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Maximum Total Length and Age of Red Drum Off Texas

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MAXIMUM TOTAL LENGTH AND AGE OF RED DRUM OFF TEXAS

Red drum (*Sciaenops ocellatus*) support economically important fisheries throughout their range (Matlock 1984). Reliable stock assessments must be conducted if management is to sustain these fisheries, because increased demand for quality recreation and commercial food production is exceeding supply (Matlock 1982). Yield models, such as the Beverton-Holt model (Gulland 1969), require an estimate of average maximum length and age (t_L). Wakefield and Colura (1983) estimated red drum maximum lengths in Texas as 717 to 835 mm total length (TL) by fitting the von Bertalanffy growth equation to scale date from Galveston and Matagorda Bays and the lower Laguna Madre in 1977 and 1978. However, their estimates appear too low because they collected no fish in the Gulf of Mexico (Gulf) where surf anglers catch even larger fish during fall (Weixelman 1982).

This study reports maximum total length and age that red drum reach in Texas estuarine and Gulf waters.

MATERIALS AND METHODS

Average maximum TL in Texas bays was determined from length-frequency data following Alverson and Carney's (1975) definition that only 0.5-1.0% of the catch exceeds the maximum length (L_{∞}). Values of L_{∞} and L_{∞} will be the same in an unfished population that is sampled randomly throughout its distribution with a completely non-selective gear. However, the theoretical, regression-estimated L_{∞} may not be equivalent to L_{∞} for red drum because Gulf fish have not been adequately

sampled. L_{∞} was estimated from length frequencies of fish caught by anglers from piers and jetties along Gulf beaches during September 1978-August 1979 (Weixelman 1982) and from one angler who recorded all red drum he caught in the Gulf surf at Cedar Bayou, Mesquite Bay, Texas, each winter (Dec-Feb) from 1978 through 1980. Tagged fish free at least 5 years (Green 1986) were used to determine a range for L_{∞} and its corresponding t_L in the sense of t_L in the Beverton-Holt model (Gulland 1969).

These data were compared to length frequencies of fish caught in bays in trammel nets during October 1976-1980 to determine the effect of using only bay data to estimate L_{∞} .

RESULTS AND DISCUSSION

The average maximum TL red drum typically reach off Texas appears to be less than 1150 or 1200 to 1300 mm at most (Figure 1). This conclusion is based on the following: 1) the state angling record is a fish 1284 mm long weight 23.36 kg caught in the Gulf (Texas Parks and Wildlife Department 1980; Harrington *et al.* 1979); 2) the angler who recorded all Gulf-caught red drum caught none larger than 1295 mm, and 99.5% of the 174 fish he caught were smaller than 1170 mm (Figure 1); 3) gulf pier and jetty anglers caught no fish larger than 1120 mm during FY 1979 (Figure 1); and 4) three tagged fish recaptured off Texas after 6-11 years reached 698-1016 mm (Table 1).

The maximum age red drum typically reach in Texas is unknown. Three tag recoveries were from fish free 6, 8, and 11 years (Table 1). Each fish was at least 1 year old at tagging because their lengths equalled or exceeded the estimated length (<330 mm) of 1-year old fish (Matlock 1984). This suggests that

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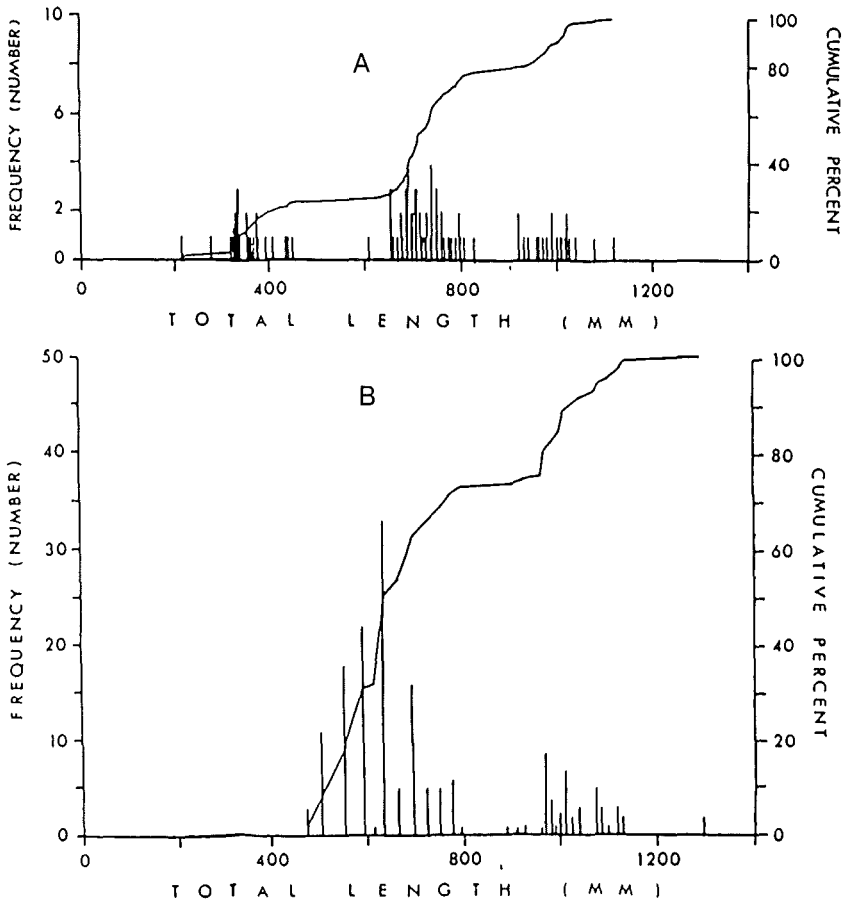


Figure 1. Total length frequency and cumulative percentage of 96 red drum caught by anglers from gulf piers and jetties in Texas during September 1978-August 1979 (A) and 174 red drum caught in the gulf of Cedar Bayou, Texas, by an angler in winter 1978-79, 1979-80, and 1980-81 (B).

the maximum age of red drum may exceed 11 years.

