa Rica, being native to that same country (Bussing, 2002) and is also found in the great lakes. of Nicaragua (Miller, 1966). Its common name is "guapote" and it is the largest species in the family, reaching a total length of 650 mm (Anonymous, 1996). Most Latin American cichlids belong to the genus Parachromis (Bussing, 2002) and are extremely heterogeneous in their feeding patterns (McGinthy, 1984).

Food is a complex system of adaptation and structures that facilitate the exploitation of the resources available in the environment.

The variety of this food may be determined by availability in the area; this in response to abiotic and biotic conditions (Berumen and McCormick, 2005). Feeding is one of the important characteristics of the life of an animal organism; it lies in getting to know the position that the organism occupies in the ecosystem and thus managing it correctly (Zavalla-Camin, 1996), so knowledge of the Feeding and habits in fish is significant, studying predator-prey relationships and the breadth and overlap of the trophic spectrum, where it is possible to know the dynamics in the community (Trujillo, 1998).

There is no information about this species, which is considered invasive, which has been introduced for ornamental crop activities and which, due to anthropogenic errors, has been released into different bodies of water in the state of Morelos, so the objective of this study is to determine the dietary diet of *Parachromis dovii*, in ``el bordo La Palapa, Mor``.

MATERIAL AND METHODS

Study area. The "La Palapa" microreservoir is located at 18°43'17.07" North and 98°54'44.56" West, 1,220 meters above sea level (Fig. 1) (INEGI, 2017). An Awo(w)(i´) g climate predominates, warm subhumid with rains in summer with a percentage of winter rainfall less than 5 mm, with temperatures of 22-24 °C and a rainfall variation of 800-1,100 (García, 2004 ; INEGI, 2017).

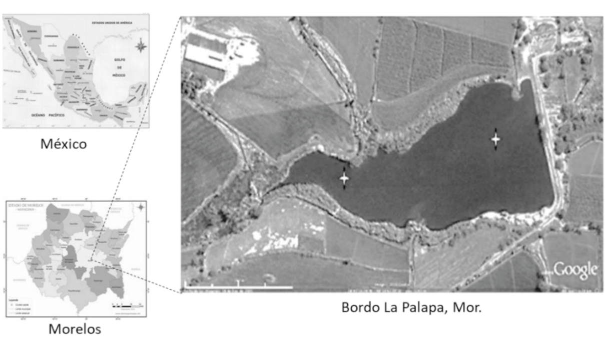

Figure 1: Location of the study area

Water samples were taken at the surface level and at a depth of one meter at a sampling station from March 2019 to February 2020, with a two-liter Van Dorn bottle to determine some parameters of the water quality of the La Palapa shore. The samples were placed in a one-liter polyethylene bottle in a cooler at a temperature of 4°C for subsequent treatment in the laboratory. In situ, pH and conductivity were analyzed with a HANNA brand multiparameter model HI 991300, and dissolved oxygen and water temperature were analyzed with a HANNA brand oximeter model HI 9146. Alkalinity was determined by the indicator method and total hardness by the complexometric method (Gómez-Márquez et al., 2014)

The organisms were captured with a size 6 hook and numbed with clove oil before being sacrificed (Perez et al., 2010). The total length (TL) and standard length (LP) were taken from each of the organisms with the help of a digital caliper with a precision of 0.1 mm. The total weight (TP) was obtained with the help of an analytical balance with a precision of 0.01g; Subsequently, a vertical cut was made from the organisms at the level of the anus up to the height of the operculum, exposing the visceral cavity, and the sex of each specimen was determined. All viscera were removed from each of the fish and their eviscerated weight (EP) was recorded. The digestive tract was separated, from the level of the gills to the end of the intestine, which was weighed with the help of an analytical balance (0.001 g) and preserved in 10% formalin.

To verify that there is no significant difference between the sexes and that the relationship is 1:1 (H:M), a chi-square goodness-of-fit test was applied ($\chi2$: $p<0.05$) with Yates' correction, which It is used when at least one expected frequency value is less than 5.

