Prey choice of the common vampire bat on introduced species in an Atlantic forest land-bridge island

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Short title: Prey choice of common vampire bat on introduced species

Abstract

The proliferation of native, alien, invasive and domestic species provide novel and abundant food resources for the common vampire bat (*Desmodus rotundus*) that could alter its prey preference. Based on the analysis of carbon and nitrogen stable isotopes, we report the prey choice of *D. rotundus* on introduced mammals in an tropical land-bridge island where the domestic animals were removed and 100 individuals of 15 mammal species were intentionally introduced. Our analysis shows that, *D. rotundus* on Anchieta Island were more likely to prey upon species from open habitats (mean value of -14.8‰), i.e., animals with high $\delta^{13}\text{C}$ values characterized by the consumption of C4 resources. As expected for a top predator species, $\delta^{15}\text{N}$ values for *D. rotundus* were higher (mean value of 8.2‰) and overlapped the niche of the capybaras (*Hydrochoerus hydrochaeris*) from the Anchieta Island, while it was distant from coatis, and also from those potential prey from the preserved area in the mainland, including the capybaras, indicating that among all potential mammalian prey species, they fed exclusively on capybaras, the highest mammalian biomass on island. Based on previous information on human occupation, the domestic animals present on Anchieta island might be the main prey of *D. rotundus* and responsible for maintaining a viable population. As the capybaras were introduced only 36 years ago, this suggests a rapid prey shift due to anthropogenic disturbances, which has allowed common vampire bats to successfully exploit them. Literature records also show that common vampire bats were not captured in preserved areas of the mainland which are near Anchieta Island indicating that the percentage of capture of *D. rotundus* is usually low in natural forested habitats where potential prey are scattered. As three individuals of introduced capybaras were confirmed died from bat rabies viruses (RABV) in 2020, we suggest periodic monitoring of bat rabies viruses in common vampire bat populations on Anchieta Island and areas nearby, in order to quantify the magnitude of the outbreak area and develop strategies for controlling, especially considering that the island and areas nearby is frequently visited by tourists. We highlighted that this prey choice is context-dependent, and possibly influenced by the removal of domestic animals, the explosive population growth of introduced capybaras combined with their predictable foraging behavior.

97 **Introduction**

98 The common vampire bat *Desmodus rotundus* (Geoffroy, 1810), an obligate blood-
 99 feeding species and the primary reservoir of rabies, has experienced changing
 100 availability of both wild and domestic prey (Greenhall *et al.*, 1983; Galetti *et al.*, 2016;
 101 Gnocchi and Srbek-Araujo, 2017; Zortéa *et al.*, 2018) throughout its range from Mexico
 102 to northern Argentina. Usually, common vampire bats have low densities in old-growth
 103 forest (Bernard, 2001; Bobrowiec *et al.*, 2014; Gonçalves *et al.*, 2017) where potential
 104 prey are sparse, but their population increases in fragments surrounded by pastures
 105 (Delpietro *et al.*, 1992; Bobrowiec, 2012) due the increased availability of livestock
 106 species (Greenhall, 1988; Delpietro *et al.*, 1992; Bobrowiec, 2015). The higher
 107 livestock densities in the Neotropical region combined with introduction of native, alien
 108 and invasive species, has created a novel, abundant and reliable source of blood for
 109 common vampire bats, causing population growth and geographic range expansions
 110 (Delpietro *et al.*, 1992; Lee *et al.*, 2012; Bobrowiec *et al.*, 2015; Galetti *et al.*, 2016).

111 Detailed analyses of prey choice of common vampire bat in this anthropogenic
 112 scenario are fundamental to answer questions on trophic interactions, how predators and
 113 prey interact, and how prey availability affects predator density and distribution
 114 (Sheppard and Harwood, 2005). In the past two decades, studies have used stable
 115 isotope analysis and molecular typing of DNA in vampire bat faeces to demonstrate
 116 reliance on livestock when they are locally abundant (Voigt and Kelm, 2006;
 117 Bobrowiec *et al.*, 2015) and studies with camera traps based on video footage have
 118 revealed behavioral aspects of feeding on wild species (Castellanos and Banegas, 2015;
 119 Galetti *et al.*, 2016; Gnocchi and Srbek-Araujo, 2017; Zortéa *et al.*, 2018). However,
 120 prey choice in regions with introduced species rather than livestock have not been
 121 studied yet, but are of critical importance due to risks to public health and consequences

for the transmission of infectious diseases by altering demographic processes, animal interactions and host immunity (Schneider *et al.*, 2009; Stoner-Duncan *et al.*, 2014; Streicker and Allgeier, 2016).

