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Diet and niche overlap of the pompano (*Trachinotus carolinus*) and palometa (*Trachinotus goodei*) (Perciformes, Carangidae) in a surf zone beach in southeastern Brazil

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Abstract: The diet and niche overlap of the pompanos *Trachinotus carolinus* and *T.goodei* in a surf zone were studied based on 352 specimens of *T. carolinus* and 53 of *T. goodei* ranging from 10 to 165 mm total length. The study was carried out in a sand beach in southeastern Brazil, where the fishes were captured with a seine net measuring 10 x 2 meters and 4.0 mm mesh. A total of 34 prey items were found for *T. carolinus* and 26 for *T. goodei*, represented mainly by Copepoda, Insecta, Decapoda larvae, Polychaeta, Mollusca, Echinodermata, and fishes. The diet showed a remarkable predominance of insects Formicidae and zooplankton represented mainly by copepods, Decapod larva, and Mysida among other prey groups. No differences were observed for day and night periods, stomach fullness, or prey length and predator length relationships. Both species share 72.16% of the prey items. The uncommon high presence of insects in the stomachs may be associated with the sample area near to coastal vegetation, and the presence of human wastes from urban zone.

Keywords: Carangidae, diet, stomach content, prey-predator, zooplankton

Resumo. Dieta e sobreposição de nicho do pampo (*Trachinotus carolinus*) e do pampo-galhudo (*Trachinotus goodei*) (Perciformes, Carangidae) em uma praia de zona de arrebentação no sudeste do Brasil. A dieta e a sobreposição de nichos dos pampos *Trachinotus carolinus* e *T.goodei* em uma zona de arrebentação foram estudados com base em 352 espécimes de *T. carolinus* e 53 de *T. goodei* variando de 10 a 165 mm de comprimento total. O estudo foi realizado em uma praia arenosa no sudeste do Brasil, onde os peixes foram capturados com uma rede picaré de 10 x 2 metros e malha 4,0 mm. Um total de 34 itens alimentares foram encontrados para *T. carolinus* e 26 para *T. goodei*, representados principalmente por Copepoda, Insecta, larvas de Decapoda, Polychaeta, Mollusca, Echinodermata e peixes. A dieta mostrou uma predominância notável de insetos Formicidae e zooplâncton representados principalmente por copépodes, larvas de Decapoda e Mysida entre outros grupos de presas. Não foram observadas diferenças para os períodos diurno e noturno, repleção estomacal ou para a relação entre comprimentos de presa e predador. Ambas as espécies compartilharam 72,16% dos itens nas dietas. A presença rara e incomum de insetos nos estômagos pode estar associada à área de amostragem próxima à vegetação costeira e à presença de resíduos humanos oriundos da zona urbana.

Palavras-Chaves: Carangidae, dieta, conteúdo estomacal, presa-predador, zooplâncton.

Introduction

The surf zone comprises the area between the outer limit of breaking waves and the coastline of the beach (McLachlan, Brown 2006). It is a dynamic and turbulent habitat, where the animals who inhabit there have adaptations to survive, like more rigid shells, body shape providing greater agility, and different dietary strategies (Lasiak, 1986; McLachlan and Brown 2006). In this way, surf zones of sandy beaches are places of great energy and constant movement of water, serving as important areas for fish feeding and protection from predators (Clark *et al*., 1996; Layman, 2000; Pessanha and Araújo, 2003; Mazzei *et al*., 2011; Inui *et al*., 2010, Able *et al*., 2013). The interest in knowledge of beache fauna is also reflected in the species of direct economic importance, such as fishes, crustaceans and molluscs for human consumption, and sometimes for fishing bait (Amaral *et al*. 1990; Andrades *et al.*, 2012). Despite the ecological, economic and social roles of ocean beaches, basic information on the biology of many surf-zone fishes is still sparse, where most research is purely descriptive, and surprisingly little is known about why fish use surf zones (Olds *et al.*, 2017).

The ichthyofauna of the surf zone has been studied in different spots along the Brazilian coast with results focused mainly on diversity and seasonal abundance (Paiva Fo., & Toscano, 1987; Giannini & Paiva Fo., 1995; Araújo *et al*., 2008; Gomes *et al*. 2003; Godefroid *et al*. 2003; Monteiro-Neto *et al*., 2003; Felix *et al.*, 2007, 2007b; Tubino *et al*., 2007, Vasconcellos *et al*., 2007; Gaelzer & Zalmon, 2008, Barreiros *et al*., 2009; Lima & Vieira, 2009; Santana *et al*., 2013; Spach *et al*., 2010; Gondolo *et al*. 2011, Fávero & Dias, 2015, 2015b). In the São Paulo coast only one fish fauna survey study has been conducted in the intertidal zone of Guarujá and São Vicente by Paiva Fo, Toscano (1987). In the Paraná coast, Godefroid *et al*. (2003) analyzed the occurrence in the surf zone of larvae and juvenile of two species of Gerreidae (*Eucinostomus argenteus* and *E. gula*) and four sciaenids (*Menticirrhus americanus*, *M. littoralis*, *Umbrina coroides* and *Micropogonias furnieri*). In Rio de Janeiro, Pessanha, Araújo (2003) investigated the influence of abiotic factors in the composition of fish species in two sandy beaches in Sepetiba bay, in the aspects of seasonal and daily variation. More recently, Monteiro Neto *et al*. (2008) analyzed fish assemblages in the coastal region of Itaipu - RJ, and Gaelzer & Zalmon (2008) analyzed the change of time of day and the tides in the fish community structure of surf zones in the Arraial Cape beaches in Rio de Janeiro.

