WHOLE WEIGHT-DRESSED WEIGHT RELATIONSHIP FOR BLACK DRUM

by Kyle W. Spiller

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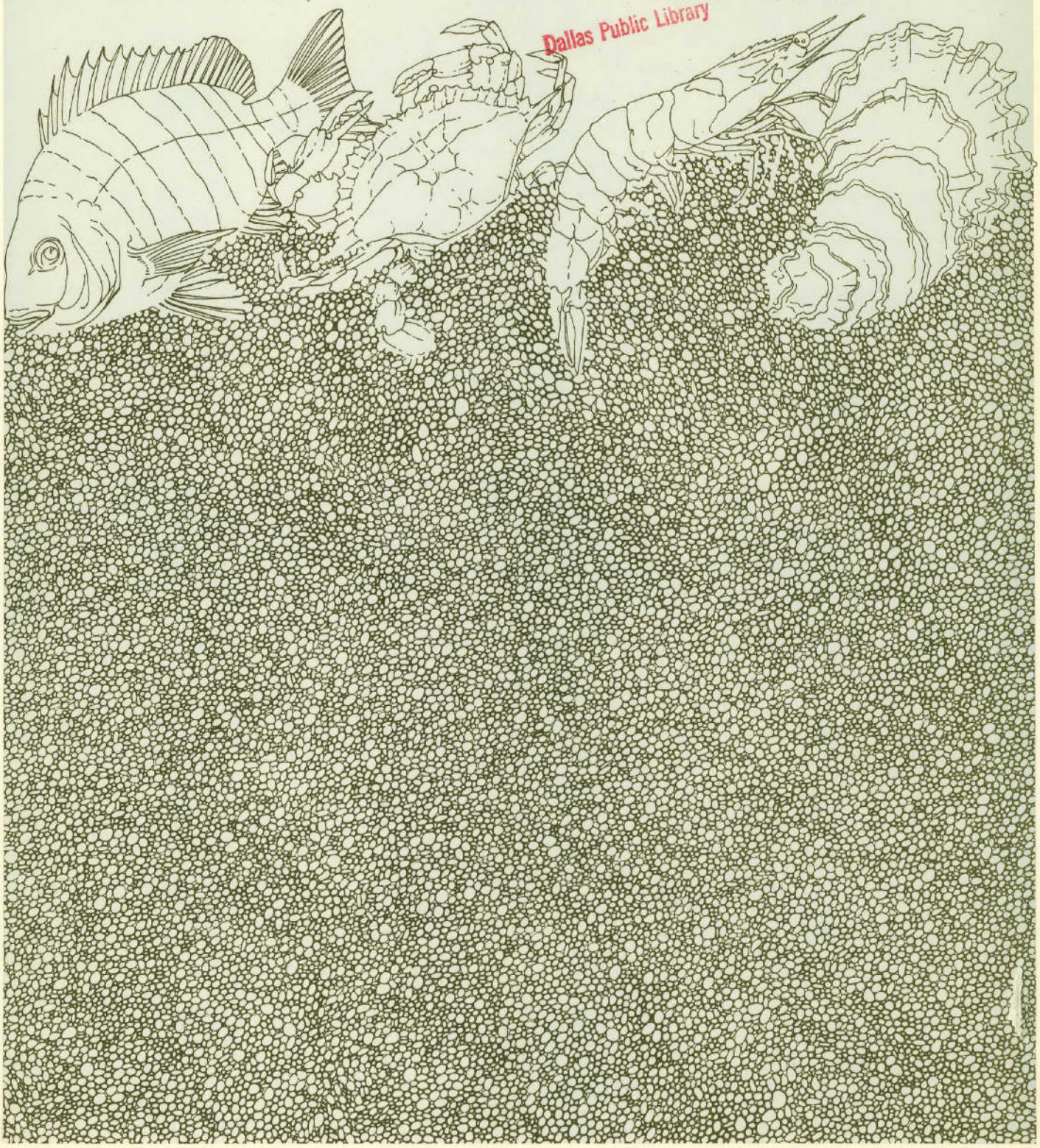