Here, we report, based on analysis of stable carbon and nitrogen isotopes, the prey choice of common vampire bats (*Desmodus rotundus*) on introduced mammals on a tropical island where 100 individuals of 15 mammal species were intentionally introduced 36 years ago. Our analysis shows that, between two suitable species classified as potential prey, they fed exclusively on capybaras (*Hydrochoerus hydrochaeris*), the highest mammalian biomass on the island. We highlight that this prey choice of common vampire bats are context-dependent, and possibly influenced by the removal of domestic animals, the explosive population growth of introduced capybaras combined with their predictable foraging behavior.

Materials and Methods

Study area

The study was carried out on Anchieta Island (23°27'S; 45°02'W), an 828-ha land-bridge island in Ubatuba, north coast of São Paulo State, Brazil (Fig. 1). The island is 500-meter away from the mainland and has a long history of human occupation and was called as Ilha dos porcos (Pigs Island) in allusion to the large number of pigs that existed on island (Guillaumon *et al.*, 1989). In the beginning of the last century, the island had a prison and, especially during the years when the prison was active (1904-1955), cattle, pigs, dogs, cats, and the domestic fowl were brought to the island (Galetti *et al.* 2009) in order to sustain its human community that reached over 1,000 residents belonging to 420 families (Guillaumon *et al.*, 1989). The prison and all infrastructures were expropriated and the island was transformed into a state park in 1977, and all the domestic animals were removed (Guillaumon *et al.*, 1989).

147

148 Fig. 1: Location of Anchieta Island, state of São Paulo, southeastern Brazil and its
 149 proximity with another islands and mainland sites.
 150

151 In March 1983, the São Paulo Zoo Foundation introduced 100 individuals of 14
 152 mammal species on island (Guillaumon *et al.*, 1989). Of the 14 species introduced onto
 153 1983, seven species have not been recorded since and have probably been extirpated
 154 (Bovendorp and Galetti, 2007; Supporting information S1). Little is known about the
 155 mammalian fauna on the island prior to human occupation. However, it is probable that
 156 it was similar to that on the continent given its proximity (500 m), with the exception of
 157 large predators (e.g., jaguars and pumas) and ungulates. Thirty-six years after
 158 introduction, the island now harbors the highest density of terrestrial mammals (486
 159 ind./km²) in the entire Atlantic Forest (Bovendorp and Galetti, 2007). The vegetation on
 160 the island is composed of coastal Atlantic rainforest, with coastal plains where notable
 161 features include a stretch of *restinga* (a distinct type of coastal tropical and subtropical
 162 moist broadleaf forest), and large areas of disturbed vegetation dominated by ferns
 163 (*Gleichenia*).

164 In October 2017 and November 2018, we did two field expeditions in order to
165 capture and sample the predator-prey systems. We selected three accessible forest sites,
166 and three accessible open sites. Sample sites were selected without prior knowledge of
167 the presence of common vampire bats or their potential prey. During each field
168 expedition, each habitat was sampled for three consecutive days in order to equally
169 divide efforts.

170

171 *Capture and sampling of common vampire bats*

172 We mist-netted bats during three consecutive nights in two field expeditions.
173 Netting was undertaken during the absence of moonlight, using 2.6×12 m ground-level
174 mist nets opened for six hours after dusk. The number of nets per night ranged from
175 three to six, but did not vary among sampling habitats (open area and forest). The
176 capture effort (net area multiplied by the number of hours nets were open) in each
177 habitat was $310 \text{ m}^2\text{h}$. All captured bats were kept individually in cloth bags for 45–60
178 min, during which time we collected hair from the dorsal posterior region for stable
179 isotope analysis. We then released the specimens at the site of capture.