The total length (TL)-total weight (TP)

relationship was obtained through a potential regression between these variables for each sex using the following relationship: PT = a LT b, where P is the body weight, LT is the total length, b is the growth exponent or length-weight factor and a is a constant. The values of a and b were estimated using a "linearized" form of the above expression by applying logarithms (base 10) and estimating the log a and b values through a linear regression analysis using the least squares method. The Student's t test was applied to accept or reject the isometric growth hypothesis (Pauly, 1984). An analysis of covariance allowed us to identify significant differences between both sexes in terms of their height-weight relationship at $p<0.05$.

The Fulton condition factor (K) was used, since it allows obtaining information on growth strategies, nutritional status and reproduction, and analyzing how the environmental conditions of aquatic ecosystems affect fish populations (Cifuentes et al., 1997). The expression was;

$$K = \frac{PT}{LT^b} * 100$$

STOMACH ANALYSIS

The identification of the tract content (qualitative analysis) was carried out using a stereoscope and its taxonomic identification was carried out using specialized literature on existing invertebrate and vertebrate groups. To carry out the quantitative analysis of the stomach contents, the emptiness coefficient (CV) was estimated, which allows us to know the feeding period of the species (Windell, 1971) based on the following expression:

$$CV = \frac{Number\ of\ empty\ stomachs}{total\ number\ of\ analyzed\ stomachs} * 100$$

TROPHIC INDICES

Due to the size of food components, the numerical method (NO) was used:

NO(%) = number of prey items A/ Total number of prey items *100

The results of this method determine the amount of food ingested. Another method was the frequency of occurrence (FO), which is based on the number of times the different components of the stomach contents appear, so that the number of stomachs where each food appears is expressed as a percentage of the total number of stomachs. examined (Berg, 1979; cited in Barros, 2004).

FO% = 100* (Occurrence of prey item A/ Total No. of stomachs with food)

To measure the volume of the interior of the digestive tract, the organs along with the contents were immersed in water, the displaced volume was determined by subtracting the weight of the tract (Beyruth et al., 2004).

In order to establish the contribution of each food category to the diet of the species, the Relative Importance Index (RII) was applied, according to the criteria of Pinkas et al., modified (1971) whose mathematical relationship is as follows : IIR=% FO (% N+% V)

Where, FO is the frequency of occurrence of a food category, N is the numerical percentage and V is the volumetric percentage.

This index has been expressed as %IIR (IIR/Σ IIR*100) for each food category. The prey are then ranked in descending order according to their contribution to the %IIR, and the cumulative %IIR is calculated.

The index (IRI) determined by Pinkas, et al. (1971) was interpreted following the evaluation scale mentioned by Yañez et al. (1976) where preferences are interpreted as 40-100% primary, 11-40% secondary and 0-10% incidental.

The analysis of community dynamics will depend largely on how the organisms occupy their environment. For this, the main ecological niche parameters of a population will be measured. The method proposed for the study of Levins' trophic niche breadth (Rodríguez, 2008; D'Hiriari et al. 2017) was used to measure the uniformity of the distribution of individuals across resources and quantify how specialized it is. a species within a given environment (Krebs, 1999); A specialist feeds on 1 or 2 food resources and therefore has a smaller niche width than a generalist (Román-Palacios and Román-Valencia, 2015).

$B=1/(\Sigma pf^2)$, where B is the trophic niche breadth index from (Levins, 1968); pj is the relative frequency of each prey item by dividing the number of individuals in each category by the total number of prey items recorded, expressed as a percentage, or the fraction of items in the diet that belong to the food category.

The results obtained from Levins' (1968) trophic niche breadth index were standardized using the trophic niche breadth standardization index, which gives a scale from 0 to 1, where all values close to 0 indicate that the organisms They ingest few food components (minimum breadth of trophic niche, maximum specialization), and those close to 1 have a broad trophic niche. Thus, when the values are less than 0.60, the organism is considered a specialist, which indicates that it uses a low number of resources. and has a preference for certain foods; while values greater than 0.60 reflect a generalist diet in which predators consume prey without any preference, which indicates that they use a low number of resources and have a preference for certain foods (Krebs, 1999; Vázquez et al., 2008, cited in Reynaldo de la Cruz et al., 2019). The formula for standardization is:

$B\_A=B-1/(n-1)$

Descriptive statistics were used, expressing the variables as mean ± standard deviation. The correlation coefficient (r) was estimated for the intestinal length-total length relationship.

