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Life history characteristics of the Colombian Wood Turtle, *Rhinoclemmys melanosterna* (Gray, 1861), in the middle Magdalena River, Colombia

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Abstract. *Rhinoclemmys melanosterna* is part of a clade of neotropical freshwater turtles known for their reduced clutch sizes with exceptionally large eggs. However, there are few studies of the life history of natural populations of these turtles to document what other aspects of their biology covary with this particular reproductive strategy. From 2009–2020, we used several capture techniques in different types of habitats in the middle Magdalena River region of Colombia to obtain captures/recaptures to estimate ontogenetic growth rates and sex ratios and to calculate body condition indices for each size class and sex. We also estimated the sizes/ages of sexual maturity of each sex, as well as generation time. Almost all individuals captured were adults, and the sex ratio was skewed towards females (1.85:1). Most recaptured individuals had moved a short distance (< 1000 m), although one female was recaptured 2800 m away from where she was first marked. Body condition indices of females diverged from those of males beginning at approximately 20 cm straight-line carapace length, with females almost always exhibiting higher scores. Using the von Bertalanffy Growth Model, we estimated that males reach sexual maturity earlier than females, at an approximate straight-line carapace length of 18–20 cm, whereas females mature at lengths of 20–22 cm, consistent with our body condition analysis. The average annual growth rate was 1.54 cm/year for males and 1.32 cm/year for females. The time required to reach the body size and/or the minimum age of sexual maturity was 3–4 years for males and 5–7 years for females.

Keywords. Body condition index, capture-mark-recapture, ontogenetic growth rates, sexual maturity, size and age.

Introduction

Clutch size in reptiles has been shown to be influenced by several factors (e.g., latitude, seasonality, insularity, interclutch intervals; Meiri et al., 2020), including maternal body size (both intra- and interspecifically; Tinkle et al., 1970; Dunham et al., 1988). This means that freshwater turtles in the geoemydid genus *Rhinoclemmys* are a bit of an anomaly from a life history perspective because while all nine species are medium-sized with maximum reported straight-line carapace lengths (SLCs) of 21.0–37.5 cm in females, they only lay small clutches of up to seven eggs and more frequently only 1–3 large, brittle-shelled eggs. Life history traits tend to covary (Sterns, 2000), but this group of turtles has been poorly studied, so it is unclear what other aspects of their life history strategies differ compared to more fecund freshwater turtle species of comparable body sizes.

One of the largest species in the genus is *R. melanosterna* (maximum SCL 30.4 cm), a species found in the Caribbean drainages from the Comarca Guna Yala in Panamá through northern Colombia up to Dibulla Municipality in La Guajira Department and in the Pacific drainages from southeastern Panamá to northwestern Ecuador (Carr and Almendáriz, 1990; Castaño-Mora et al., 2004; Vargas-Ramírez et al., 2013; TTWG, 2025; Páez et al., 2026). It prefers lentic habitats within neotropical forests but may also occur in degraded aquatic habitats (Vargas-Salinas and Bolaños-L., 1999; Echeverri-Garcia et al., 2012). Throughout much of its range, it occurs in sympatry with the comparably sized emydid *Trachemys c. callirostris* (maximum reported SCL = 31.5 cm), an ecologically similar freshwater turtle that may lay clutches of up to 25 eggs ($\bar{x}$ = 10; Bock et al., 2010, 2012). In contrast, *R. melanosterna* clutch size varies from 1–5 eggs ($\bar{x}$ = 2; Echeverri-Garcia et al., 2012; Páez et al., 2026). Many other aspects of the life history of this species remain undocumented.

In 2009, we initiated a study of the freshwater turtle fauna in the middle Magdalena River drainage in Colombia, using various capture methods in different local aquatic habitat types. During 12 years of sampling aquatic turtles, we were able to capture substantial

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numbers of *R. melanosterna* in this region and our recaptures of some individuals permitted us to make estimates of ontogenetic growth rates, size/age at first reproduction for each sex, and the longevity and generation time of the species. Characterizing these life history attributes is a first step toward understanding how the life history strategies of species in the genus *Rhinoclemmys* differ from those of more fecund freshwater turtle species.

