RELATIONSHIP BETWEEN BODY WEIGHT AND HEART GIRTH IN WHITE-TAILED DEER FROM SOUTH CAROLINA

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ABSTRACT

Relationships between heart girth and body weight were determined in 545 white-tailed deer (Odocoileus virginianus) *killed in South Carolina during the period September 1965 to December 1966. Data for heart girth, total body weight, and "hog-dressed" weight were recorded for 102 male fawns, 127 female fawns, 113 adult males, and 203 adult females. Data for males and females were pooled. Prediction equations developed for hog-dressed weight, (W, lb.) based on heart girth, (H, in.) were:* $W = 3.9499H - 55.6158$ *($R^2 = 0.71$) for fawns; and* $W = 5.6037H - 94.0982$ *($R^2 = 0.74$) for adults. Prediction equations developed for total body weight were:* $W = 5.3003H - 74.1489$ *($R^2 = 0.69$) for fawns; and* $W = 6.5520H - 95.0128$ *($R^2 = 0.74$) for adults.*

Ragsdale and Brody (1935) reported that the relationship between body weight and heart girth for cattle was closer than the relationship between body weight and any of 21 other linear measurements. This knowledge has been utilized in animal agriculture to estimate body weight with "weight-tapes" and has minimized the need for costly weighing equipment. Predictive equations for expressing body weight as a function of heart girth have been developed for several species of wild ruminants (Bandy et al. 1956, Talbot and McCulloch 1965, McEwan and Wood 1966). Recently, Smart et al. (1973) developed predictive equations for estimating body weight from heart girth measurements for both fawns and adult white-tailed deer (*Odocoileus virginianus*) from Virginia.

In the present report we examined the relationship between heart-girth and body weight for white-tailed deer, male and female, young and adult, from South Carolina.

MATERIALS AND METHODS

Data on sex, age, heart girth, body weight, and hog-dressed weight were collected primarily from deer harvested during hunting on the Savannah River Plant (Aiken and Barnwell Counties), South Carolina. A total of 545 deer was examined as follows: 102 male fawns, 127 female fawns, 113 adult males, and 203 adult females. Data were collected during the hunting seasons 1965 and 1966, September through December in each year. A limited number of road-killed deer recovered during 1966 were also included.

Data were coded, punched on computer cards, and analyzed on an IBM 370/155 computer with the Statistical Analysis System (Barr and Goodnight 1971). Preliminary scatter-diagrams indicated that data could be organized into two major categories, fawns and adults. Accordingly, data for both sexes were pooled and analyzed by age classes only.

RESULTS AND DISCUSSION

Prediction equations for converting heart girth to hog-dressed and total body weight for fawns and adults are given in Table 1. The degree of correlation, as shown by the R^2 values, indicates that acceptable results can be expected in predicting body weight from heart

Table 1. Prediction equations for body weight of white-tailed deer from South Carolina, based on heart girth (W= body weight in pounds, H = heart girth in inches): K = body weight in kilograms, C = heart girth in centimeters).

Weight measured	*Age class*	*Equation*	R^2	*Mean body weight of sample*	*95% confidence interval for mean weight*
Hog-dressed	Fawns	W=3.9499H−55.6158	0.71	45.378 lb	44.409− 46.346
	Adults	W=5.6037H−94.0982	0.74	90.399 lb	88.572− 92.225
Total body weight	Fawns	W=5.3003H−74.1489	0.69	61.372 lb	60.015− 62.730
	Adults	W=6.5520H−95.0128	0.74	120.706 lb	118.555−122.857
Hog-dressed	Fawns	K=0.7063C−25.3075	0.71	20. 57 kg	20.14 − 21.02
	Adults	K=1.0011C−42.7197	0.74	41.00 kg	40.18 − 41.83
Total body weight	Fawns	K=0.9476C−33.8455	0.70	27.84 kg	27.22 − 28.45
	Adults	K=1.1834C−44.1011	0.74	54.75 kg	53.78 − 55.73

girth. Conversions from heart girth to hog-dressed weight and to total body weight are given in Table 2.

The technique appears satisfactory for estimating weights of deer from heart girth measurements. The data generally agree with those of Smart et al. (1973). The usefulness of this relates to the elimination of the need for weighing equipment in monitoring weight changes in deer populations. The report of Smart et al. (1973) relates to conditions with Virginia white-tailed deer collected during a shorter hunting season. The present report indicates that essentially similar results were obtained with deer from another southeastern state over a wider portion of the year. In the present report rather few deer of body weight greater than 70 kg were examined. In regions were white-tailed deer frequently exceed 70 kg body weight additional observations may be necessary to verify the value of the present regression equations in predicting body weight of large deer.

Smart et al. (1973) cautioned against the use of the technique for estimating individual animal weights for research purposes. A similar caution is offered in this report. It is suggested that reasonably accurate estimates of body weight of white-tailed deer can be made using heart girth measurements. The major advantage of this method is that it is rapid and less laborious than actual weighing of deer.

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Table 2. Heart girth to weight conversions for South Carolina deer.

Heart girth	*Hog-dressed weight*		*Total body weight*	
	Fawns	*Adults*	*Fawns*	*Adults*
in. (cm)	*lb. (kg)*	*lb. (kg)*	*lb. (kg)*	*lb. (kg)*
20(50.8)	23(10.4)		32(14.5)	
21(53.3)	27(12.2)		37(16.8)	
22(55.9)	31.(14.1)		42(19.1)	
23(58.4)	35(15.9)		48(21.8)	
24(61.0)	39(17.7)	40(18.1)	53(24.1)	62(28.1)
25(63.5)	43(19.5)	46(20.9)	58(26.3)	69(31.3)
26(66.0)	47(21.3)	52(23.6)	64(29.1)	75(34.1)
27(68.6)	51(23.2)	57(25.9)	69(31.3)	82(37.2)
28(71.1)	55(25.0)	63(28.6)	74(33.6)	88(40.0)
29(73.7)	59(26.8)	68(30.9)	80(36.3)	95(43.1)
30(76.2)	63(28.6)	74(33.6)	85(38.6)	102(46.3)
31(78.7)	67(30.4)	80(36.3)	90(40.9)	108(49.0)
32(81.3)	71(32.2)	85(38.6)	95(43.1)	115(52.2)
33(83.8)		91(41.3)		121(54.9)
34(86.4)		96(43.6)		127(57.7)
35(88.9)		102(46.3)		134(60.8)
36(91.4)		108(49.0)		141(64.0)
37(94.0)		113(51.3)		147(66.7)
38(96.5)		119(54.0)		154(69.9)
39(99.1)		124(56.3)		161(73.1)
40(101.6)		130(59.0)		167(75.8)
41(104.1)		136(61.7)		174(79.0)
42(106.7)		141(64.0)		180(81.7)
43(109.2)		147(66.7)		187(84.9)
44(111.8)		152(69.0)		193(87.6)
45(114.3)		158(71.7)		200(90.8)
46(116.8)		164(74.5)		206(93.5)
47(119.4)		169(76.7)		213(96.7)
48(121.9)		175(79.5)		219(99.4)
49(124.5)		180(81.7)		226(102.6)
50(127.0)		186(84.4)		233(105.8)
51(129.5)		192(87.2)		239(108.5)
52(132.1)		197(89.4)		246(111.7)