RESULTS

Based on the results obtained, the La Palapa microreservoir is a shallow artificial system with a maximum depth of 3.20 meters recorded in the month of September during the months with the highest rainfall and the minimum in April during the dry season, with 1.15 m. During the sampling time (March-19 to February-20), the environmental temperature ranged between 27 °C (September) and 34 °C (April). The water temperature on board varied between 19.91°C (January) and 27.98°C (August). The oxygen concentration is higher in the surface zone, where photosynthetic organisms are found, and the highest average record is for the month of March (14.93 mgL-1) and the lowest concentration (0.98 mgL-1) during June. No anoxia was recorded.

The total alkalinity obtained indicates a productive aquatic system (> 100 mgL-1 CaCO3) whose values increased towards the end of the study. On the other hand, the hardness of the water reflects a hard water system (> 300 mgL-1 CaCO3), with the tendency to also increase towards the last sample. With the visibility data of the Secchi disk (transparency), total phosphorus and chlorophyll "a" of the system water (Gómez-Márquez et al., 2021), it was obtained that the board is considered a eutrophic system (60<TSI <80) throughout the year.

The number of fish captured was 277, of which 167 (60.3%) were males and 110 (39.7%) were females. The highest values in pattern length of P. dovii were recorded during the rainy months (August-November) and in the cold season (January) and the lowest in February and March. The standard length of the captured organisms ranged between 9.2 and 20.2 cm. The highest density of organisms was recorded in the range of 11.7 to 18.7 cm.

For males, individuals were recorded from 9.2 to 20.2 cm and weight from 5 to 320 g, showing the highest frequency within the range of 14.2 to 17.7 cm. For females, they recorded minimum sizes of 12.2 cm and maximum sizes of 19.6 cm, with weights of 40 to 150 g, with a greater density between 15.7 to 17.2 cm (Fig. 2).

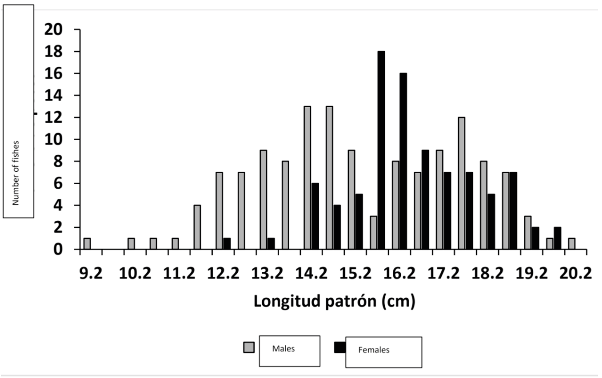

Figure 2. Frequency distribution of sizes of *P. dovii*

The female:male sex ratio favored the males: 1.5:1 (M:H) (χ^2 = 11.73; $p<0.05$), mainly in March, July and January.

The relationship between standard length and total weight for P. dovii was expressed as a potential type model, where the value of the slope (b) indicated the type of negative allometric growth for the entire population (b=2.6789; r= 0.9101, $p<0.05$), the same as for females (2.4512; R^2 = 0.8999, $p<0.05$) and also for the males (b=2.6874; R^2=0.9116, $p<0.05$).

When reviewing the values of the Fulton condition factor (FC), it remained constant throughout the months of the study, since it showed small oscillations between 1.61 and 1.72, without significant variations being observed with the change in temperature in the body of water. Both female and male organisms showed better condition during the cold season than during the rainy season.

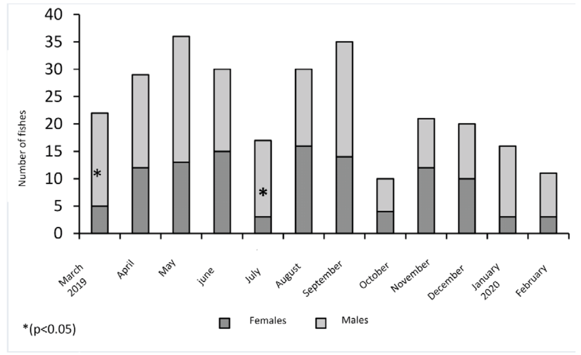

Figure 3: Temporal variation of the sex ratio for *P. dovii*

Regarding the analysis of the stomachs, of the total number of specimens analyzed (238 organisms), 93.7% of them had completely full stomachs and 6.30% had empty stomachs. According to Levins' trophic niche breadth (Rodríguez, 2008), a value greater than 0.60 was obtained, which indicates that organisms of this species have a generalist diet where predators consume prey without any preference.

