

ARGULUS YUCATANUS N. SP. (CRUSTACEA: BRANCHIURA) PARASITIC ON CICHLASOMA UROPTHALMUS FROM YUCATAN, MEXICO

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ABSTRACT A new species, *Argulus yucatanus*, is described based on 14 specimens from *Cichlasoma urophthalmus* collected in Celestun Lagoon, Yucatan, Mexico. Diagnostic characters include the number of and shape of sclerites in the suction cup support rods, shape of and position of respiratory areas, and modifications on the legs of males. In males, the coxae of the 2nd legs bear an angular lobe with 5–7 erect scales and 13–21 sensilla. The new species is compared to *Argulus funduli* Krøyer, 1863, *A. chromidis* Krøyer, 1863, *A. cubensis* Wilson, 1936, *A. rhamdiae* Wilson, 1936, and *A. varians* Bere, 1936.

RESUMEN Una nueva especie, *Argulus yucatanus*, está escrito de catorce especímenes de *Cichlasoma urophthalmus* colectaron del Estero de Celestún, Yucatán, México. Varios caracteres la distinguen con inclusión del número de y de la forma de escleritos en las rayas de las ventosas, de las áreas respiratorias y de las modificaciones en las patas de los machos. En los machos, las segundas parejas de las patas tienen un lóbulo angular con 5–7 escamas erguidas y 13–21 sensillas. *Argulus funduli* Krøyer, 1863, *A. chromidis* Krøyer, 1863, *A. cubensis* Wilson, 1936, *A. rhamdiae* Wilson, 1936 y *A. varians* Bere, 1936 están comparado a la nueva especie.

FISHERY AND BIOLOGY OF BLACKFIN TUNA *THUNNUS ATLANTICUS* OFF NORTHEASTERN BRAZIL

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ABSTRACT Blackfin tuna, *Thunnus atlanticus*, is the target species of a handline artisanal fishery off northeastern Brazil in September–January, but it is also caught by anglers and as by-catch in industrial fisheries. The population structure, morphometric relationships, mortality, reproduction, and fishery dynamics were studied during 2 fishing seasons (1996 and 1997). The maximum length and weight observed were 87 cm FL and 10 kg W_d , respectively. Males were larger and predominant (1.9:1). The length at 50% maturity was 49.8 cm FL for females and 52.1 cm FL for males. This species uses the area for reproduction, although a spawning peak was not observed. The length at first capture (58.1 cm FL) was higher than the length at 50% maturity. The total, natural, and fishing mortality rates were 2.34, 0.94, and 1.40 year⁻¹, respectively. The total length-fork length and the total length-standard length relationships were $TL = 1.35369 + 1.0462 FL$ and $TL = 6.37742 + 1.0544 SL$, respectively (sexes grouped). The length-weight relationship estimated for both sexes was $W_d = 0.00003 FL^{2.8569}$. Annual catches decreased from 154 t year⁻¹ in the 1970s to 33.5 t year⁻¹ in the 1990s. It seems that there was not much change in the structure of this stock after 30 years, but the lack of a proper collection system of catch data and the increasing interest in recreational fisheries raise reasons for concern.

RESUMEN El Atún aleta negra, *Thunnus atlanticus*, es capturado por una pesquería artesanal en el noreste de Brasil de septiembre a enero, pero también por pescadores recreacionales y como fauna acompañante en pesquerías industriales. La estructura de la población, relaciones morfométricas, mortalidad, reproducción y dinámica pesquera fueron estudiadas durante dos temporadas de pesca (1996 y 1997). La longitud y el peso máximos observados fueron 87 cm FL y 10 kg W_d , respectivamente. Los machos fueron mayores y predominantes (1.9:1). El tamaño al 50% de madurez fue 49.8 y 52.1 cm FL para machos y hembras, respectivamente. Esta especie usa la región para reproducción, aunque un pico de desova no fue observado. El tamaño en la primera captura (58.1 cm FL) fue más alto que el tamaño al 50% de madurez. La mortalidad total, natural, y por pesca fueron 2.34, 0.94 y 1.40 año⁻¹, respectivamente. Las relaciones longitud total-longitud furcal y longitud total-longitud estándar fueron: $TL = 1.35369 + 1.0462 FL$ y $TL = 6.37742 + 1.0544 SL$, respectivamente (sexos agrupados). La relación peso-longitud estimada para ambos los sexos fue de $W_d = 0.00003 FL^{2.8569}$. Las capturas anuales disminuyeron de 154 t año⁻¹ en la década de los 70s a 33.5 t año⁻¹ en la década de los 90s. Los resultados parecen indicar que no ha habido

mucho cambio en la estructura de este estoque después de treinta años, pero la carencia de un sistema apropiado de la obtención de datos de captura y el interés de las industrias pesqueras recreacionales son motivo de preocupación.