180

181 *Capture and sampling of potential prey*

182 According to literature records, common vampire bats just feed on medium-size
183 and/or large mammals ($> 1 \text{ kg}$), thus coatis (*Nasua nasua*) and capybaras (*H.*
184 *hydrochaeris*) are the only suitable potential prey on the Island. In order to capture and
185 collect hair from coatis, we used 30 live traps in each sampling site (forest and open),
186 during three consecutive nights simultaneously to the mist nets, which resulted in an
187 effort of 360 trap-nights. For capybaras, we collected hair samples stuck in barbed-wire
188 fences in all trails on Anchieta Island. To complement our sampling effort, hair samples

189 from coati and capybaras were collected opportunistically with tweezers. All captures,
190 handling, and tagging techniques followed the guidelines of the Mammal Society (Sikes
191 *et al.*, 2016).

192 To understand if the common vampire bat uses the mainland nearby Anchieta
193 Island to feed on wild animals, we used isotopic values obtained by Magioli *et al.*
194 (2019) on five large-bodied mammals [white-lipped peccary (*Tayassu pecari*), collared
195 peccary (*Pecari tajacu*), deer (*Mazama* sp.), lowland tapir (*Tapirus terrestris*) and
196 capybara] from a protected area of the mainland (Núcleo Santa Virgínia, an
197 administrative division of the Serra do Mar State Park). This area is inserted in the
198 largest continuous remnant of the Atlantic Forest, and distance ~19 km (Fig. 1) in a
199 straight line from Anchieta Island.

200

201 *Common vampire bats feeding on potential prey*

202 We observed common vampire bats feeding by *ad libitum* sampling (Martin and
203 Bateson, 2007) during 17 nights (47 hours of observation), in October 2017 and
204 November 2018 in the same 6 selected sampling sites. Observations occurred between
205 specific shifts of two to five hours per night, between 6pm and 5am. Observers,
206 equipped with red flashlights, were situated on high ground in order to see the entire
207 area. When capybara were detected, the observers approached them slowly, and
208 observed if common vampire bats were feeding. If feeding was detected, we recorded it
209 (WebVideos S1 and S2).

210

211 *Data analysis*

212 We also compiled bat capture data from literature, including capture effort, from
213 only two previous studies on the island (Aires, 1998; Colas-Rosas, 2009), in order to

214 complement our species list and to estimate the percentage of capture. The percentage
215 of capture of common vampire bats on Anchieta Island was calculated by dividing the
216 number of total common vampire bat mist-netted by the effort (m^2h) multiplied by 100.
217 We used data from Bovendorp and Galetti (2007) to estimate the potential prey density
218 on the island, and to estimate prey biomass, we used body mass data from Gonçalves et
219 al. (2018).

220

221 *Stable isotopes analysis*

222 To analyze the stable carbon and nitrogen isotopes, we cleaned the hair samples
223 with water and 70% alcohol to remove any residue and dried them with absorbent
224 paper. We then cut up the samples and stored them in thin capsules. Later, we used a
225 CHN-1110 Elemental Analyzer (Carlo Erba, Milan, Italy) to combust the material, and
226 separated the resultant gases in a chromatographic column. Lastly, we inserted the gases
227 in a coupled continuous flow isotope ratio mass spectrometer (Delta Plus, Thermo
228 Scientific, Bremen, Germany) to obtain the isotopic composition of the samples. The
229 isotopic values of carbon and nitrogen were expressed in delta notation ($\delta^{13}\text{C}$, $\delta^{15}\text{N}$) in
230 parts per mil (‰) relative to the V-PDB (Vienna-Pee Dee Belemnite) and atmospheric
231 N_2 standards, respectively. Delta values were calculated based on the standards using
232 the following equation $\delta X = [(R_{\text{sample}}/R_{\text{standard}}) - 1]$ multiplied by 1000, where X
233 represents the stable carbon or nitrogen isotopes (^{13}C or ^{15}N), and R the isotopes ratio
234 ($^{13}\text{C}/^{12}\text{C}$ or $^{15}\text{N}/^{14}\text{N}$).