According to the Pinkas Index, we sought to determine the contribution of each item in the diet; As seen in Figure 4, 6 groups were recorded in different proportions.

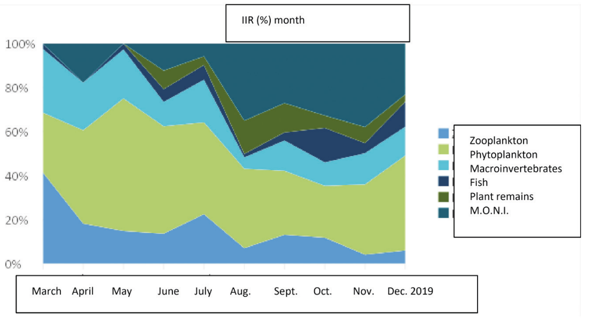

Figure 4: Temporal Relative Importance Index for *P. dovii*

As it was seen in Figure 4, in the dry season (March-May) there is a considerable drop of 50% in the consumption of zooplankton (Cladóceros 10.26%), an increase in phytoplankton (Chlorophyta 15.05% and Bacillariophyta 23.38%).) and a decrease in fish consumption, while non-living organic matter (detritus or MONI) decreases during this period. During the beginning of rains (June), the intake of zooplankton, macroinvertebrates and MONI increased again; However, as the rainy season progresses, MONI intake increases. After the rainy season (October and December), a decrease in zooplankton consumption is observed, an increase in phytoplankton and fish, and the MONI is maintained. Plant remains increase towards the end of the study.

It was observed that females (127 organisms) show a preference for phytoplankton, which is available throughout the year. On the other hand, there is a minimum consumption of fish and plant remains. During the months of March to July, a considerable consumption of macroinvertebrates was obtained, which decreased after these months; being minimum in the month of November. The plant remains appear from June onwards (Figure 5).

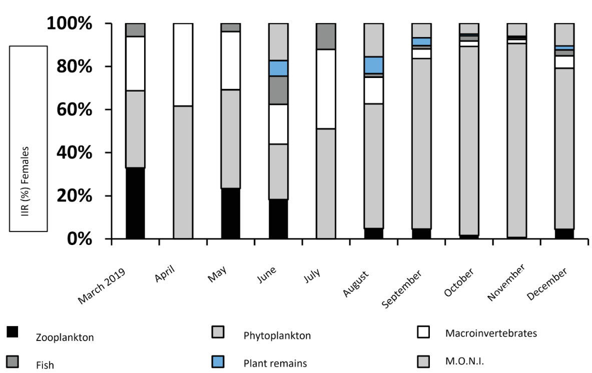

Figure 5: Index of Relative Importance of prey consumed by females of *P. dovii*

In the case of males (111 organisms), the presence of phytoplankton was observed throughout the study, but in a lower percentage than females, while the consumption of macroinvertebrates remained constant throughout the year. Similarly, there is an increase in MONI intake towards the end of the study, compared to females. It must be noted that during the month of July and December there is a greater consumption of fish compared to the other months (Figure 6).

The Relative Importance Index by size shown below (Fig. 7) presents the stomach content of the 12 size classes recorded, where a preference for the ingestion of zooplankton and a large percentage of fish is observed in the first four sizes. in the 2 smallest sizes; In the following four records there is a greater amount in terms of phytoplankton consumption; Larger organisms tend to have more unidentified organic matter.