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WHOLE WEIGHT-DRESSED WEIGHT RELATIONSHIP FOR BLACK DRUM

ABSTRACT

Separate regression equations were fitted to the whole weight (WW), headed weight (HW) and the whole weight-collared weights (CW) black drum (Pogonias cromis) data. Conversion equations for headed weight and collared weight were developed from these equations. The whole weight-headed weight conversion equation was WW = 1.85 HW - 1.67 where weights are in kg. The whole weight-collared weight conversion equation was WW = 2.63 CW - 4.74 where weights are in kg. Analysis of variance of the two regression equations indicated that they were not significantly different. The data were pooled and fitted to a regression equation. A conversion equation for dressed weight (DW) using either headed or collared weight was developed from this equation. The pooled conversion equation was WW = 2.44 DW - 3.74. Conversion tables for all three conversion equations are presented.

INTRODUCTION

Seafood dealers are required by law (Texas Parks and Wildlife Code, Section 66.209) to report the weight of each species of edible marine life sold in Texas. The weight of large ($\geq$ 4.5 kg) black drum (Pogonias cromis) landed is often reported as dressed weight (head removed or head and collar removed). The relationship for converting dressed (headed or collared) weight to whole weight has not been documented. The relationship between whole weight and gutted and gilled weight was reported by Harrington et al. (1979).

Only black drum that have a whole weight of < 4.5 kg are gutted and gilled, fish that have whole weights between 4.5 kg and 6.8 kg are headed. To head the fish the atlas-axis joint is cut, the isthmus is cut, the head, gills and viscera are removed and the air bladder and developed gonads are left in the fish. Fish that have a whole weight $\geq$ 6.8 kg are collared. To collar a fish a cut is made from the atlas-axis joint to just posterior of the pelvic fins and the pelvic girdle, head, viscera, air bladder and developed gonads are removed.

This paper provides a whole weight-headed weight and whole weight-collared weight relationship for converting dressed weight to whole weight for individual black drum.

MATERIALS AND METHODS

Black drum were weighed (to the nearest 10 g) by Texas Parks and Wildlife Department (TPWD) biologists during regular visits to commercial fish houses in Corpus Christi Bay and the upper Laguna Madre during March and April 1979 and February and March 1980. The fish were weighed on a Universal Accu-Weigh Kg Scale and then dressed (headed or collared) by the fish house staff. The fish were then weighed again (to the nearest 10 g).

The whole weight-headed weight and the whole weight-collared weight data were fitted to the linear equations $HW = a + b\ WW$ and $CW = a_1 + b_1\ WW$ where HW represents headed weight, CW represents collared weight, and WW represents whole weight; a and a_1 represent the HW and CW axis intercepts; b and b_1 represents the slope. Analysis of covariance was performed to determine if the slopes and intercepts of the two equations were significantly different. These data were then pooled and fitted to the linear equation $DW = a + b\ WW$ where DW represents dressed weight (either headed weight or collared weight). The correlation coefficients (r) and the 95% confidence intervals for the slopes of each of the regression equations were calculated. Ninety-five percent conficence intervals for the whole

weights in the conversion equations can be calculated by using the inverse prediction equation found in Biostatistical Analysis by Jerrold H. Zar. Regression analysis and analysis of covariance were performed using the BMDP1R program for the Biomed statistical package.

RESULTS

The whole weight-headed weight regression equation for black drum was HW = .751 + 0.54 WW (r = 0.725) (Table 1). Solving this equation for whole weight yielded WW = 1.85 HW - 1.67 the conversion equation for individually headed black drum. The whole weight-collared weight regression equation for individual black drum was CW = 1.80 + 0.38 WW (r = 0.909). Solving this equation for whole weight yields WW = 2.63 CW - 4.74 the conversion equation for individually collared black drum. The slopes and/or intercepts of the two regression equations were not significantly different (P = 0.01)(Table 2). The regression equation for the pooled data was DW = 1.53 + 0.41 WW (r = 0.933). Solving this equation for whole weight (WW) yields WW = 2.44 DW - 3.74, the conversion equation for either headed or collared individual black drum.