The trophic organization of the ecosystem can be given through the diet and the body characteristics where the power is linked to the morphology of the individual (Wootoon, 1990; Gerking, 1994). Overall, most studies in the surf zone focus on variations of diversity and abundance of species throughout the year. However, information on population structures and interrelationships between vertebrate and invertebrate species is rare or ignored, as well as studies of trophic relationships between different species in this environment. Feeding habits of surf zone fishes have been studied in different shores of the world (Bellinger & Avault, 1971, Escalona & Cárdenas, 2004, Inoue *et al*., 2005). Along the Brazilian coast studies were carried out regarding the feeding habits of juveniles of *Trachinotus marginatus* in Cassino Beach, Southern Brazil (Monteiro-Neto, Cunha, 1990), *Trachinotus* sp. in southeatern Brazil (Helmer *et al*., 1995), juveniles of *Menticirrhus americanus* and *M. littoralis* in Rio Grande do Sul (Rodrigues, Vieira, 2010), *T. carolinus* diet in Rio de Janeiro (Niang *et al*., 2010), *T. carolinus* and *M. littoralis* in Rio de Janeiro (Palmeira, Monteiro-Neto, 2010), and *T. carolinus* diet in Caraguatatuba bay in São Paulo (Denadai *et al*. 2013). Studies of fish associated with beach debris were performed by Robertson & Lenanton (1984) in Australia.

Fishes of the genus *Trachinotus* are known as pompanos being commonly found from Massachusetts (USA) to Rio Grande do Sul (Brazil), with juveniles inhabiting the surf zone (Carvalho-Filho 1999; Monteiro-Neto *et al*. 2003; Vasconcellos *et al*. 2007). The Florida pompano, *Trachinotus carolinus*, and the palometa, *T. goodei*, are the most frequent pompanos in the southeastern Brazilian beaches (Gaelzer & Zalmon, 2008; Giannini & Paiva Fo., 1995; Godefroid *et al.*, 2003). *Trachinotus carolinus* (Linnaeus 1766), is characterized by the compressed body, blunt snout, subterminal mouth, large forked caudal fin, and yellow belly, pelvic and caudal fins (Carvalho-Filho 1999). *Trachinotus goodei* (Jordan, Evermann 1896) is very similar, but present narrow dark vertical bars on the upper body, and large dark dorsal and anal fins. These anatomical characteristics increase search efficiency of *Trachinotus* spp., due to fast swimming, ability to make quick maneuvers, and group foraging, and so enhance also feeding time and maximize the efficiency in energy expenditure. Similar characteristics were also observed in mesocosm tanks experiments with *T. carolinus* feeding upon coquina clams (*Donax* spp.) where fishing groups were more successful in their feeding attempts (Schrandt & Powers, 2015).

The present study aimed to analyze the occurrence, size structure, and the diet of *T. carolinus* and *T. goodei* in a surf zone in the central coast of São Paulo State in the aspects of prey species, ecological relationships, niche breath and food overlap between the two species. The goal is to verify if the diet of two similar species of pompanos share the same prey items, and to explore possible causes for differences in that response.

Materials and Methods

The study was conducted in the locality of Praia Grande (24º 00' 21" S; 46º 24' 10" W), once it is an open dissipative shore beach, located in the central coast of São Paulo, which has an extensive sandy beach in its coastal portion, with 24 km long and low slope (Fig. 1). Throughout the year, the seasonal differences in the region of Praia Grande are slightly pronounced, with an average rainfall of 226 mm month^{-1} and rainfall peaks during the summer (364.75 mm month^{-1}) and dry periods in the winter (98.63 mm month^{-1}) (DAEE, 2016). During high rainfall seasons, the stretch of sand exhibits many effluents from the urban fringe that connect to the sea.

Bimonthly sampling campaigns were conducted between April 2013 and April 2015, during the day (8 to 11 h) and night (19 to 21 h), comprising twelve field samples. Fishes were caught by a beach seine net with a mesh opening size of 4.0 mm, an area of 10 x 2 m and a central triangular bag with mesh of 2.5 mm. In each sampling, three hauls were taken with the net parallel to the shore in water approximately 1.0 m deep, hauled by two persons at a distance of 50 m. The catch from three hauls were pooled and considered as one, aiming to ensure a sufficient quantity of fish for the study. The fishes were properly conditioned in plastic bags in the field, and immediately stored frozen for posterior laboratory analysis. The species identification was according Carvalho-Filho (1999), and Fischer *et al*. (2004). In the laboratory all specimens had their total length (TL) measured in millimeters (mm), and then stored in alcohol 70% for posterior analysis of stomach contents. For better visualization of the variations along the ontogeny of the pompanos, results were obtained for classes of 2 cm TL to standardize the analysis for the sampled sizes. The stomachs of the pompanos were removed by opening the abdominal cavity and by severing them from the intestine and the esophagus, and than preserved in formalin at 5 %. All prey items were identified to the lowest possible taxon. For each stomach data such as the number of individuals of each food item, and total length (cm) for all organisms were recorded.