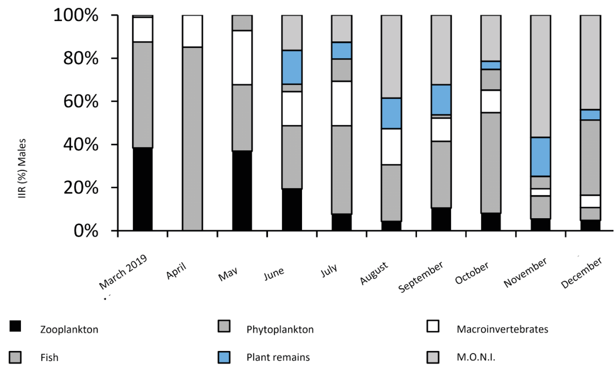

Figure 6: Relative importance index of prey consumed by males of *P. dovii*

Table 1 shows a summary of the data obtained for the population during the study period, which is described by the size class obtained according to Sturges' rule (Wayne, 1987); expressing for each food group occurrence, emptiness coefficient and relative importance.

DISCUSSION

Water quality can be understood as the evaluation of its chemical, physical and biological nature in relation to natural quality, human effects and its possible uses of the water resource (Torres et al., 2009). To determine if the water meets the optimal characteristics to be used in different activities, different biotic and abiotic indicators are used, which include measurable physical, chemical and microbiological parameters, being the

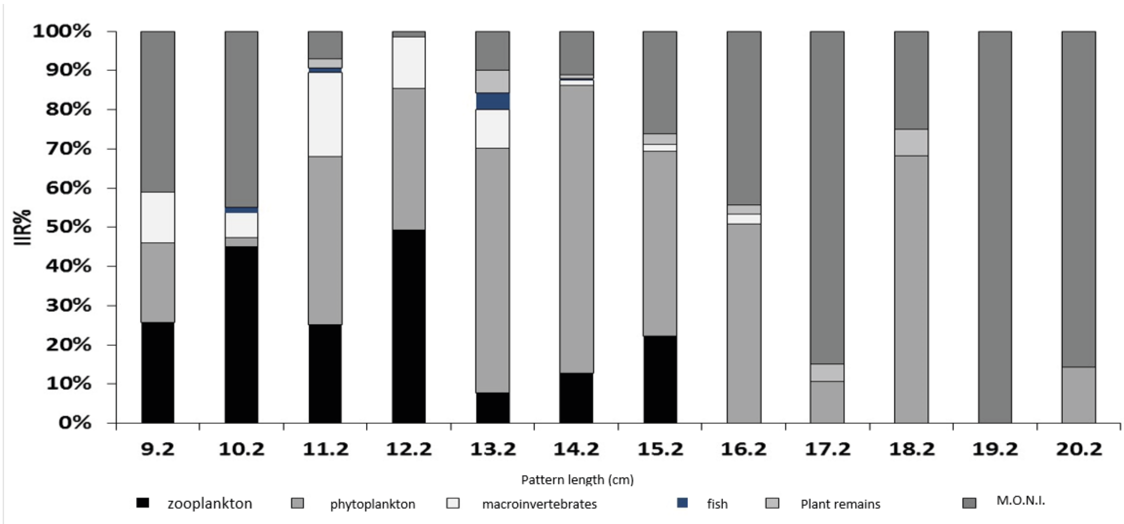

Figure 7. Relative importance index by size of P. dovii

Sizes		ZOOPLANKTON	PHYTOPLANKTON	MACROINVERTEBRATES	FISH	PLANT MATTER	M.O.N. I
	NO%	36.00	0.91	1.64			61.45
1	FO%	100.00	100.00	66.67			100.00
	CV%	0					
	IIR%	29.18	21.65	14.54			34.64
	NO%	26.82	6.83	15.00	6.28		45.06
2	FO%	75.00	87.50	75.00	87.50		81.25
	CV%	6.25					
	IIR%	20.06	18.28	17.46	18.14		26.07
	NO%	18.47	49.45	13.24	4.58		14.25
3	FO%	59.38	81.25	50.00	21.88		50.00
	CV%	12.50					
	IIR%	20.91	39.56	16.47	6.38		16.69
	NO%	3.38	89.60	5.09	0.41	0.42	1.08
4	FO%	61.36	88.64	65.91	43.18	38.	47.73
	CV%	11.36					
	IIR%	12.80	47.35	14.17	8.52	7.62	9.54
	NO%	2.27	90.58	0.95	0.06	1.07	5.07
5	FO%	58.06	80.65	61.29	38.71	29.03	45.16
	CV%	9.68					
	IIR%	10.25	59.46	10.31	6.29	4.91	8.78
	NO%	5.39	51.22	1.41	0.26	5.39	36.33
6	FO%	81.82	100.00	100.00	72.73	72.73	72.73
	CV%	0					
	IIR%	13.58	29.45	15.49	11.03	12.07	18.38

Table 1: Items recorded in each of the size classes obtained

complement of the different water quality indices (Sedeño -Díaz and López-López 2009; Trejo-Albarrán et al., 2021).