COASTAL ORIGIN OF COMMON SNOOK, *CENTROPOMUS UNDECIMALIS*, IN FLORIDA BAY

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ABSTRACT We used the elemental signatures of otoliths to investigate the coastal origin of common snook (*Centropomus undecimalis*) in Florida Bay, Florida and evaluate current management boundaries. We examined juvenile otoliths from Florida's Atlantic and Gulf of Mexico (Gulf) populations and determined that there were significant differences in several elemental ratios (Mn/Ca, Cu/Ca, Sr/Ca, Ba/Ca). In addition, a discriminant function analysis (DFA) indicated a significant separation between the juveniles from each coast and otoliths were never misclassified by coast, indicating a distinct difference in their otolith chemistry. Using only juvenile otoliths to derive a calibration function, a separate DFA indicated that the adults from Florida Bay likely originated from both coasts of Florida in roughly equal proportions. Although these preliminary results contradict tagging studies, they concur with genetic studies suggesting that both east and west coast populations contribute to the common snook found in Florida Bay.

PARASITES OF THE AMERICAN WHITE PELICAN

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ABSTRACT Metazoan symbionts, including parasites, infecting the American white pelican (AWP) *Pelecanus erythrorhynchos* comprise a list of 75 species, 7 of which are new host records. Several new geographic records are also presented, but generally these have a low value because of the migratory nature of the bird. Evidence suggests that some parasites, mostly flies and other arthropods but also nematodes and digeneans, produce detrimental behavioral or pathologic changes in the AWP. Some of the arthropods transmit microbial agents to the pelican. Two digeneans that have the AWP as a definitive host harm and even kill their catfish intermediate host, especially in aquaculture, and another causes abnormalities and mortality in amphibians. Some of the arthropods with low host-specificity can potentially transmit harmful microbial agents to humans and domestic animals. A few avian blood-flukes, intestinal flukes, and nematodes can potentially cause "swimmers itch," gastroenteritis, and "anisakiasis," respectively, in humans. Because of the life cycles of some helminths, presence of those worms can provide an indication as to the dietary items of a specific pelican individual, where the individual has been, and how long it has been present in an area. Feather mites, lice, and diplostomoid digeneans serve as good parasites to indicate phylogenetic relationships among different pelican species as well as relationships among the Pelecanidae and other families such as the Sulidae.

ECOLOGY OF THE ROCK SHRIMP *SICYONIA DORSALIS* KINGSLEY, 1878 (CRUSTACEA: SICYONIIDAE) IN A SUBTROPICAL REGION OF BRAZIL

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ABSTRACT The present study analyzes the abundance and distribution of the rock shrimp *Sicyonia dorsalis*, in relation to water temperature, salinity, depth, organic matter content, and sediment texture in Mar Virado (MV),

Ubatuba (UBA) and Ubatumirim (UBM), 3 distinct bays along the northern coast of São Paulo State (23°S, 45°W), Brazil. Six transects were taken in each bay, 4 being parallel to the coastline and 2 next to the rocky shores. Monthly samples were taken over a 2-year period (1998 and 1999) with a shrimp fishing boat equipped with double-rig nets. A total of 2,498 specimens was obtained with 804 from MV, 922 from UBA, and 772 from UBM. The spatial distribution of *S. dorsalis* did not differ among bays. Higher abundance values were recorded in areas where silt+clay comprised more than 60% of the sediment. Abundance also followed a seasonal trend, being highest during spring when intrusions of the cold South Atlantic Coastal Waters are most common, promoting the migration of this shrimp species to more sheltered areas. In short, sediment type and water temperature appear to be the most important environmental variables analyzed which affect the spatial and seasonal distribution of *S. dorsalis*.