Materials and Methods

Study area. We began our study by sampling varied aquatic habitats (wetlands, channels, streams, or rivers) in the middle Magdalena River drainage in Yondo Municipality, Antioquia Department, on the northwestern shore of the Magdalen River and in Cimitarrá Municipality, Santander Department, on the southeastern shore. This region of Colombia has been heavily deforested for agricultural purposes and cattle ranching, with only scattered riparian forests remaining along the shores of some waterbodies. The area has a bimodal hydrological regime represented by two dry seasons in December–March and July–September, and two rainy seasons in April–May and October–November (Bock et al., 2021).

In July 2009, we began working in a small stream known to locals as "La Montaña" (6.72°N, 74.25°W; only approximate coordinates provided to discourage poaching) that drains into the Barbacoas Wetland and is connected to the Magdalena River via the Caño Barbacoas [Barbacoas channel]. La Montaña is narrow (approximately 8 m wide), shallow (< 1 m deep), and permanent, with a length of 420 m, where we captured turtles by hand. We observed turtles either on land or in the shallow water among roots of riparian vegetation, or we discovered them while hand-probing cavities in the banks and the bottom substrate (a technique known as "puddling"; Rueda-Almonacid et al., 2007; De la Ossa et al., 2012). We were able to capture, mark, release, and occasionally recapture *R. melanosterna* individuals during our visits to this site over two years.

We also began sampling in a nearby, larger stream that drains directly into the Magdalena River, known locally as "Guamal" (6.69°N, 74.27°W). Its greater width and length (approximately 11 m wide and 5 km in length) and comparable depth (also < 1 m deep) allowed us to supplement manual captures with the use of a trammel net, which two people pulled through the channel while others drove turtles into the net by walking towards the net while slapping the water surface and making other noises. We visited this site intensively from 2009–2012 and periodically in the following years because we were able to occasionally capture *R. melanosterna*.

The third capture technique we attempted was the use of single and double funnel traps, with or without bait, using a variety of mesh sizes and opening diameters. We placed traps in Guamal and in different locations along Caño Barbacoas (6.74°N, 74.22°W). We also occasionally placed traps directly in the Barbacoas Wetland or the Magdalena River near the beginning and end of Caño Barbacoas, respectively. During this time, we captured some aquatic turtles but no *R. melanasterna*.

Thanks to increased funding, we were able to begin more intensive sampling of aquatic turtles in this area in 2012 with a more standardized methodology that involved placing ten baited double-funnel traps in four channel habitats (Alzate-Estrada et al., 2020) that connect wetlands to the Magdalena River (or its major tributary, the Carare River), with occasional manual captures. Caño Negro was slightly deeper than Guamal (mean depth 1 m), with a mean width of 11 m and a total length of 3 km. Caño Cachimbero had a mean depth of 2 m, a mean width of 12 m, and a total length of 7 km. Caño Barbacoas had a mean depth of 3.6 m, a mean width of 24 m, and a total length of 5 km. Finally, Caño San Juan had a mean depth of 3.5 m, a mean width of 30 m, and a total length of 17 km (although only the 5 km closest to its confluence with the Carare River were included in our sampling efforts).

On each visit to these four channels, we placed the ten double-funnel traps in the channel along the shoreline in sites with little current. We maintained a distance of approximately 400 m between the traps and baited them with leaves of a local plant species (*Maclura tinctoria*). We checked traps every 4 h from 05:00–23:00 h over a 5-day sampling period (for a more complete description of the channels and the trapping methodology, see Páez et al., 2015, 2024; Alzate-Estrada et al., 2020). Budget limitations caused us to gradually reduce the frequency of visits to each site and eventually also caused us to reduce the total number of channels included in the monitoring over the years, until we only monitored Caño San Juan up to 2022.