Based on the trophic state index (TI) of the La Palapa reservoir carried out by Gómez-Márquez et al. (2021) and Gómez-Márquez et al. (2023) and using the water quality parameters determined in this study, the aquatic system can be classified as a eutrophic water body with a tendency to hypertrophy. On the other hand, the reservoir presented warm waters with an average temperature of 26°C. Based on these data, it is established that it is a continuous warm polymictic system according to the classification given by Lewis (1983) and what was reported by Rivera and Hernández (2011).

El-Sayed (2006) mention that water quality is an important factor in the growth of organisms, mainly in the early stages of development. Likewise, Ornelas et al. (2017) cite that poor water quality represents a threat because it increases the chances of growth of pathogenic organisms and decreases their immune response. As is known, when water temperature decreases, it affects growth, causing organisms to reduce their metabolic processes and, consequently, their growth and development (Arredondo and Ponce, 1998; Saavedra 2006).

During the study period, the reservoir presented an alkaline pH of 8.03, which indicates the neutralization capacity of the water and the presence of carbonates in natural waters is important, since it can have a balance in the system allowing aquatic life in it (Beita and Barahona, 2011). The aquatic system presents well-oxygenated waters (average of 5.9 mgL^{-1}) and according to Arredondo and Ponce (1998) and Roldan and Ramírez (2008), depending on the species, the fish requires a minimum DO concentration, approximately 5.0 mgL-1 to avoid fish stress and can withstand levels of 1 mgL-1 and even lower for short periods as with tilapia (*Oreochromis* spp.) (Martínez-Suárez *et al*., 2015).

Low oxygen content or oxygen depletion is important, because at low concentrations, the organism stops feeding, affecting its development and generally results from the combination of high biological productivity, high amounts of suspended solids that inhibit light entry. and also by reduced water exchange (Dai et al., 2006, Saavedra, 2006). However, dissolved oxygen depends mainly on temperature.

Regarding alkalinity and hardness, there is a great relationship between them, this is because calcium, magnesium and bicarbonate ions are equivalent derivatives of the same geological deposits and, therefore, the values of alkalinity and hardness are frequently similar in magnitude; However, in some bodies of water the total alkalinity may exceed the hardness or vice versa, since Arredondo and Ponce (1998) indicate that waters that contain 40 mgL-1 or more of total alkalinity are considered very productive, while which for hardness determines that bodies with concentrations greater than 300 mg CaCO3L-1 are very hard waters; Therefore, in the Palapa aquatic system, the water is considered very hard (453 mg CaCO3L-1) for the rainy season and 421 mg CaCO3L-1 for the dry season and they are very productive, almost all year round, except the month of February, where hardness and alkalinity concentrations reach their lowest point and even so, determines very productive and hard waters. Arredondo and Ponce (1998) mention that hard waters tend to be more biologically productive than soft waters, since the latter are deficient in calcium and magnesium.

The introduction of exotic fish species often has a negative impact on the native ichthyofauna and has caused serious ecological problems in the fish communities of this system, affecting their feeding, reproduction and growth (Contreras-MacBeath 1991), as happened in this case. when introducing it to grow and reinforce ornamental crops.

With respect to the organisms, the average size of the females was 16.7 cm and that of the males was 15.7 cm, which differs from what was reported by Aldave (1985) and Campos (1986), who report average sizes of 45.6 cm in males and 28.6 cm in females. Similarly, Farid et al. (2000) obtained minimum sizes of 12 cm and maximum sizes of 56 cm, while the minimum and maximum sizes obtained in the present study were smaller than reported, being 9.2 cm and 25.6 cm in total length, respectively. This may be due to the fact that the species has begun to adapt to these environments in the state of Morelos (La Palapa and Amate Amarillo), although the environmental conditions are adequate for its growth and reproduction, expecting to find organisms with greater biomass and size with respect to what was reported in this study and that it is more accepted by the people who live around aquatic systems.