DISTRIBUTION OF MYODOCOPID OSTRACODS IN TAMPA BAY, FLORIDA, AND ASSOCIATION WITH ABIOTIC VARIABLES

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ABSTRACT Myodocopid ostracods were identified from > 600 benthic samples collected from Tampa Bay, Florida, during 1995 to 2001, as part of an annual synoptic survey of the benthos. At least 24 taxa were present. *Parasterope pollex* was the most abundant (76%) and most frequently collected (48%) species; *Rutiderma darbyi* (28%) and *Eusarsiella disparalis* (16%) were the next most frequently collected species. Logistic regression and “center of abundance” calculations were used to identify habitat “preferences” for the most frequently occurring species. With the exception of *P. pollex*, these were more likely to occur in coarser sediments, in more saline waters, and at greater depths than the mean for Tampa Bay. *Parasterope pollex* occurred over the widest ranges of salinity and sediment types, although it preferred medium to fine sand-sized sediments; *P. pollex* was also the species most tolerant of low dissolved oxygen concentrations.

MANATEE OCCURRENCE IN THE NORTHERN GULF OF MEXICO, WEST OF FLORIDA

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ABSTRACT Reports of West Indian manatees (*Trichechus manatus*) in the US Gulf of Mexico west of Florida have increased during the last decade. We reviewed all available manatee sighting, capture, and carcass records ($n = 377$) from Alabama, Louisiana, Mississippi, and Texas since the early 1900s; only 40 of these were previously published. Manatees were reported most often in estuarine habitats, usually either near a freshwater source or natural or industrial warm-water springs/runoffs during winter months. The recent increase in manatee records may be due to a combination of increased public awareness and dispersal of manatees, most likely seasonal migrants from Florida. We caution that the presence of artificial warm-water sources outside of the manatee’s traditional range may attract an increasing number of manatees and could increase the incidence of cold-related mortality in this region.

HIGH CYANOBACTERIAL ABUNDANCE IN THREE NORTHEASTERN GULF OF MEXICO ESTUARIES

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ABSTRACT Aquatic phytoplankton comprise a wide variety of taxa spanning more than 2 orders of magnitude in size, yet studies of estuarine phytoplankton often overlook the picoplankton, particularly chroococcoid cyanobacteria (cf. *Synechococcus*). Three Gulf of Mexico estuaries (Apalachicola Bay, FL; Pensacola Bay, FL; Weeks Bay, AL) were sampled during summer and fall 2001 to quantify cyanobacterial abundance, to examine how cyanobacterial abundance varied with hydrographic and nutrient distributions, and to estimate the contribution of cyanobacteria to the bulk phytoplankton community. Cyanobacterial abundances in all 3 estuaries were high, averaging $0.59 \pm 0.76 \times 10^9 \text{ L}^{-1}$ in Apalachicola Bay, $1.7 \pm 1.2 \times 10^9 \text{ L}^{-1}$ in Pensacola Bay and $2.4 \pm 1.9 \times 10^9 \text{ L}^{-1}$ in Weeks Bay (mean \pm standard deviation). Peak abundances typically occurred in the oligohaline zone (low salinity estuarine zone) during the summer. Freshwater sites had nearly undetectable abundances, and marine sites had abundances several-fold lower than the oligohaline zone. When converted to equivalent chlorophyll *a* concentrations, cyanobacteria comprised a large fraction of the total phytoplankton biomass, at times approaching 100% in all 3 systems. These observations clearly indicate a cyanobacterial community of estuarine origin that can make up a large proportion of phytoplankton biomass.

SHORT COMMUNICATIONS

SELECTED LIFE-HISTORY OBSERVATIONS ON THE CAYMAN GAMBUSIA, *GAMBUSIA XANTHOSOMA* GREENFIELD, 1983 (POECILIIDAE)

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FIRST REPORT OF THE MAYAN CICHLID, *CICHLASOMA UROPTHALMUS* (GÜNTHER 1862) COLLECTED IN THE SOUTHERN LITTORAL ZONE OF LAKE OKEECHOBEE, FLORIDA

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RECENT OBSERVATIONS OF THE WHALE SHARK (*RHINCODON TYPUS*) IN THE NORTHCENTRAL GULF OF MEXICO