Morphometric data. We notched marginal scutes in individually unique patterns (Cagle, 1939) for all *R. melanosterna* captured from 2009–2022. We also measured and weighed the turtles and georeferenced the site of capture before releasing the turtles there. We measured SCL for small individuals with digital callipers to the nearest 0.01 mm and used mechanical

callipers for larger individuals to the nearest 0.1 mm. We also quantified the body weight (BW) of each captured turtle, depending on its size, with one of two Pesola scales (Pesola Präzisionswaagen, Chur, Switzerland). We weighed smaller individuals with a 1-kg scale to the nearest 0.1 g, and larger individuals with a 20-kg scale to the nearest 200 g. We could sex all but the smallest individuals captured (< 15 cm SCL), with males having a concave plastron and a longer and thicker tail for any given body size, and with the cloaca located posterior to the posterior margin of the carapace (Rueda-Almonacid et al., 2007; Echeverri-García et al., 2012). We also calculated a Body Condition Index (BCI) for every turtle using the regression of log-transformed BW against log-transformed SCL (Green, 2001; Schulte-Hostedde et al., 2005). After verifying the linearity of the relationship, we used residual values for every turtle as our BCI. The BCI was intended to quantify the relative body weights of the turtles while controlling for differences in body sizes. We also measured and weighed all recaptured, previously marked individuals and georeferenced their new capture locations.

Body growth analyses. Thanks to the recaptured individuals, we could calculate the ontogenetic growth rate for each sex using the von Bertalanffy Model (von Bertalanffy, 1951), based on SCL measurements of the turtles on their first and last captures. This model is adequate for species with indeterminate growth that slows with age (Bjorndal and Zug, 1995). The model estimates the asymptotic size and growth coefficients that permit the age estimation for different body size classes. When the growth rate begins to decline abruptly, the point of inflection of the curve often coincides with the size at sexual maturity for a sex in a given species (Shine and Schwarzkopf, 1992; Shine and Iverson, 1995; Stamps et al., 1998).

To calculate the characteristic body growth coefficient (k), which describes how fast an animal grows from birth to maximum length, we used the following equation (Munro, 1982):

$$k = \frac{[\log_e(L_\infty - L_m) - \log_e(L_\infty - L_r)]}{(r-m)}$$

where L_∞ is the maximum SCL that individuals of a given sex in the population can attain (in this case, it was 32 cm SCL for females and 28 cm for males), L_m is the SCL at first capture, L_r is the SCL at the last recapture, and r and m are the dates of the last recapture and first capture, respectively. We calculated k for all the recaptured individuals, from which we could calculate an average and the coefficient of variation (CV) for each sex.

Subsequently, we used the von Bertalanffy Model to estimate the SCL corresponding to each year of life of the individuals in this population (L_t) beginning in Year 0, in which the individuals measured approximately 4.5 cm SCL at hatching (Castaño-Mora and Medem, 1983; Corredor et al., 2007) until reaching the maximum SCL. In this study, we set a maximum SCL of 32 cm for females because the lowest CV was obtained with this value and because it was close to the maximum SCL we recorded for females (30.4 cm). Similarly, we set a maximum SCL of 28 cm for males because the lowest CV was obtained with this value and because it was close to the maximum SCL we recorded for males (27.3 cm). With these values, we estimated the time in years for the individuals of this population to reach the minimum SCL for sexual maturity, as follows:

$$L_t = L_\infty\left\{1 - e^{[-k(t-t_0)]}\right\} + \text{mean SCL at hatching}$$

where t_0 is the hatching date and the average SCL at hatching (4.5 cm; Castaño-Mora and Medem, 1983; Corredor et al., 2007). In addition, we calculated the annual body growth rate (BGR), which is the difference between the SCL of the last recapture (L_r) and the first capture (L_m) over time:

$$\text{BGR} = (L_r - L_m)/\text{year}$$

Data analyses. We used the JMP statistical software package (v3.2.6) to conduct comparisons of morphometric variables (SCL, BW, and BCI) among sites and sexes with ANOVA tests and for a regression analysis to inspect the relationship between log SCL and log BW. We inspected for differences in sex ratios among sites using χ^2 tests. The alpha level employed in all tests was 0.05.