235 We performed the replication of the same individual material for only 10% of
236 the samples, but the precision of the analytic method for 22 replicas of an internal
237 standard for all batches, was estimated as 0.09‰ for carbon and nitrogen. The samples
238 were anchored to international scales by the use of international reference materials:

239 NBS-19 and NBS-22 for carbon, and IAEA-N1 and IAEA-N2 for nitrogen.

240

241 *Resource use*

242 To obtain information on resource use of common vampire bats, we adapted the
243 analytical approach used by Magioli et al. (2014, 2019). The analysis consists of using a
244 simple mixed model that interpolates the stable carbon isotopic values of samples,
245 accounting for specific fractionation factors, with the mean values of the different
246 vegetation types (C₃ and C₄ plant photosynthetic cycles), while also considering the
247 minimum and maximum values obtained for all animal samples analyzed. To estimate
248 fractionation factors ($\Delta^{13}\text{C}$ and $\Delta^{15}\text{N}$), we used the ‘SIDER’ package (Healy et al.
249 2018), available in R 3.5.3 (R Development Core Team 2019), that estimates species-
250 specific fractionation factors from phylogenetic regression models, accounting for a
251 database of fractionation values available for several species. We generated the $\Delta^{13}\text{C}$
252 value for the common vampire bats ($2.1 \pm 1.9\text{‰}$) using the script available in (Healy *et*
253 *al.*, 2018).

254 To determine the origin of food items consumed by the mammals, i.e., C₃ or C₄
255 plants, we calculated the carbon content in each sample ($\delta^{13}\text{C}$ values corrected by $\Delta^{13}\text{C}$
256 values) using the following equation:

257

$$\text{C}_3 \text{ carbon incorporated (\%)} = \frac{\delta^{13}\text{C}_{\text{corrected sample}} - \delta^{13}\text{C}_{\text{mean C}_4 \text{ vegetation}}}{\delta^{13}\text{C}_{\text{mean C}_3 \text{ vegetation}} - \delta^{13}\text{C}_{\text{mean C}_4 \text{ vegetation}}} * 100$$

258

259 We used as base for our model, the mean $\delta^{13}\text{C}$ value of -32‰ to indicate C₃
260 plants, and -12‰ V-PDB to C₄ plants. These values were obtained from the extreme
261 $\delta^{13}\text{C}_{\text{corrected}}$ values of all animal samples analyzed (predator and prey). After calculating
262 the proportion of C₃/C₄ carbon, we classified samples in three groups: (1) C₃ group –

species that preferentially consumed C₃ items (> 70% of C₃ carbon; $\delta^{13}\text{C} = -32$ to -26‰); (2) Mixed group – species that used both C₃ and C₄ food items (from 30 to 70% of C₃ carbon; $\delta^{13}\text{C} = -25.9$ to -18.1‰); C₄ group – species that mainly consumed C₄ items (< 30% of C₃ carbon; $\delta^{13}\text{C} = -18$ to -12‰). We also corrected the $\delta^{15}\text{N}$ values using the fractionation factor ($\Delta^{15}\text{N} = 3.4 \pm 1.5\text{‰}$) generated by the ‘SIDER’ package.

Isotopic niches

To assess the overlap of resource use by the common vampire bat and its potential prey, we analyzed the size of the isotopic niches using the ‘SIBER’ package (Jackson *et al.*, 2011), available in R 3.5.3. This package calculates the standard ellipses area (SEA) using $\delta^{13}\text{C}_{\text{corrected}}$ and $\delta^{15}\text{N}_{\text{corrected}}$ values, which contain 95% of the data, independent of sample size, allowing comparison of the isotopic niche width between species. To control sample size, we used the SEA corrected (SEAc).

Results

Capture of common vampire bats and potential prey

We recorded 187 individuals (16 of common vampire bats) belonging 13 bat species on Anchieta Island (Supporting information S2) and collected fur of 17 individuals of capybaras and 10 coatis (Supporting information S3 and S4). The percentage of capture for common vampire bats was 0.12% (16 individuals/12607 m²h * 100) (Supporting information S2), while the mean density of both potential prey was estimated as 60.9 individuals/km² (coati = 25.06 and capybara = 35.30) (Table 1). Capybaras showed the highest mean biomass (1,112 kg/km²) on the island (Table 1). Due to the predictable foraging behavior of capybaras in open areas, only the bat-capybara system was detected by observers. The common vampire bat fed on capybaras in 17 observations

288 during 47 hours of sampling effort (Supporting information S5, WebVideos S1 and S2).