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SPECIAL SECTION

INTRODUCTION TO SPECIAL SECTION ON RESEARCH ACTIVITIES AT THE IZTACALA CAMPUS OF THE UNIVERSIDAD NACIONAL AUTÓNOMA DE MÉXICO, MÉXICO

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ECOLOGY OF THE MAYAN CICHLID, *CICHLASOMA UROPTHALMUS* GÜNTHER, IN THE ALVARADO LAGOONAL SYSTEM, VERACRUZ, MEXICO

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ABSTRACT The Mayan cichlid, *Cichlasoma urophthalmus*, has a wide distribution in southeastern Mexico where it inhabits rivers and coastal lagoons. In the Alvarado lagoonal system, Veracruz, it is distributed towards the north in Camaronera Lagoon. The Mayan cichlid shows an affinity for oligohaline to mesohaline sites with submerged vegetation, well-oxygenated, deep, and transparent water. The major abundance and biomass of this species was obtained during December to February. The diet of Mayan cichlids consists principally of plant detrital material and algae. Length-frequency distribution shows 2 size classes during both the dry and rainy seasons, corresponding to reproductive fish and young of the year; during the nortes season there is only one modal size class of fish between 60–100 mm SL. Individuals with developed gonads are found throughout the year, although most reproductive adults are found between April and December. The highest Gonadosomatic Index (GSI) values coincided with the peak in reproductive activity between May and July. The fecundity ranged from 1,556–3,348 eggs/female, and there was no relationship between female size and fecundity.

RESUMEN El cíclido maya, *Cichlasoma urophthalmus*, tiene una distribución amplia en el sureste de México, donde habita ríos y lagunas costeras. En el sistema lagunar de Alvarado, Veracruz, esta especie se distribuye hacia el norte principalmente en la Laguna Camaronera. Esta especie muestra afinidad por sitios oligohalinos y mesohalinos con vegetación sumergida, bien oxigenados, profundos y de aguas transparentes. La mayor abundancia y biomasa de *C. urophthalmus* fue obtenida durante Diciembre a Febrero. La dieta del cíclido maya consistió principalmente de detritus vegetal y algas. La distribución frecuencia-longitud mostró dos clases de talla durante las temporadas de secas y lluvias, correspondientes a individuos reproductores y menores de un año; durante la temporada de nortes se encontró solo una clase de talla modal entre 60–100 mm LS. Los individuos con gónadas desarrolladas se encontraron a lo largo del año, aunque los adultos más reproductivos se encontraron entre Abril y Diciembre. El valor más alto del Índice Gonadosomático (IGS) coincidió con el pico de actividad reproductiva entre Mayo y Julio. La fecundidad se registró entre 1,556–3,348 huevos/hembra y no hubo relación entre la talla de las hembras y su fecundidad.

SEASONAL AND SPATIAL PATTERNS IN SALINITY, NUTRIENTS, AND CHLOROPHYLL *a* IN THE ALVARADO LAGOONAL SYSTEM, VERACRUZ, MEXICO

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ABSTRACT Ten monthly collections, distributed among three seasons, were taken from July 2000 to June 2001 in the Alvarado lagoonal system, Veracruz, Mexico. Variables measured *in situ* included dissolved oxygen, salinity, and water temperature. Water samples were collected to determine concentrations of ammonium, nitrates, nitrites, orthophosphates, total phosphorus and chlorophyll *a*. Collections representing the rainy season were taken in September and October, those for the nortes season were taken in November, December, and January, and dry season collections were taken during February, March, May June, and July. There was seasonal and spatial variation in nutrient concentrations, and they were related to the discharge of the rivers; concentrations increased during the rainy and nortes seasons. Other factors affecting water quality included the constant discharge of organic materials into the system, resuspension of sediments during the nortes season and the biological activity within the system that assimilated the nutrients in the water. The Alvarado lagoonal system has three separate zones based on physicochemical characteristics; Camaronera Lagoon, Buen Pais Lagoon and the urban zone of Alvarado Lagoon, and the river zone in Alvarado Lagoon.