Results

Captures. Over all sites we captured only two *R. melanosterna* that were too small to assign to a sex (14.5 and 14.8 cm SCL). These juveniles were not considered further in the analyses. Seven visits to La Montaña from 2009–2011 allowed us to capture 55 *R. melanosterna* using the manual capture method (35 females, 20 males), with recaptures of eight individuals. We recaptured four turtles at the site of their first capture, while the other four were recaptured < 200 m from their site of first capture.

Eighteen visits to Guamal from 2011–2013 allowed the capture of 28 *R. melanosterna* using the trammel net and manual capture methods (15 females, 13 males). None were recaptured, but we recaptured an individual

previously marked in La Montaña, which had moved to Guamal and traversed 2800 m from the point of its last capture.

In 71 trapping days in Caño Barbacoas from 2009–2016, we failed to capture any *R. melanosterna*. In 87 trapping days in Caño Negro from 2011–2018, we captured only five *R. melanosterna* (including the two juveniles). These two sites were not considered in further analyses. In contrast, in 61 trapping days in Caño Cachimbero from 2012–2014, we captured 49 *R. melanosterna* (30 females, 19 males), with six recaptures of five individuals. One individual was recaptured 1064 m from the point of its first capture and then was recaptured a second time, having moved 230 m back towards its original point of capture. The other four recaptured individuals moved 13, 173, 279, and 745 m between their two capture sites. Finally, in 170 trapping days in Caño San Juan from 2012–2022, we captured 53 *R. melanosterna* (40 females, 13 males), with two individuals recaptured after having moved 118 and 188 m. All individuals recaptured in Caño Cachimbero and Caño San Juan were females.

Body sizes. Over all sites, there were significant size differences between the sexes in SCL ($F_{1,178}$ = 7.181, $p < 0.001$) and BW ($F_{1,178}$ = 16.693, $p < 0.001$), with females the larger sex (Table 1). The log-transformed values of these two variables produced a significant linear relationship (Fig. 1; R^2_{176} = 0.85, F = 978.836, $p < 0.001$), supporting the use of the residuals from the regression line as our BCI (Green, 2001; Schulte-Hostedde et al., 2005). However, females differed significantly from males in their BCI values ($F_{1,178}$ = 21.390, $p < 0.001$), with higher values, especially for larger individuals (Fig. 1; beginning at approximately 1.3 log SCL, which corresponds to an SCL of approximately 20 cm).

There were significant differences among the four study sites in terms of both SCL ($F_{3,176}$ = 7.960, $p < 0.001$) and BW ($F_{3,176}$ = 3.531, $p < 0.05$), with turtles from Caño Cachimbero the largest and those from Caño San Juan the smallest (Table 1). In all four sites, sex ratios were skewed in favour of females (1.85:1). In part because sex ratios in the four study sites were not significantly different from each other (χ^2_3 = 4.505, $p > 0.10$; Table 1), there were no significant differences among the sites in BCI values ($F_{3,176}$ = 1.699, $p > 0.10$). The pattern of significant differences in the sizes of turtles among the sites was unchanged when we considered individuals of each sex separately (females: SCL, $F_{3,113}$ = 5.409, $p < 0.005$; BW, $F_{3,113}$ = 2.832, $p < 0.05$; males: SCL, $F_{3,57}$ = 5.092, $p < 0.005$; BW, $F_{3,57}$ = 3.512, $p < 0.05$), while BCI values at the sites did not differ (females, $F_{3,113}$ = 1.559, $p > 0.10$: males, $F_{3,57}$ = 1.993, $p > 0.10$).

Growth rates. Using the von Bertalanffy ontogenetic growth model for females, we estimated a minimum size at reproduction (based upon a decline in their growth rates) of 20–22 cm SCL (Fig. 2). The model with the lowest coefficient of variation (CV = 0.67) produced an estimate for L_∞ of 32 cm SCL and a corresponding k of 0.12. This indicated that females in this population reach this size at approximately 5–7 years of age (Fig. 2). We similarly estimated males to have a k of 0.20, with an estimated L_∞ of 28 cm SCL. Our estimation of minimum size at reproduction for males (again, based upon a decline in their growth rates) was at 18–20 cm SCL at 3–4 years of age (Fig. 2).