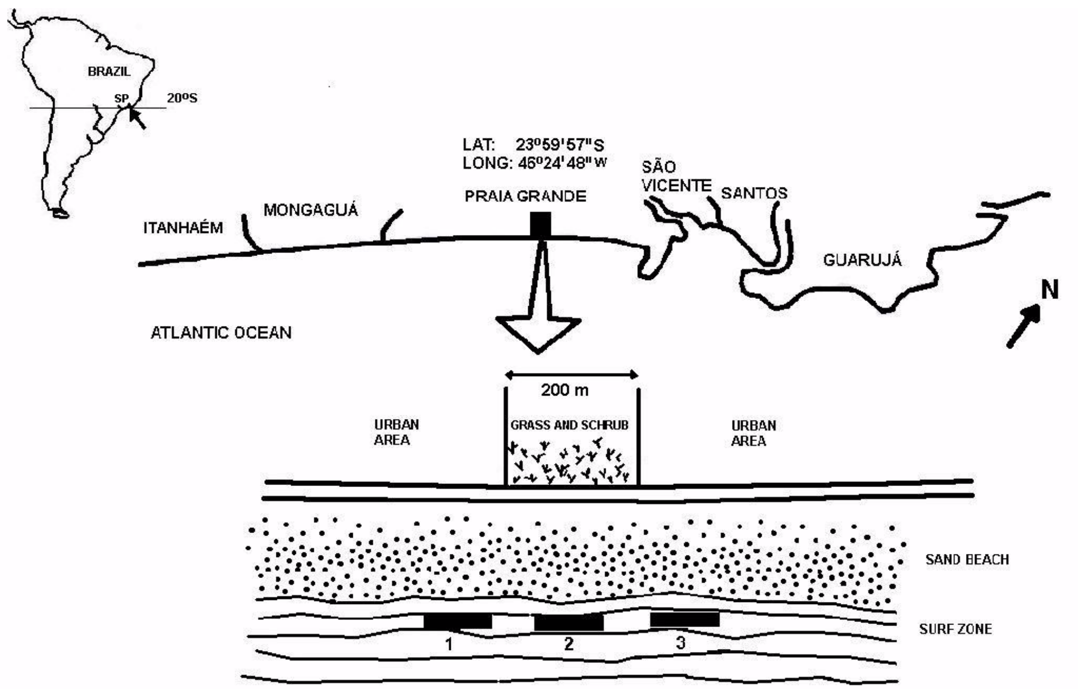

Figure 1 - Sample area in the surf zone of Praia Grande – SP. Black rectangles correspond to trawls points of purse seine beach where fish were collected.

An ANOVA procedure was used to compare night-day length distributions using Statistical Package *Past 2.17*. The stomach fullness was recorded according to a five-point scale of estimated percentages of total fullness: empty (I), 25 % full (II), 50 % full (III), 75 % full (IV), and full (V). A chi square (X^2) test was used to determine whether fullness variables differ from one another in both species. A cumulative prey curve was elaborated to infer if the stomachs sampled were sufficient to obtain the food spectra of both species (Statistical Package *Past 2.17*).

The importance of each food item in the diets was obtained by the Index of Relative Importance (IRI) (Pinkas *et al*. 1971), modified to volume:

$IRI_i = \%FO_i \times (\%N_i + \%V_i)$

where $\%FO_i$ - relative frequency of occurrence of each item; $\%N_i$ - proportion in prey number of each item in the total food; and $\%V_i$ - proportion in volume in mm^3 of each item in the total food content, measured by comparison to known geometric figures like sphere, cube, cylinder and others.

The niche overlap was determined by the MacArthur and Levins's measure with Pianka's simetric modification (Krebs, 1989):

$O_{jk} = \Sigma\, p_{ij}\, p_{ik} / \sqrt{(\Sigma\, p_{ij}\, \Sigma\, p_{ik})}$

where:

O_{jk} = MacArthur-Levin's measure to the resources j and k;

p_{ij} = Proportions resource i of the total resources used by species j;

p_{ik} = Proportions resource i of the total resources used by k.

Temperature and salinity were measured with mercury thermometers (Incoterm 001/14) *in situ*, and with portable salinity refractometer (Extech, model RF20) in the laboratory, respectively. Sample water was taken to the laboratory using dark plastic bottles.

Results

The weather conditions during the study varied between light breeze and weak wind, according to the Beaufort scale. The highest values of water temperature were recorded in the summer and ranging from 28.5 ° C (day) to 30 ° C (night), both in February 2015 (Fig. 2). On the other side, the minimum temperatures occurred during the winter ranging from 18.7 ° C (day) in August 2013 to 16.7 ° C (night) in August 2014. The salinity showed small variations with a minimum of 33 and maximum of