289

290 *Prey choice of the common vampire bat*

291 Common vampire bats on Anchieta Island were more likely to prey upon species
 292 from open habitats (mean value of -14.8‰), i.e., animals with high $\delta^{13}\text{C}$ values
 293 characterized by the consumption of C_4 resources. The $\delta^{15}\text{N}$ values for common
 294 vampire bats were higher than expected and most likely similar with apex predator
 295 species (mean value of 8.2‰) (Fig. 2, Supporting information S3). One of the potential
 296 prey – the coati – largely depended on resources from the forest remnants (C_3 resources)
 297 (Fig. 2). Capybaras presented a large isotopic niche, using resources from both open
 298 areas and forest remnants, but feeding mainly on C_4 plants (Fig. 2). The isotopic niche
 299 of common vampire bats overlapped the niche of the capybaras, while it was distant
 300 from coatis (Fig. 2), and distinct from mean values of potential prey in the mainland,
 301 including the capybaras there (Fig. 3).

302

303 Fig. 2: Isotopic niches (standard ellipses area corrected - SEAc) and individual values
 304 ($\delta^{13}\text{C}$, $\delta^{15}\text{N}$) of common vampire bats (*Desmodus rotundus*) (black) and its potential
 305 prey on Anchieta Island, state of São Paulo, southeastern Brazil. Isotopic values for *D.*
 306 *rotundus* were corrected using species-specific fractionation factors ($\Delta^{13}\text{C} = 2.1\text{‰}$;
 307 $\Delta^{15}\text{N} = 3.4\text{‰}$). Dashed lines = estimated standard ellipses using 95% of the data; solid
 308 lines = confidence intervals (95%) around the bivariate means; capybara (*Hydrochoerus*
 309 *hydrochaeris*) = red; Coati (*Nasua nasua*) = green.

310

311 Discussion

312 The isotopic niche of common vampire bats overlapped the capybaras' niche from the
 313 Anchieta Island (Fig. 2), and was distinct from the mean values of potential prey in the
 314 preserved area of the mainland (Fig. 3), indicating that capybaras from the Anchieta
 315 island are their main food source. Even with concentrated sampling effort, our results
 316 support previous studies that showed a choice of common vampire bats to feed on
 317 locally abundant and reliable prey (Voigt and Kelm, 2006; Bobrowiec *et al.*, 2015;

318 Streicker and Allgeier, 2016, Zórtea *et al.*, 2018). Previous long-term isotopic studies,
 319 which analyzed tissues with different isotopic turnover rates (e.g. blood, skin, hair from
 320 the different individuals and assemblages) showed that the common vampire bat dietary
 321 preferences have low variability over time and did not change over seasons (Voigt and
 322 Kelm, 2006; Voigt *et al.*, 2008; Voight, 2009; Streicker and Allgeier, 2016). This
 323 information was also supported by our direct observations, which showed that the
 324 common vampire bats can use memory and/or sensory cues to repeatedly feed on the
 325 same group of capybaras (Groger and Wiegrebe, 2006; Bahlman and Kelt, 2007,
 326 WebVideos S1 and S2).

327

328 Fig. 3: Mean and standard deviation of $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values of common vampire bats
 329 (*Desmodus rotundus*; red triangle) and its potential prey on Anchieta Island (green
 330 circles) and Núcleo Santa Virgínia of the Serra do Mar State Park (mainland site; blue
 331 squares), state of São Paulo, southeastern Brazil. Isotopic values for *D. rotundus* were
 332 corrected using species-specific fractionation factors ($\Delta^{13}\text{C} = 2.1\text{‰}$; $\Delta^{15}\text{N} = 3.4\text{‰}$).
 333 Anchieta Island potential prey: Capybara (*Hydrochoerus hydrochaeris*) and coati (*Nasua*
 334 *nasua*). Mainland site potential prey: White-lipped peccary (*Tayassu pecari*), collared
 335 peccary (*Pecari tajacu*), deer (*Mazama* sp.), lowland tapir (*Tapirus terrestris*) and
 336 capybara.

337

338 Common vampire bats were not captured in studies in preserved areas of the
339 mainland (Picinguaba, Mambucada e Santa Virgínia), which are near Anchieta Island
340 (Supporting information S6, Fig. 1). This evidence corroborates the hypothesis that the
341 percentage of capture of common vampire bats is usually low in natural forested
342 habitats where potential prey are scattered, and high in areas with high concentration of
343 prey (Turner, 1975; Bobrowiec *et al.*, 2015). Also, the number of individuals mis-
344 nested varied on island nearby that have different history of human occupation
345 (Supporting information S6, Fig. 1) indicating that common vampire bats may respond
346 according to different type and intensity of anthropogenic disturbance (Streicker and
347 Allgeier, 2016, Gonçalves *et al.*, 2017).