The relationship between the standard length and the total weight of the species showed that the value of the slope indicates that the population has a negative allometric growth, that is, greater growth in size than in weight, as for both sexes, as It is also reported by Tabash and Guadamuz (2000). This is a strategy that presents the species in the aquatic environment where there are predators that cause the species to tend to grow larger in size to avoid this aspect.

In studies on feeding habits, where knowing the trophic spectrum of the prey species is important, it is possible to observe biases caused by the lack of representativeness in the samples (Ruiz-Pérez et al., 2016). Very little is known about P. dovii about its feeding habits and the composition of its diet in the state of Morelos. The analysis of stomach contents in fish is a traditional method that allows us to know the food network of an aquatic community, using the variety of food components they consume, this is reflected in their morphological adaptations to use the availability of food depending on their habitat. (Berg, 1979, cited by Pazmiño, 2019).

Regarding the diet of *P. dovii* in total, 238 digestive systems (stomach and intestines) were analyzed with a report of 6 different food items. Individuals of the genus *Parachromis dovii, they* are essentially carnivores, their main food source being other fish, although they also eat insects and crustaceans (Bussing, 2002).

As reported by Retana (2019), the temporal variation of phytoplankton was always present during all seasons, with the Chlorophyta division being found in greater abundance; However, Bacillariophyta only had a record of greater abundance in the Palapa during the months of May, June and July; that is, during the warm dry season and the beginning of the rainy season. Zooplankton consumption was represented by cladocerans (10.26%), which differs from the record of Retana (2019), where it is recorded that the largest number of zooplankton organisms were represented by copepods in the entire ecosystem.

Phytoplankton and zooplankton have a very close relationship, this is because phytoplankton organisms are capable of maintaining their populations and providing food to zooplankton and indirectly to the animals that feed on them (Cifuentes et al., 1997). This can be seen in the diet of P. dovii that in the dry months, the amount of zooplankton in the stomach was 43.28%, but in the rainy season up to 31.66% was reported on average. This may be because during the rainy seasons the food is diluted by the greater amount of water in the system.

The growth obtained by Aldave (1985), Campos (1986) and Farid et al. (2000) is a little different from what was reported in this research, and this may be conditioned by the availability of nutrients and energy resources, as well as the stress situations when the species is subjected to a space different from the natural area of distribution (Jerez et al., 2019), it is also linked to a photoperiod, temperature, dissolved oxygen, among other factors that influence the food intake of fish (Noriega et al., 2020), such is the case of P. dovii in the La Palapa microreservoir, Morelos.

Tabash and Guadamuz (2000) determined that in the stomachs of P. dovii the highest frequency of occurrence was found in the remains of fish and insects, representing 37% and 26.8% respectively. In turn, the fish remains were composed mainly of small fish, including juveniles of P. dovii. On the other hand, they observed that the diet of the juveniles consisted more of poecilids and microcrustaceans; which differs a little from what has been reported in this work, the most juvenile sizes have a diet based on zooplankton and unidentified organic matter; While the adults supplemented their diet with insects, in the Palapa there is a greater amount of Phytoplankton and M.O.N.I ingested. Regarding what was recorded in the Palapa, the highest frequency is observed in the consumption of zooplankton, phytoplankton and macroinvertebrates (gastropods) and fish, which possibly can be: *Poeciliopsis gracilis, Pseudoxiphophorus bimaculatus, Poecilia sphenops u Oreochromis niloticus* (Granados-Ramírez *et al*., 2014). Similar groups or items obtained from the diet in this study are also reported by Tabash and Guadamuz (2000).

Grabowska et al. (2016) and Tabash and Guadamuz (2000), mention that food varies according to the average size of each species, there being a relationship between the size of the species and competition for food, which limits the possibility of acquiring a greater variety. of prey. Munday et al., (2001) mention that, at larger sizes, organisms allow themselves to choose their diet.

Based on the stomach contents obtained from *Parachromis dovii* can be determined as an omnivorous species, with opportunistic habits taking advantage of the resource available in the system, having similarities with *Oreochromis niloticus* (tilapia) that also present omnivorous habits, of a generalist and opportunistic nature as mentioned by Castellanos (2004).

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