The average maximum TL of red drum in Texas bays typically is 755 mm. In the period October 1976-April 1980, 99.5% of the 8519 fish captured in TPWID

trammel nets were smaller than 755 mm (Figure 2). The maximum size I estimated for bay fish (755 mm) agrees well with the mid-range (776 mm) of the 717-835 mm values that Wakefield and Colura (1983) reported for L_{∞} . Their estimate for L_{∞} ap-

Table 1. Summary of data for fish tagged and released in Texas bays during the 1960's and recaptured at least 5 years later. Weight (g) estimated from total length (mm) for fish released on 7 August 1968 using Harrington *et al.* (1979) weight-length regression.

At tagging				At recapture			
Date	Location	Total length	Weight	Date	Location	Total length	Weight
07 Aug 1968	Lower Laguna Madre (Intracoastal Waterway Marker 54)	684	3455	02 Dec 1979	Gulf of Mexico, South of jetties; at Port Aransas	1016	11,110
18 Jul 1969	Copano Bay (Newcom Point)	345	476	24 May 1977	Mission Bay	698	5,330
16 Mar 1966	San Antonio	380	590	11 Nov 1972	Gulf of Mexico,	915	6,804

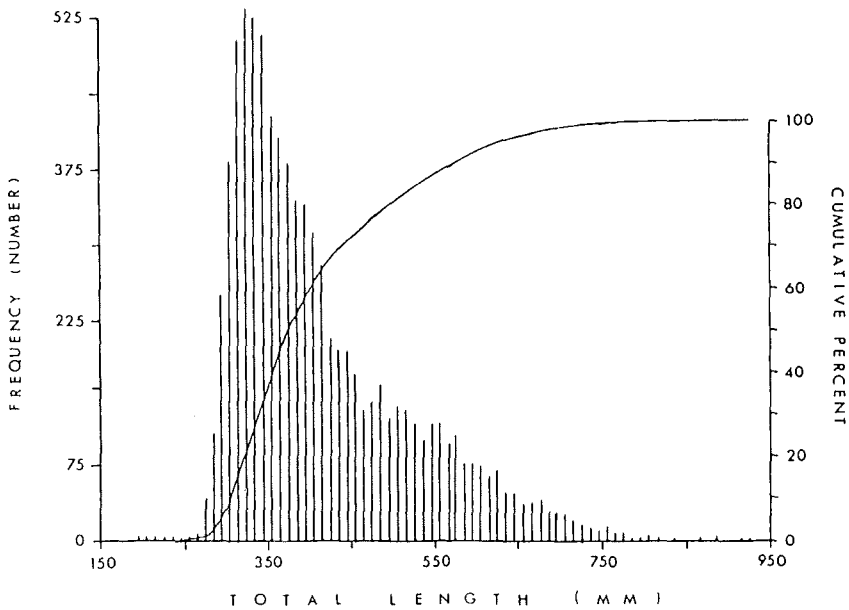


Figure 2. Total length frequency and cumulative percentage of 8519 red drum collected in trammel nets in Texas bays during October 1976-April 1980.

pears to be an underestimate because my estimate of maximum TL for bay fish underestimates L_{∞} . Data from fish in the Gulf are needed to better estimate von Bertalanffy parameters because fish larger than 755 mm TL mainly occur there.

Maximum sizes and, presumably, ages of red drum occupying the cold temperate waters of the Atlantic Ocean near and north of Cape Hatteras, North

Carolina appear much larger than those in the warm temperate water of the Carolinian Province south of that general area and extending into the Gulf of Mexico. In contrast to records of 19.5-34.0 kg from Carolinian Province state south of North Carolina (Table 2), the record in Virginia is 38.6 kg (C. Rogers, personal communication). The South Carolina record fish was caught near the North Carolina border. Fish

Table 2. Record size of red drum caught by anglers in the Gulf of Mexico. No data were available from Mississippi. Lengths were not available for any record fish.

State	Weight (kg)	Year caught	Reference
Alabama	19.5	1982	Walter Tatum, Alabama Department of Conservation and Natural Resources.
Florida	23.1	1979	Alan Huff, Florida Department of Natural Resources.
Georgia	20.4	1969	Duane Harris, Georgia Department of Natural Resources.
Louisiana	25.6	1963	William Perret, Louisiana Department of Wildlife and Fisheries.
South Carolina	34.0	1965	Don Hammond, South Carolina Wildlife and Marine Resources Department.
Texas	23.4	1967	Texas Parks and Wildlife Department (1980).

16-27 kg and larger are commonly caught in North Carolina (Matlock 1980), and the last two angling world records (40.8 kg by Elvin Hooper; 42.7 kg by David Deuel) were for fish caught near Cape Hatteras (Anonymous 1985). The difference in sizes north and south of the Cape Hatteras area suggests zoogeographic variation in population dynamics of red drum near there as has been suggested for Atlantic croaker, *Micropogonias undulatus* (White and Chittenden 1977) and for the genera *Stenotomus* (Geoghegan and Chittenden 1982), *Peprilus* (Murphy 1981), and *Cynoscion* (Shlossman and Chittenden 1981).

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