Table 1. Data for *Rhinoclemmys melanosterna* individuals captured at four study sites in Colombia. Comparison of body size includes straight carapace length (SCL) in cm, body weight (BW) in grams, and body condition index (BCI), providing means and standard deviations (in parentheses), and sex ratios (SR) at the sites.

Site	Females				Males				SR
	n	SCL	BW	BCI	*n*	SCL	BW	BCI	(F:M)
La Montaña	35	21.4 (1.2)	1490.7 (318.3)	0.01 (0.05)	20	20.8 (1.5)	1185.0 (252.3)	-0.04 (0.05)	1.75:1
Guamal	15	21.8 (1.4)	1633.3 (399.4)	0.03 (0.05)	13	20.6 (1.9)	1070.3 (421.6)	-0.03 (0.03)	1.15:1
Cachimbero	30	22.7 (2.5)	1740.0 (820.4)	0.00 (0.05)	19	21.9 (1.7)	1405.3 (317.1)	-0.03 (0.05)	1.58:1
San Juan	40	20.8 (1.9)	1387.9 (439.7)	0.02 (0.06)	13	19.4 (2.2)	1073.8 (368.0)	0.00 (0.05)	3.08:1
Totals	120	21.6 (2.0)	1537.9 (543.5)	0.01 (0.06)	65	20.8 (1.9)	1206.3 (353.1)	-0.03 (0.05)	1.85:1

Using six years as the average age at maturity for females and Iverson's regression equations for generation time and longevity (Iverson, 2024), we estimated generation time for female *R. melanosterna* to be 11–12 years, and longevity to be 53–54 years; this is comparable to the 50-year longevity estimates made previously by Iverson (2014). The annual body growth rate was 1.32 cm/year for females and 1.54 cm/year for males.

Finally, a comparison of the three main capture techniques employed in this study revealed that none succeeded in capturing a significant number of juveniles in the habitats sampled, but that all three were successful in capturing adult turtles of comparable sizes (SCL, $F_{2,175} = 1.014, p > 0.10$; BW, $F_{2,176} = 1.465, p > 0.10$), with all three methods yielding a female-biased sex ratio that did not differ between the methods ($\chi^2_2 = 0.860, p > 0.10$; Table 2).