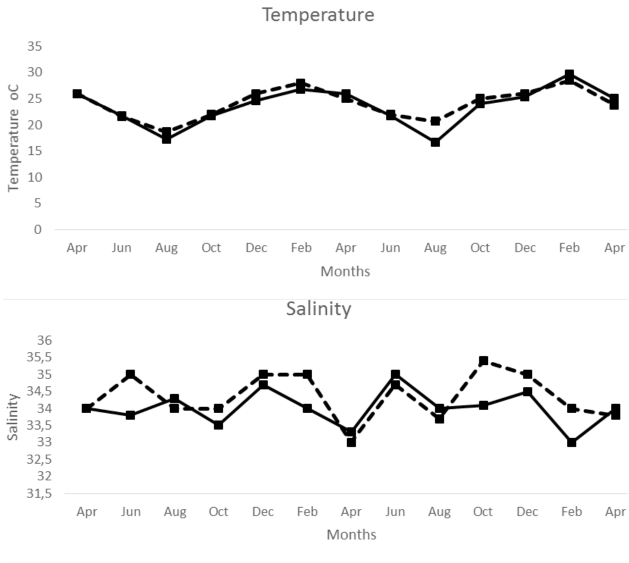

Figure 2 – Variations in water temperature and salinity along the year in the surf zone, of Praia Grande – SP. Dashed line – day, solid line – night.

35.4 in April and October 2014, respectively. However, the salinity averages in relation to the time of day were quite similar, ranging from 34.4 (day) to 34 (night).

A total of 375 stomachs were analyzed, of which 352belonged to *T. carolinus* (299 with prey items and 28 empty), and 53 to *T. goodei* (47 with prey items and 6 empty) (Table I). Lengths of *T. carolinus* ranged from 10.0 mm to 165.0 mm, and most individuals were between 20.0 and 80.0 mm with mean lengths of 52.1 mm for day and 54.1 for night captures (Fig. 3). *T. goodei* ranged from 20.0 mm to 165.0 mm, nevertheless most fishes were larger than *T. carolinus* with means ranging from 144.9 mm for day and 132.4 mm for the night captures. No statistical diferences were found for day/night length distributions for any of both species (F=0.12; p = 0.72).

The stabilization of the species cummulative curve was obtained at 26 prey items and 200 stomachs for *T. carolinus*, which means that the number of examined individuals was sufficientl (Fig. 4). For *T. goodei*, the cummulative prey curve based on the number of stomach analysed did not arrived to a plateau. In consequence, it is necessary to increase the number of samples in order to provide a better description of the diet for this species. No differences were found between the degree of stomach fullness and time of the day species ($\chi 2 = 4$, $p > 0.05$), where stomachs with 25% fullness were the most representative (Fig 5).

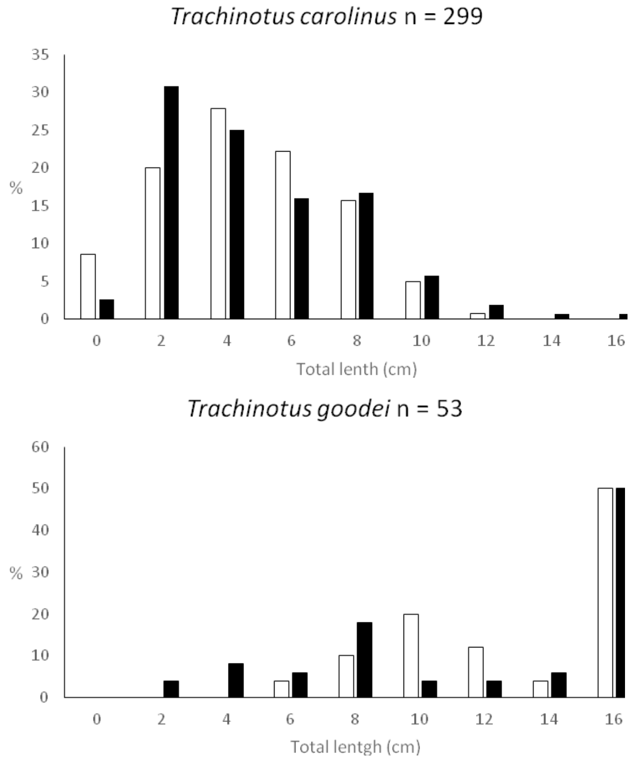

Figure 3 - Length frequence distribution for *Trachinotus carolinus* and *T. goodei* in Praia Grande – SP. White bar – day; dark bar – night.

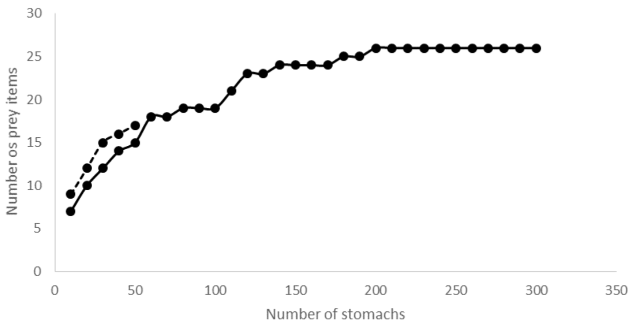

Figure 4 – Cummulative curve of prey items diversity. *Trachinotus carolinus* (solid line), *Trachinotus goodei* (dashed line).