RESUMEN Se realizaron diez muestreos durante el periodo comprendido entre Julio de 2000 a Junio de 2001, distribuidos a lo largo de tres estaciones climáticas, en el sistema lagunar de Alvarado, Veracruz, México. Los parámetros que fueron registrados *in situ* incluyendo oxígeno disuelto, salinidad y temperatura de agua. Al mismo tiempo se colectaron muestras de agua para determinar en laboratorio las concentraciones de amonio, nitratos, nitritos, ortofosfatos, fósforo total y clorofila *a*. Los meses de colecta que abarcaron las temporadas de lluvias fueron tomadas en Julio, Septiembre y Octubre, para Nortes Noviembre, Diciembre, y Enero, y por último, la temporada de secas que correspondieron los muestreos de Febrero, Marzo, Mayo, y Junio. Los nutrientes presentan una variación espacio-temporal presentando relación con: la descarga de los ríos, incrementándose su concentración durante la temporada de lluvias y Nortes; las constantes descargas de agua provenientes de diversas actividades humanas, como son la agricultura y los asentamientos humanos; la resuspensión de los sedimentos durante la temporada de Nortes; y la gran actividad biológica de estos sistemas que permiten la rápida transformación de la materia orgánica en nutrientes. El sistema lagunar de Alvarado presenta tres zonas diferentes basadas en sus características fisicoquímicas: Laguna de Camaronera, Laguna de Buen País y la zona urbana de Laguna de Alvarado, y la zona de ríos en Laguna de Alvarado.

LONG-TERM FISH ASSEMBLAGE DYNAMICS OF THE ALVARADO LAGOON ESTUARY, VERACRUZ, MEXICO

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ABSTRACT The fish assemblages of Alvarado Lagoon Estuary (a complex of coastal lagoons in the state of Veracruz, Mexico) have been surveyed intermittently by different researchers over the last 40 years. Assessing long-

term trends in fish assemblage composition for this ecosystem is problematic due to differences in sampling efforts among the survey periods (1966–1968, 1987–1988, 1989, 1989–1990, 1990–1991 and 2000–2001) and by the inherent ecological variability of estuaries. To overcome these data limitations and better understand fish assemblage change over time, we used robust, simulation-based analyses to compare collections from the different surveys. The 107 fish species collected from the Alvarado Lagoon Estuary in these surveys represent 4 ecological guilds: marine stenohaline, marine euryhaline, estuarine, and freshwater fishes. The occurrence frequency of fish species representing each guild did not change significantly among the survey periods: the chi-square deviation statistic ($\chi^2 = 8.53$) was not significantly larger than the average value for 1000 simulated matrices ($\chi^2 = 138.64$; $P = 1.00$). A non-metric multidimensional scaling (MDS) based on Bray-Curtis similarities of fish species presence-absence data showed that the 1966–1968 survey period was the least similar to the other survey periods. For the 1966–1968 survey, the range of Bray-Curtis inter-survey similarities was 40.4–58.6 ($n = 5$). By comparison, the remaining range of inter-survey similarities was 61.5–81.7 ($n = 10$). Average taxonomic distinctness (Δ^+) and variation in taxonomic distinctness (Λ^+), two sample size-independent measures of diversity, were calculated for all survey periods. Although Δ^+ and Λ^+ for all survey periods were within the simulated 95% confidence limits for expected values, these values for the 2000–2001 survey period were less than the average Δ^+ and Λ^+ values for the entire species pool. This suggests that the fish assemblage collected during the latest survey reflects a loss of both widespread higher taxa (reduced Δ^+) and that the higher taxa lost are those with only a few representative species in the assemblage (reduced Λ^+). These assemblage data show that fish assemblages of Alvarado Lagoon Estuary have not experienced significant changes over 40 years, but differences among the earliest (1966–1968), the latest (2000–2001), and the remaining survey periods indicate a recent decline in diversity.