Table 3 presents conversions from headed weight to whole weight based on the headed weight conversion equation. Table 4 presents conversions from collared weight to whole weight based on the collared weight conversion equation. Table 5 presents conversions from dressed weight to whole weight based on the pooled data conversion equation.

DISCUSSION

Since the treatments (heading or collaring) were not applied to all sizes of fish (fish with whole weights greater than 6.8 kg were not headed and fish with whole weights less than 6.8 kg were not collared) use of the pooled data equation to make predictions about dressed weights should be done with caution. The small number (5) of very large black drum that were weighed created a cluster of data points that were widely separated from the bulk of the data and may have contributed to the high r value (r = 0.933) for this equation.

Table 1. Whole-dressed weight relationship for black drum from Corpus Christi Bay and the upper Laguna Madre.

	a	b	95% confidence interval of b		r	Sample size
Headed	750.98	0.54	0.32	0.76	0.725	26
Collared	1801.69	0.38	0.32	0.45	0.909	35
Pooled	1533.84	0.41	0.32	0.45	0.933	61

Table 2. Analysis of covariance of regression coefficients over groups.

Source of Variation	Sum of squares	Degrees of freedom	Mean squares	F-Statistic
Regression over groups	448454	2	224227.000	1.266 NS
Residual within groups	10097626	57	177151.313	

NS - not significant at P = 0.01

Table 3. Corresponding headed weight and whole weight for black drum using the headed data equation (WW = 1.85 HW - 1.67).

Headed Weight		Whole Weight	
Kg	lb	Kg	lb
2.6	5.7	3.4	7.5
2.7	6.0	3.6	7.9
2.8	6.2	3.8	8.3
2.9	6.4	4.0	8.8
3.0	6.6	4.2	9.2
3.1	6.8	4.3	9.6
3.2	7.0	4.2	9.4
3.3	7.3	4.4	9.8
3.4	7.5	4.6	10.2
3.5	7.7	4.8	10.6
3.6	7.9	5.0	11.0
3.7	8.2	5.2	11.4
3.8	8.4	5.4	11.8
3.9	8.6	5.5	12.2
4.0	8.8	5.7	12.6
4.1	9.0	5.9	13.0
4.2	9.2	6.1	13.4
4.3	9.5	6.3	13.8
4.4	9.7	6.5	14.3
4.5	9.9	6.6	14.7
4.6	10.1	6.8	15.0

Table 4. Corresponding collared weight and whole weight for black drum using the collared data equation (WW = 2.63 CW - 4.74).

Collared Weight		Whole Weight	
Kg	lb	Kg	lb
4.3	9.5	6.7	14.5
4.4	9.7	6.8	15.1
4.5	9.9	7.1	15.6
4.6	10.1	7.4	16.2
4.7	10.4	7.6	16.8
4.8	10.6	7.9	17.4
4.9	10.8	8.1	18.0
5.0	11.0	8.4	18.5
5.1	11.2	8.7	19.1
5.2	11.5	8.9	19.7
5.3	11.7	9.2	20.3
5.4	11.9	9.5	20.9
5.5	12.1	9.7	21.4
5.6	12.3	10.0	22.0
5.7	12.6	10.2	22.6
5.8	12.8	10.5	23.2
5.9	13.0	10.8	23.8
6.0	13.2	11.0	24.3
6.1	13.4	11.3	24.9
6.2	13.7	11.6	25.5
6.3	13.9	11.8	26.1
6.4	14.1	12.1	26.6
6.5	14.3	12.4	27.2
6.6	14.6	12.6	27.8
6.7	14.8	12.9	28.4
6.8	15.0	13.1	29.0
6.9	15.2	13.4	29.6
7.0	15.4	13.7	30.1
7.1	15.6	13.9	30.7
7.2	15.9	14.2	31.3
7.3	16.1	14.4	31.9
7.4	16.3	14.7	32.4
7.5	16.5	15.0	33.0
7.6	16.8	15.2	33.6
7.7	17.0	15.5	34.2
7.8	17.2	15.8	34.8
7.9	17.4	16.0	35.4

Table 4. (Cont'd).