In the stomach contents 34 prey items were found for *T carolinus* and 26 for *T. goodei*, mainly represented by Copepoda, Insecta, Decapoda larvae, Polychaeta, Mollusca, Echinodermata, and fishes (Table II). Both species shared 24 items, ten only for *T. carolinus* and two only for *T. goodei*. Crustaceans were mainly represented by zooplanktonic organisms like Copepoda, Mysida, Euphausiacea, Decapoda larva, among others. Fishes occurred as juveniles of some common species of surf zones like mullets, anchovies, as much as small specimens of *T. carolinus* and *T. Goodei*, evidencing canibalism.

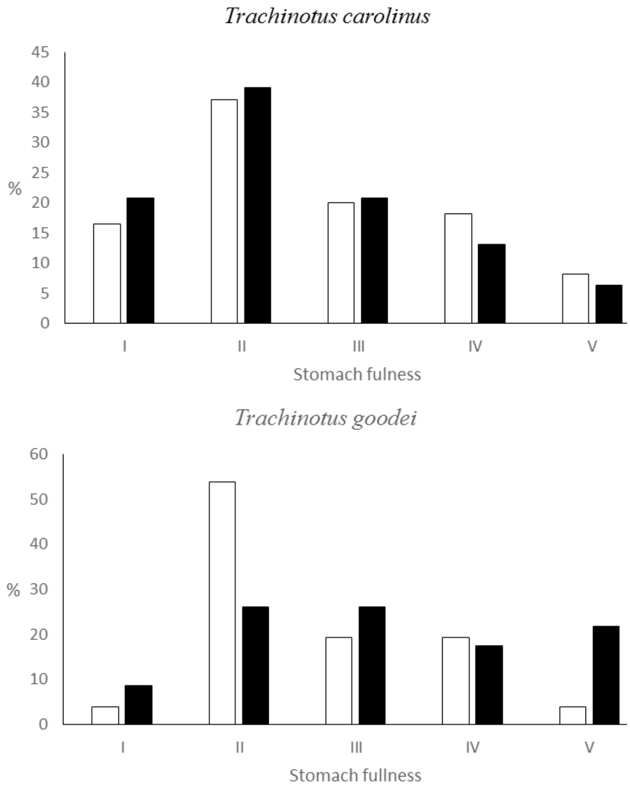

Figure 5 – Stomach fullness for *Trachinotus carolinus* and *T. goodei* in the surf zone of Praia Grande-SP. White bar – day, black bar – night. Empty (I), 25 % full (II), 50 % full (III), 75 % full (IV), and full (V).

The unique species of Echinodermata was represented by the sand dollar *Mellita quinquiesperforata* that occurred as fragments in the stomachs, nevertheless, easily identified once the sand dollar is very common in the local surf zone of Praia Grande. Polychaets and the bivalve *Donax gemmula* were the other important invertebrates found. Most prey items ranged between 0.2 to 11.0 mm total length, and 2.3 mm mean for *T. carolinus*, and between 0.5 and 21 mm, and 3.1 mm for *T. goodei* (Fig. 6). The largest preys (> 10 mm) were represented by fishes for both species.

The most remarkable observation in this study was the considerable frequency of insects in the diet of both species. Thirteen taxa of insects were identified to the lowest possible taxon, which means 36.5 % in number of the prey items of *T. carolinus*, and 7.7 % of *T. goodei*. Only families or major groups of insects are shown in table II, for better interpretation. For example, Formicidae was represented by several taxa like Pheidole, Myrmicinae, *Dorymirmex* sp. *Componutus* sp., *Solenopsis* sp., and Cicadoidea. Diptera was represented by Nematocera, *Clogmia* sp., and Ceratopogonidae. The importance of insects can also

Tabel II - Number (N), Volume (V) and Frequence of Occurrence (FO) and respective prey IRI index for *Trachinotus carolinus and T. goodei* in the surf zone of Praia Grande-SP. Data are cummulated for day and night, and along the year occurrences. RTc and RTg means the prey ranking of *T. carolinus* and *T. goodei* (first to tenth main items).

