BODY CONDITION INDEX EVALUATION IN GROWING RED-FOOTED TORTOISE (*CHELONOIDIS CARBONARIA*) HATCHLINGS

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Abstract

The present study aimed to evaluate the application of body condition index (BCI) equations previously used in chelonians, in growing red-footed tortoises (*Chelonoidis carbonaria*). Individual data of straight carapace length (SCL, mm), straight carapace width (SCW, mm), carapace height (CH, mm), and body mass (g) were evaluated from a total of 20 hatchlings between 30-209 g of body mass (0-9 months old). Data were collected weekly until 6 months of age, then every two weeks. The BCI equations utilized included:

[a] $BCI = \frac{body\ mass(g)}{SCL*SCW*CH(cm^3)}$ evaluated in leopard tortoises (*Geochelone pardalis*; Lickel & Edwards, 2009) and desert tortoises (*Gopherus agassizii*; Nagy *et al*., 2002)

[b] $BCI = \frac{6*body\ mass(g)}{\pi*SCL*SCW*CH(cm^3)}$ evaluated in wild Namaqualand speckled padloper (*Homopus signatus*; Loehr *et al*., 2007), and leopard tortoises (Lickel & Edwards, 2009)

[c] Ratio $BCI = \frac{Observed\ body\ mass(g)}{a*SCL^b(g)}$ evaluated in green turtles (*Chelonia mydas*; Labrada-Martagón *et al*., 2010)

[d] $BCI = \frac{Observed\ body\ mass - a*SCL^b(g)}{a*SCL^b(g)} * 100$ evaluated in captive African side-neck turtles (*Peloedusa subrufa* and *Pelosios cataneus*; Rawski & Józefiak, 2014)

[e] $BCI = \log\frac{Observed\ body\ mass(g)}{a*SCL^b(g)}$ evaluated in Greek tortoises (*Testudo greaca, T. hermanni, and T. marginate*; Willemsen & Hailey, 2002)

The obtained values of BCI were: 0.57±0.04 g/cm^3, 1.09±0.07 g/cm^3, 1.00±0.07, 0.09±6.51 %, 0.00±0.05, from the "a, b, c, d, and e" equations, respectively. The BCI values obtained from the "a" equation were close to previous reports of 0.60±0.02 and 0.64 g/cm^3 (Lickel & Edwards, 2009; Nagy *et al*., 2002). The "b" equation has described values of 1.02 g/cm^3 (Loehr *et al*., 2007) and

1.15±0.05 g/cm^3 (Lickel & Edwards, 2009), which were similar to our results. Both equations "a and b" were an expression of the ratio body mass-volume, whereas the "c and d" equations used a percentage expression of the residual in relation to the body mass. The obtained BCIs from "c and d" equations indicated an ideal BCI as described by Rawski & Józefiak (2014). The "e" equation describes weight loss (negative values) or maintenance of the BCI (Willemsen & Hailey, 2002). In this sense, optimal values were recorded in the present study which indicated that the animals did not lose weight and gained weight proportionally to size growth. Although obtained values of BCI were numerically different using the various equations, they describe the same body condition relationship(s), and provide an indirect way to evaluate and monitor nutritional status in growing *C. carbonaria* under conditions of managed care.

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