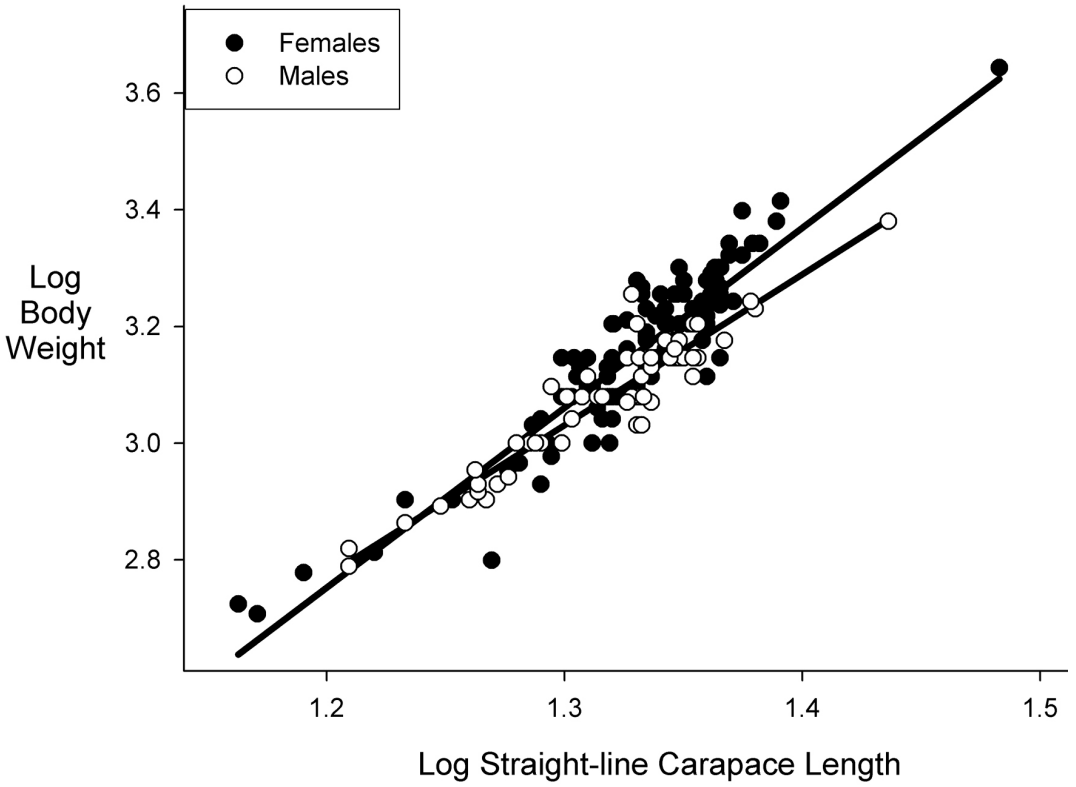

Figure 1. Relationship of log straight-line carapace length (SCL) to log body weight (BW) in *Rhinoclemmys melanosterna* from Colombia. The residuals from the overall regression line (log BW = –0.8419 + 2.99393 • log SCL) were used as a body condition index. Here, separate regression lines for females and males are shown.

Table 2. Comparison of straight-line carapace lengths (SCL) and sex ratios (SR) of adult *Rhinoclemmys melanosterna* captured at four study sites in Colombia, obtained using three different capture methods.

Method	Females		Males		SR
	n	Mean SCL	*n*	Mean SCL	(F:M)
Manual	49	21.4	29	20.4	1.68:1
Trammel net	14	21.9	5	21.1	2.8:1
Funnel traps	56	21.7	28	21.0	2:1
Total	119		62		

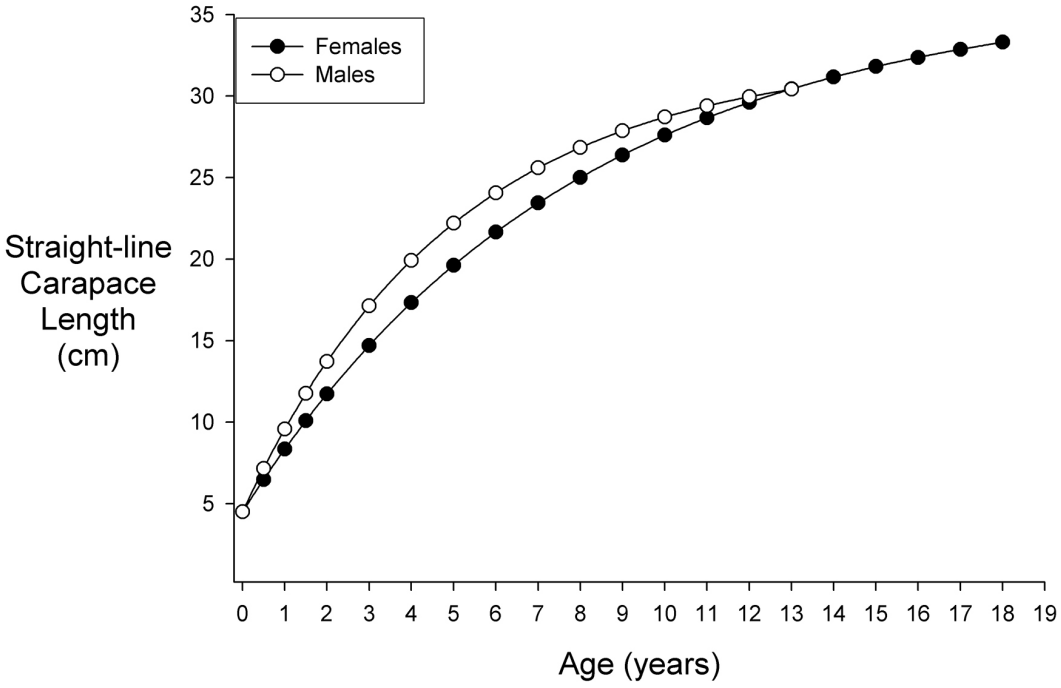

Figure 2. The von Bertalanffy growth curve for female (n = 11) and male (n = 5) *Rhinoclemmys melanosterna* from four sites in Colombia.