Collared Weight		Whole Weight	
Kg	lb	Kg	lb
8.0	17.6	16.3	35.9
8.1	17.8	16.6	36.5
8.2	18.1	16.8	37.1
8.3	18.3	17.1	37.7
8.4	18.5	17.4	38.2
8.5	18.7	17.6	38.8
8.6	18.9	17.9	39.4
8.7	19.2	18.1	40.0
8.8	19.4	18.4	40.6
8.9	19.6	18.7	41.2
9.0	19.8	18.9	41.7
9.1	20.1	19.2	42.3
9.2	20.3	19.4	42.9
9.3	20.5	19.7	43.5
9.4	20.7	20.0	44.0
9.5	20.9	20.2	44.6
9.6	21.2	20.5	45.2
9.7	21.4	20.8	45.8
9.8	21.6	21.0	46.4
9.9	21.8	21.3	47.0
10.0	22.0	21.6	47.5

Table 5. Corresponding dressed weight[a] and whole weight in 0.1 kg increments for black drum using the pooled data equation (WW = 2.24 DW - 3.74).

Dressed Weight		Whole Weight	
Kg	lb	Kg	lb
2.8	6.2	3.1	6.8
2.9	6.4	3.3	7.4
3.0	6.6	3.6	7.9
3.1	6.8	3.8	8.4
3.2	7.0	4.1	9.0
3.3	7.3	4.3	9.5
3.4	7.5	4.6	10.0
3.5	7.7	4.8	10.6
3.6	7.9	5.0	11.1
3.7	8.2	5.3	11.6
3.8	8.4	5.5	12.2
3.9	8.6	5.8	12.7
4.0	8.8	6.0	13.3
4.1	9.0	6.3	13.8
4.2	9.2	6.5	14.3
4.3	9.5	6.8	14.9
4.4	9.7	7.0	15.4
4.5	9.9	7.2	16.0
4.6	10.1	7.5	16.5
4.7	10.4	7.7	17.0
4.8	10.6	8.0	17.6
4.9	10.8	8.2	18.1
5.0	11.0	8.5	18.6
5.1	11.2	8.7	19.2
5.2	11.5	8.9	19.7
5.3	11.7	9.2	20.3
5.4	11.9	9.4	20.8
5.5	12.1	9.7	21.3
5.6	12.3	9.9	21.9
5.7	12.6	10.2	22.4
5.8	12.8	10.4	23.0
5.9	13.0	10.6	23.5
6.0	13.2	10.9	24.0
6.1	13.4	11.1	24.6
6.2	13.7	11.4	25.1
6.3	13.9	11.6	25.6
6.4	14.1	11.9	26.2
6.5	14.3	12.1	26.7
6.6	14.6	12.4	27.2
6.7	14.8	12.6	27.8

Table 5. (Cont'd).

Dressed Weight		Whole Weight	
Kg	lb	Kg	lb
6.8	15.0	12.8	28.3
6.9	15.2	13.1	28.9
7.0	15.4	13.3	29.4
7.1	15.6	13.5	29.9
7.2	15.9	13.8	30.5
7.3	16.1	14.1	31.0
7.4	16.3	14.3	31.6
7.5	16.5	14.6	32.1
7.6	16.8	14.8	32.6
7.7	17.0	15.0	33.2
7.8	17.2	15.3	33.7
7.9	17.4	15.5	34.3
8.0	17.6	15.8	34.8
8.1	17.8	16.0	35.3
8.2	18.1	16.3	35.9
8.3	18.3	16.5	36.4
8.4	18.5	16.8	36.9
8.5	18.7	17.0	37.5
8.6	18.9	17.2	38.0
8.7	19.2	17.5	38.6
8.8	19.4	17.7	39.1
8.9	19.6	18.0	39.6
9.0	19.8	18.2	40.2
9.1	20.1	18.5	40.7
9.2	20.3	18.7	41.2
9.3	20.5	19.0	41.8
9.4	20.7	19.2	42.3
9.5	20.9	19.4	42.8
9.6	21.2	19.7	43.4
9.7	21.4	19.9	43.9
9.8	21.6	20.2	44.5
9.9	21.8	20.4	45.0
10.0	22.0	20.7	45.5

[a]Dressed weight = either headed weight or collared weight.

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