Food items	%N	%V	FO	%FO	IRI	RTc	%N	%V	FO	%FO	IRI	RTg	*Tc*	*Tg*
CRUSTACEAN														
Euphausiacea	0.45	0.15	6	2	1.2		0.38	0.08	3	6.38	2.96	**10**	x	x
Copepoda	27.6	43.9	42	14	1004.7	**2**	77.6	77.6	14	29.6	4623.7	**1**	x	x
Decapoda larva	11.2	18.7	24	8.02	240.4	**4**	3.07	3.23	4	8.51	53.69	**5**	x	x
Penaeidae							0.51	0.1	4	8.51	5.27	**8**		x
Brachyuran megalopa	0.17	0.02	5	1.67	0.32								x	
Isopoda	0.06	0.08	2	0.66	0.08								x	
Areneus cribarius	0.07	0.09	3	1	0.16		0.25	0.05	2	4.25	1.31		x	x
Mysidacea	12.8	3.19	19	6.35	101.26	**6**							x	
Stomatopoda larva	0.04	0.04	1	0.33	0.02								x	
Cirripedia	0.47	0.03	4	1.33	0.69								x	
Emeritta brasiliensis	2.1	5.28	7	2.34	17.29	**8**							x	
Decapoda zoea	2.5	0.2	4	1.33	3.63	**10**							x	
TELEOSTEAN														
Teleostei							0.12	0.02	1	2.12	0.32			x
Menticirrhus littoralis														
Mugil brevirostris							1.28	3.37	8	17	79.17	**4**		x
Atherinella blackburni	0.06	0.09	1	0.33	0.04								x	
Trachinotus carolinus							0.12	0.33	1	2.12	0.98			x
Trachinotus goodei							0.12	0.33	1	2.12	0.98			x
ECHINODERM														
Mellita quenquisperforata	0.57	0.14	5	1.67	1.2		0.89	0.28	5	10.6	12.61	**6**	x	x
POLYCHAET														
Polychaeta	1.2	3.12	14	4.68	20.26	**7**							x	
BIVALVE														
Mesodesma mactroides	0.07	0.06	1	0.33	0.04								x	
Donax gemmula	4.03	10.1	46	15.4	217.87	**5**	7.93	12.5	3	6.38	130.72	**3**	x	x
INSECT														
Formicidae	21.6	7.31	152	50.8	1463.1	**1**	5.88	1.24	12	25.5	182.05	**2**	x	x
Diptera larva	12.8	5.34	51	17.1	308.56	**3**	0.12	0.04	1	2.12	0.35		x	x
Winged Formicidae	1.12	0.39	18	6.02	9.19	**9**	0.64	0.13	3	6.38	4.94	**9**	x	x
Chilopoda	0.04	0.02	1	0.33	0.01								x	
Calliphoridae	0.07	0.31	3	1	0.39								x	
Cicadidae							0.64	0.13	5	10.6	8.24	**7**		x
Syrphidae	0.42	0.59	7	2.34	2.35								x	
Lepidoptera							0.12	0.02	1	2.12	0.32			x
Coleoptera														
Apidae	0.06	0.33	2	0.66	0.25		0.25	0.4	2	4.25	2.81		x	x
Hymenoptera	0.2	0.44	7	2.34	1.51								x	
Culicidae	0.15	0.03	2	0.66	0.12								x	
Coleoptera	0.06	0.02	1	0.33	0.02								x	
TOTAL	100	100					100	100					26	17

be observed along different body sizes of the fishes, where they were the unique prey group that has appeared in all body sizes of both *T. carolinus* and *T. goodei*, for day and night cumulated data (Fig. 7). Moreover, the proportion of insects was frequently the most important among other prey groups. Sand, shell fragments, plants and antropogenic wastes like plastic, wood, nylon, styrofoam were also found in the stomachs but in smaller quantities.

The niche overlap was Oji = 0.7216, *i.e.*, 72.16% of the diets of *T.carolinus* and *T. goodei* was similar. The first and second prey items according to IRI ranking were Copepoda for *T. goodei*, and Formicidae for *T. carolinus*, and vice-versa, *i. e.*, the zooplankton Copepoda and the alloctonous prey Formicidae were the main prey items of the pompanos in the surf zone of Praia Grande.