RESUMEN Los ensamblajes de peces del sistema lagunar de Alvarado (un complejo de lagunas costeras del Estado de Veracruz, México) han sido investigados intermitentemente por diferentes grupos durante los últimos 40 años. La determinación de las tendencias a largo plazo de estos ensamblajes ha sido problemática debido a las diferencias en los esfuerzos de muestreo empleados entre los períodos de investigación (1966–1968, 1987–1988, 1989, 1989–1990, 1990–1991 y 2000–2001) y por la variación ecológica inherente a los estuarios. Para evitar estas limitaciones de los datos y presentar una explicación apropiada de los cambios de los ensamblajes de peces respecto al tiempo, se usó un análisis de simulación para comparar las colectas de los diferentes períodos de trabajo. Las 107 especies colectadas en el sistema lagunar de Alvarado representan 4 gremios ecológicos: marino estenohalino, marino eurihalino, estuarino y dulceacuícolas. La frecuencia de ocurrencia de las especies de peces que representan cada gremio no cambió significativamente entre los períodos de investigación: El estadístico de desviación chi cuadrada ($\chi^2 = 8.53$) no fue significativamente mas grande que el valor promedio para las 1000 matrices simuladas ($\chi^2 = 138.64$; $P = 1.00$). La prueba de escalamiento múltiple dimensional no-métrico (MDS) se ejecutó considerando los datos de presencia-ausencia y las similitudes calculadas por el índice de Bray-Curtis, esta prueba mostró que el período 1966–1968 fue menos similar a los otros períodos de colecta. Para el período 1966–1968, el rango de similitudes Bray-Curtis entre investigaciones fue de 40.4–58.6 ($n = 5$). En comparación, el rango de similitudes restante entre investigaciones fue de 61.5–80.7 ($n = 10$). La distinción taxonómica promedio (Δ^+) y la variación de la distinción taxonómica (Λ^+), dos medidas de la diversidad independientes del tamaño de muestra, fueron calculadas para todos los períodos de investigación. Aunque los valores de Δ^+ y Λ^+ para todos los períodos de investigación estuvieron dentro de los límites de confianza de 95% para los valores esperados, estos valores fueron menores para el período 2000–2001 respecto a los valores promedio de Δ^+ y Λ^+ para el conjunto completo de especies. Esto sugiere que el ensamblaje de especies colectado en el último período de investigación refleja una pérdida de taxa superiores (Δ^+ reducida) y que los taxa superiores perdidos son aquellos con pocas especies representativas en el ensamblaje (Λ^+ reducida). Estos datos muestran que los ensamblajes de especies del sistema lagunar de Alvarado no han sufrido cambios significantes durante los últimos 40 años, pero las diferencias entre el primer y último período de investigación y los otros períodos indican una declinación reciente en la diversidad.

TROPHIC RELATIONSHIPS OF DEMERSAL FISHES IN THE SHRIMPING ZONE OFF ALVARADO LAGOON, VERACRUZ, MEXICO

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ABSTRACT The diet of demersal piscivorous fishes captured as bycatch of the commercial shrimping fleet off the Alvarado lagoonal system, Veracruz, Mexico, was studied. Nine collections distributed throughout the nortes (windy), wet, and dry seasons were made from November 1993 to January 1995. Sampling yielded a total of 646 fishes representing 10 families and 14 species, of which 44.9% had empty digestive tracts and were excluded from analysis. *Trichiurus lepturus* and *Synodus foetens* were the most abundant demersal predators in the collections. Differences in food consumption of the 7 most abundant predators were observed among the 3 seasons, with the greatest variety of prey (20 species) taken during the nortes season and the lowest variety (9 species) during the dry season. Five distinct trophic guilds were determined based on an index of relative importance of prey. Prey type and location of prey within the water column helped determine guild classification. The occurrence of different trophic guilds may allow for decreased competition for food resources on the continental shelf off Alvarado, Mexico.

RESUMEN Se estudio la dieta de los peces piscívoros demersales capturados como fauna acompañante del camarón en la flota de barcos camaroneros del sistema de lagunas de Alvarado, Veracruz, México. Se obtuvieron nueve colecciones que abarcaron las temporadas de nortes, lluvias y secas desde noviembre de 1993 hasta enero de 1995. Las muestras produjeron un total de 646 peces representados por 10 familias y 14 especies; 44.9% fueron encontrados con el tracto estomacal vacío y no fueron analizados. *Trichiurus lepturus* y *Synodus foetens* fueron los depredadores demersales más abundantes en nuestras muestras. Se observaron diferencias en el consumo de alimento en las tres temporadas. La temporada de nortes mostró la mayor variación de presa (20 especies), y la menor variación se observó en la temporada de secas (9 especies). Cinco distintivos gremios tróficos fueron identificados basados en el índice de importancia relativa de la presa. El tipo de presa y la localización de las presas en la columna de agua permitieron determinar la clasificación de los gremios. La existencia de diferentes gremios tróficos permite una disminución en la competencia por recursos alimenticios en la plataforma continental del Alvarado, México.