Discussion

Despite sampling various habitat types with different capture methods, we only captured two juveniles of *R. melanosterna* (both large juveniles just below the 15 cm SCL cut-off point where it first becomes possible to reliably sex individuals in this species). This suggests that juvenile *R. melanosterna* were largely absent from the aquatic habitats we surveyed (and not simply escaping detection from all of our capture methods). Perhaps juveniles of this species prefer the extreme headwater habitats of small streams or are more terrestrial than adults. Medem (1962) mentioned that *R. melanosterna* are sometimes found far from the shorelines of waterbodies, especially in *bijaoguales* (low, humid lands), but made no mention of whether this was particularly the case with juveniles. Intensive monitoring studies of other *Rhinoclemmys* species have also shown that juveniles are less detectable than adults (Garcés-Restrepo et al., 2013; Wariss et al., 2012; Folt, 2020; Brito et al., 2022).

The patterns of occurrence of *R. melanosterna* adults in the channels we intensively monitored was surprising, with many individuals, including the largest individuals of both sexes recorded so far for the species, captured in the small Caño Cachimbero, yet in the nearby, comparably small Caño Negro, only six adults were obtained (despite more intense sampling at that site). It also was surprising that body sizes varied significantly among our sites, with the small Caño Cachimbero producing the largest mean body size for adults vs. the much larger Caño San Juan supporting turtles with the smallest mean body size (a pattern opposite to what occurs in *Podocnemis lewyana* at these same sites; Páez et al., 2015, 2024; Alzate-Estrada et al., 2020). Finally, it was also surprising that while Caño San Juan yielded numerous *R. melanosterna* subadults and adults, the nearby and comparably sized Caño Barbacoas yielded no *R. melanosterna*. Caño Barbacoas connects the Barbacoas Wetland to the Magdalena River, and this wetland is fed by La Montaña, where *R. melanosterna* adults were found. We have no explanation for the absence or low density of *R. melanosterna* in two of the seemingly suitable habitats we sampled (Caño Negro and Caño Barbacoas), while densities in comparable nearby habitats were high. Perhaps this situation might be explained by the fact that in both cases, the land surrounding the channels are swampy, low regions that might provide alternative habitat for the species (Medem, 1962).

Our (limited) recapture results suggest that *R. melanosterna* adults move little. The longest documented distance moved was by an individual captured in La Montaña in 2009 and recaptured in Guamal in 2012, a distance of 2800 m. Interestingly, 2010 was characterized by atypical levels of flooding in this region, so this individual could possibly have moved this distance with a mostly direct displacement through the flooded forest rather than having to descend La Montaña, move through the Barbacoas Wetland and Caño Barbacoas, and finally ascend the Magdalena River into Guamal, a much longer route.

Sex ratios were female-biased in all our study sites, despite the different capture methods employed in these sites, suggesting that this sex-ratio difference was real and not a capture method artifact. The only other study to report adult sex ratios of *R. melanosterna* (Rengifo-Palacios et al., 2022) found a male bias in turtles captured in the Chocó Region of Colombia using the same three capture methods we used. The differences in sex ratio in these two studies might be related to differences in survivorships of the two sexes in these two regions of Colombia, or perhaps to differences in the egg incubation temperatures in these regions. While it is unknown whether *R. melanosterna* exhibits temperature-dependent sex determination, this mechanism has been demonstrated in two other members of the genus (*R. areolata* and *R. pulcherrima*; Ewert and Nelson, 1991; Ewert et al., 2004). Demographic studies on other *Rhinoclemmys* species have documented female-biased sex ratios in some populations of *R. nasuta* (Giraldo et al., 2012; Garcés-Restrepo et al., 2013), male-biased ratios in some populations of *R. rubida* (Butterfield et al., 2020) and *R. funera* (Folt, 2020), and balanced sex ratios in *R. puntularia* (Wariss et al., 2012; Brito et al., 2022).