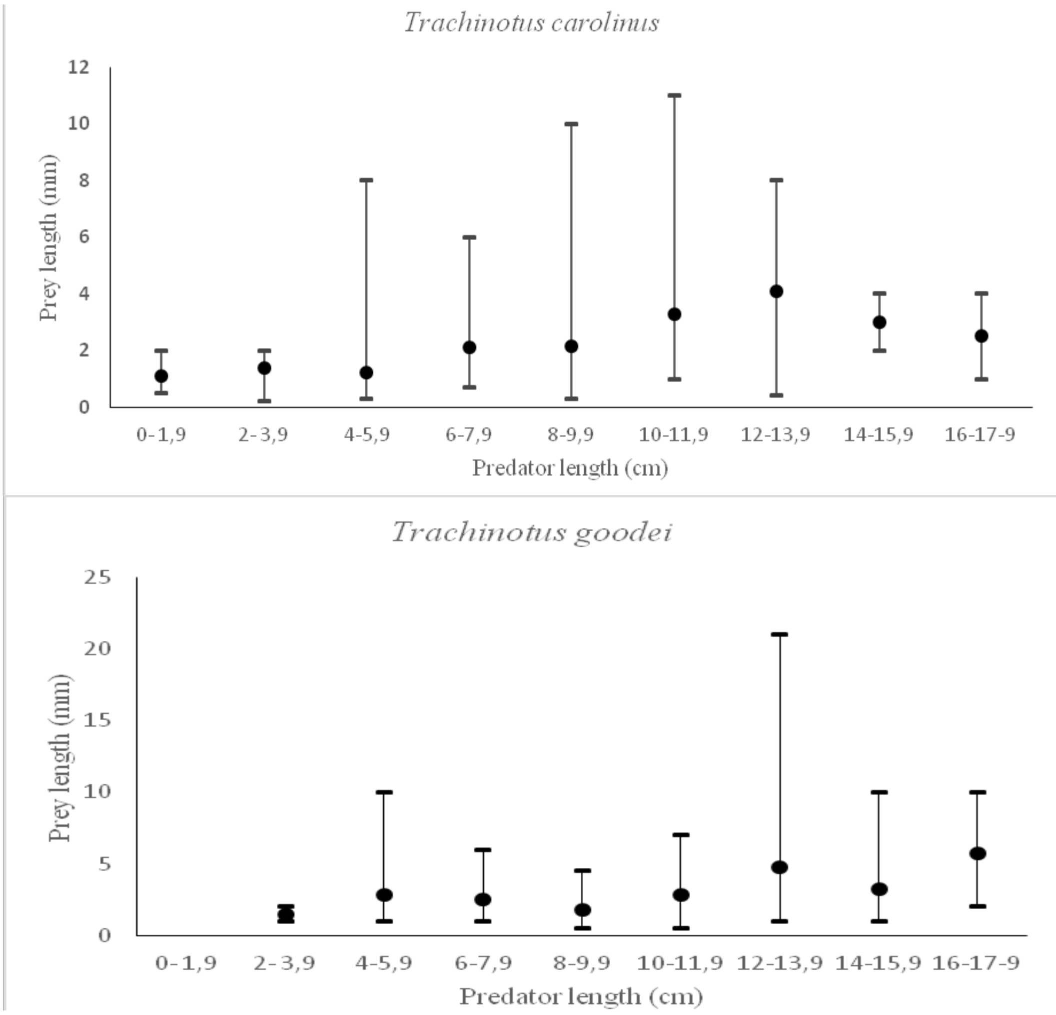

Figure 6 – Prey-predator relationships for *Trachinotus carolinus* and *T. goodei* in the surf zone of Praia Grande-SP. Vertical bars indicate minimum, mean (dot), and maximum length of preys.

Discussion

The length of the fishes captured indicate that the surf zone really serve as shelter and feeding area, once no adult individuals were found. Considering that pompanos finishes its larva transformation to juvenile when it reaches approximately 10 mm (Richards, 2006), and considering that *T. goodei* can reach up to 500 mm and *T. carolinus* up to 650mm (Carvalho-Filho 1999), it can be concluded that larger and adult pompanos of both species do not inhabit the surf zones, migrating to deeper waters when they reach 160 mm TL, or more.

In spite of the insufficient number of stomachs of *T. goodei*, one can assume that the main food items are well represented, and can be compared for food overlap estimates, once there are no differences in prey length/predator length relationship. The 72.16 % similarity of niche overlap indicate that both species share their prey items with a diet clearly directed to copepods and ants, commonly between 2.0 and 3.0 mm total length. The most similar results was observed by Helmer *et al*. (1995) in the Cassino surf zone (RS), where insects represented 7.85 % in dry weight for *T. goodei* and 0.99 % for *T. carolinus*. Other occurrences of insects were observed only as a rare item, *e.g.*, 8.4 % FO of Hymenoptera found in the diet of *T. carolinus* in Rio de Janeiro (Niang *et al*. 2010). Palmeira & Monteiro Neto (2010) found insects only in fishes < 4.5 mm, mainly, Formicidae and Vespidae, for *T. carolinus* in Rio de Janeiro. Bellinger & Avault (1971) also found high proportions of insects in small *T. carolinus* (10-25 mm TL), mainly Coleoptera and Diptera larvae in the coast of Luisiania. Other fish species of surf zone prey insects in low proportions (<5%), like *Menticihrrus littoralis* in Rio de Janeiro (Palmeira & Monteiro-Neto, 2010), *Plecoglossus altivelis* in Japan (Inoue *et al*., 2004), *Menidia menidia* in New Jersey (Wilber *et al*., 2003), *Lithognathus mormyrus, Pomadasys olivaceum, Rhabdosargus*

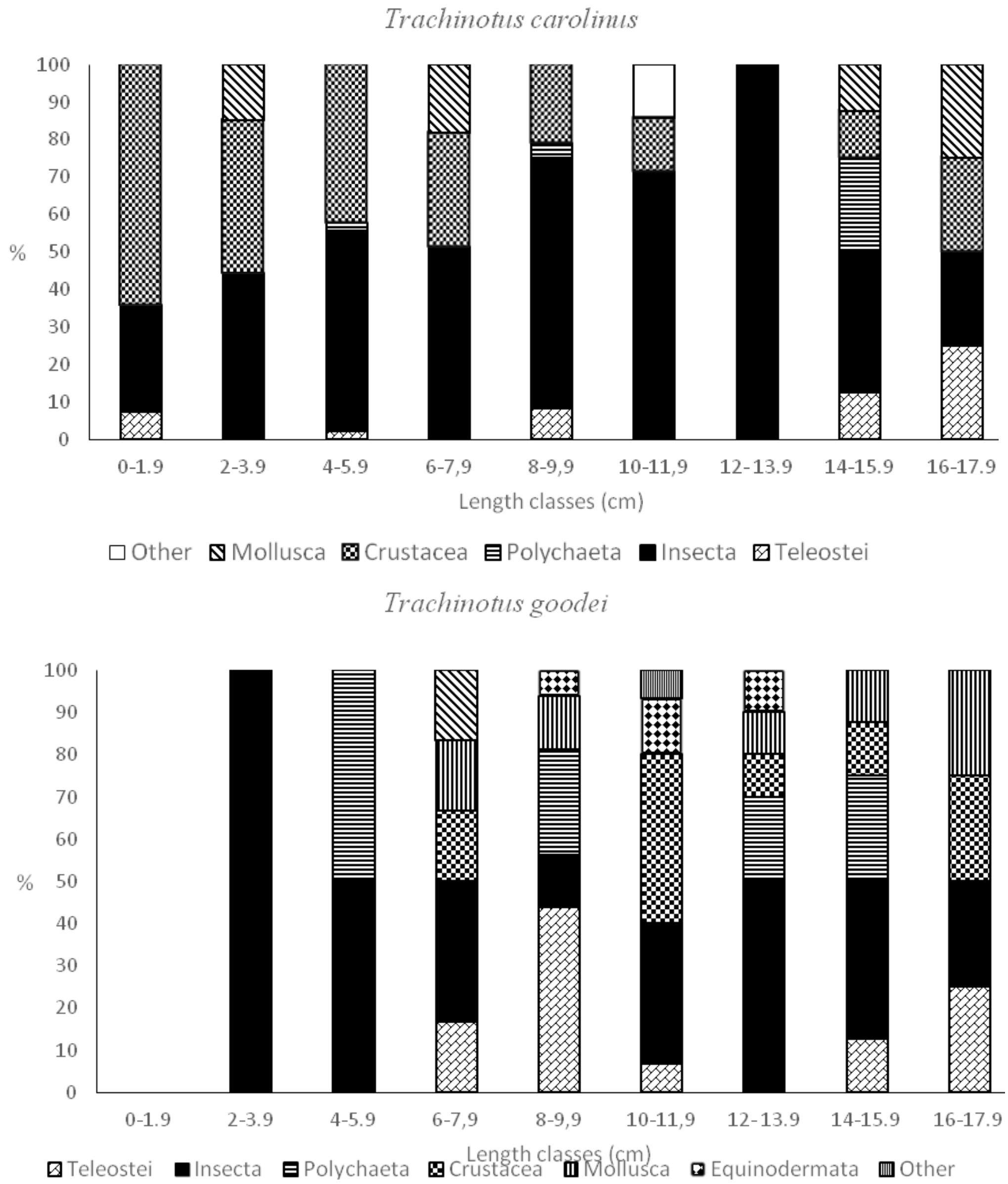

Figure 7 – Main prey groups along the different body sizes of *Trachinotus carolinus* and *T. goodei* in the surf zone of Praia Grande – SP.

globiceps, *Sarpa sarpa,* and *Trachurus trachurus* in South Africa (Lasiak, 1986). Insects were absent in other prey lists of surf zone fishes like *T. carolinus* in Caraguatatuba (Denandai *et al*., 2013), five fish species in Gulf of Mexico (Modde, Ross, 1983), seven species in South Carolina (Delancey, 1989), *T. carolinus* in the Gulf of Mexico (Wheeler *et al*., 2002), and other similar *T. paitensis* in a surf zone in Mexico (Escalona & Cárdenas, 2004).

The remarkable high proportion of insects in the present study is explained due to two reasons. The location of the sampling points were in front of a large field of grass and shrub vegetation (200 x 800 m), with visible large concentration of several species of insects (ants, flies, moths), and larval stages. Rainfalls occur regularly along the year in the region, and so, temporary down streams are formed in the beach during strongest rainfall carrying a wide range of insects to the sea. Another explanation for the high proportion of insects can be attributed to the anthropogenic waste because of turism and urban wastes, which can be associated to insects. During trawls, waste was frequently observed in the seine net. Bellinger, Avault (1971) pointed out that insects found in the stomachs of *T. carolinus* in Luisiania are from garbage and dead fish along the beaches, and currents from the estuary. Another possible cause of the predation upon insects is due to the proper pigmentation of insects. Once they are terrestrial organisms, they are more heavily pigmented than the zooplankton organisms, and so, an insect becomes much more visible in the water column and more susceptible to be viewed and preyed. With the movement of the waves the bottom is in constant disturbance and so many organisms remain in the water column making them accessible to predators, which may explain the presence of bottom preys like Polychaeta, *Mellita quinquiesperforata* and *Donax gemmula*.

DeLancey (1989) and Jarrin and Shanks (2011) observed that in surf zones daily variation of fauna occurs on daily basis, suggesting that during the night there are more fish, and also invertebrates in the surf zone in the active state of the search for food. Modde and Ross (1983) and DeLancey (1989) observed that feeding of the pompano occurred preferentially during the day in Folly Beach Beach, South Carolina (USA) and in Horn Island, Mississippi (USA) respectively, depending on local environmental factors. In this study, no statistical differences were found for day/night stomach fullness, which means that the fishes are active feeders overe the whole daily cycle. Rodrigues & Vieira (2012) also observed no significant differences in surf zone fish communities when separated by physic barrier such as rocky jetties, being more influenced by seasonal patterns like summer-winter periods. As observed by Vasconcellos *et al*. (2007) *Trachinotus* spp. use beaches as breeding areas, which can be seen in a possible change in size classes between seasons. Once the zooplankton and insects are in the rough environment and midwater, thay become prey preferred by these fish with active swimming, terminal mouth and big eyes characteristic for this activity (Palmeira & Monteiro-Neto 2010). In the present study data were analyzed as a whole along the year. Perhaps another seasonal study may reveal some trends for certain kind of prey at different times of the year. Monthly study should be conducted for better visualization of seasonal feeding behavior.

Conclusion

In conclusion, it can be said that the surf zone of Praia Grande-SP, serves as home to a population of pompanos using this area as a feeding ground and growth, sharing similar food resources dominated by insects and zooplankton.

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