Medem (1962) provided anecdotal accounts from local residents in the Chocó Region that *R. melanosterna* lays eggs throughout the year, with a clutch size of a single egg. *Rhinoclemmys melanosterna* transported out of their normal range and reared in captivity in Villavicencio, Meta Department, Colombia, also laid eggs year-round (Castaño-Mora and Medem, 1983; Ramírez-Parilla, 2005), with clutch sizes of 1–3 eggs. Our body size and weight data on subadult and adult *R. melanosterna* showed that the two variables were highly correlated and that this relationship is linear when both variables are plotted on a logarithmic scale (Fig. 1). However, at approximately 20 cm SCL, the variance in residuals around the regression line began to increase, with females of a given SCL tending to fall above the regression line (having a higher BCI value) than males of the same SCL. Our interpretation of this result is that females in our populations begin to reproduce at approximately this body size and, therefore, are relatively heavier than comparably sized males from this point onward.

Our recapture data also allowed us to examine ontogenetic growth rates in *R. melanosterna* for the first time (based on 11 recaptures for females and five for males). The limited number of juveniles (< 15 cm SCL) captured (with no recaptures) made it impossible to document more representative ontogenetic growth rates for the youngest size classes. Thus, our data summarizes body growth rates characteristic of subadults and adults in this population. Nevertheless, the von Bertalanffy Model showed differences in growth trajectories between males and females, indicating that males (the smaller sex in this species) exhibit a higher annual growth rate and a larger k coefficient (describing how rapidly an individual attains the maximum body size of its sex). Consequently, males appear to be younger and smaller when they reach maturity, as illustrated by the earlier inflection point in their growth curve (Fig. 2). Once both sexes reached our estimated sizes at sexual maturity (18–20 cm SCL for males and 20–22 cm SLC for females), the growth rates in both sexes dropped, presumably associated with the allocation of more energy to reproduction beginning at that time. The body size estimates for maturity obtained from the growth analysis were roughly the same as the point where males and females began to diverge in BCI values (see above), consistent with the idea that reproduction begins in this population at this time.

Our estimates of the sizes at maturity for *R. melanosterna* were close to those reported for *R. funerea* (20 cm plastron length; Moll and Legler, 1971), but larger than the reports of 14.5–15.0 cm SCL in *R. areolata* (Legler and Vogt, 2013), 13.5 cm SCL in *R. diademata* (Morales-Betancourt and Lasso, 2012), 14 cm SCL for males and 16 cm SCL for females in *R. nasuta* (Carr and Giraldo, 2009), and 14 cm SCL for males and 15 cm SCL for females in *R. pulcherrima* (Schaffer, 2000). These differences could be related to the greater mean and maximum body sizes of *R. melanosterna* and *R. funerea* compared to their other congeners.

Information on life history attributes such as age at maturity, generation time, and longevity for species in the genus *Rhinoclemmys* is limited and usually biased by the use of data from captive animals.

Our age at maturity estimates of 3–4 yrs for males and 5–7 yrs for females in *R. melanosterna* are similar to those reported for *R. areolata* (5 yrs; Yolotzin-Nallely, 2008), for *R. pulcherrima* in captivity (3 yrs; Hainz and Rafalowski, 2011), and for *R. rubida* (6.5 yrs; Legler and Vogt, 2013). Estimates of age at maturity for other *Rhinoclemmys* species are considerably higher, as illustrated by the 12–14 year estimate for *R. nasuta* (Carr and Giraldo, 2009) and the 9–10 year estimate for *R. areolata* (Legler and Vogt, 2013). Hypothesizing possible evolutionary or ecological explanations for these differences seems premature at this point, given the limited data available. However, our results provide a first approximation to the study of the life history characteristics of *R. melanosterna*, laying the foundations for future research into how other life history traits covary with their reproductive strategy of laying few, very large eggs, probably continuously once sexual maturity is reached.

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