348 The current native mammal fauna on the Anchieta Island was quite
349 impoverished due to its isolated location, as well as past human impact (Bovendorp and
350 Galetti, 2007, Souza *et al.*, 2019, Supporting information S1). There are no previous
351 studies about the occurrence and/or diet of common vampire bats on the island in the
352 beginning of the last century (Garbino *et al.*, 2016, Muylaert *et al.*, 2017). However,
353 previous information on human occupation on island (Guillaumon *et al.*, 1989) and
354 record of common vampire bats in the mainland and island nearby Anchieta (Garbino *et*
355 *al.*, 2016), led us to believe that domestic animals present there (especially cattle, pigs
356 and dogs) were the main prey and responsible for maintaining a viable population of the
357 species on island. When the island became a state park in 1977, all the domestic animals
358 were removed (Guillaumon *et al.*, 1989) and forced the population of common vampire
359 bats to leave or to reach very low density. After the species introductions in 1983,
360 capybaras underwent explosive population growth due to food availability and absence
361 of predators, and became an abundant and reliable source of blood for common vampire
362 bats on Anchieta Island. The new scenario allowed common vampire bats to return to

the island and/or increase the population densities. An alternative hypothesis is that common vampire bats never existed on the island and the new scenario created after species introductions allowed the species to colonize then.

The extent to which common vampire bats can shift to new food sources is poorly understood, but the degree to which they exhibit dietary shifts and how these feeding strategies respond to human activity, can be an indicator of community-level responses to environmental changes (Bolnick *et al.*, 2002; Layman *et al.*, 2007; Gonçalves *et al.*, 2017). The common vampire bat needs to feed every night (Freitas *et al.*, 2003), and prey that are dispersed or free to walk are more difficult to attack (Delpietro, 1989). Capybaras present a more predictable and constant food source on Anchieta Island, as they feed on grasses in open areas during the night, and are larger than coatis, reinforcing our conclusion that capybaras are the most attractive and reliable food source for common vampire bats in the study area.

The large biomass of capybaras on Anchieta Island and their predictable behavior, make them easy to find and more accessible than other potential prey for the common vampire bat. As the species was introduced to Anchieta Island only 36 years ago, this suggests a rapid prey shift due to anthropogenic disturbances, which has allowed common vampire bats to successfully exploit them. The shift from a livestock-based diet to introduced species poses interesting questions for common vampire bat health and behavior. Blood from translocate species might affect common vampire bats directly through differences in nutritional quality and exposure to new diseases, as detected in some bat individuals from Anchieta Island in which leptospirosis was serologically confirmed (Aires, 1998). Beyond that, three individuals of introduced capybaras were confirmed died from bat rabies viruses (RABV) in 2020 (PS Moreira, unpublished data) and we suggest, then, a periodic monitoring of bat rabies viruses

(RABV) in common vampire bat populations on Anchieta Island and areas nearby, in order to quantify the magnitude of the outbreak area and develop strategies for controlling viruses, especially considering that the island and areas nearby is frequently visited by tourists.

In summary, stable isotope analysis is a useful tool for studying prey choice because it integrates information across wide time spans when quantified from tissues with slow turnover such as hair (Peterson and Fry, 1987), which in vampire bats, represent prey choice over 4–6 months prior to sampling (Voigt and Kelm, 2006). Our results indicate that, in the absence of livestock and domestic animals, vampire bats on Anchieta Island feed primarily on capybara, which is consistent with the bats having a preference for abundant species. The results are context-dependent and strongly influenced by: (1) the extirpation of domestic animals (2) the high abundance of this prey species, that is the highest mean biomass on the island; (3) the predictable foraging behavior of capybaras in open areas.

Supplementary Material

Supporting Information S1. Introduced species and current population size and density of mammals [adapted from (Bovendorp and Galetti, 2007)] on the Anchieta island and their respective biomass [body mass according to Gonçalves et al. (2018)].

Supporting Information S2. Bat species recorded on the Anchieta Island, southeastern Brazil.

Supporting Information S3. $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values of common vampire bats (*D. rotundus*) and potential prey (*H. hydrochaeris* and *N. nasua*) on Anchieta Island, southeastern Brazil, including the number of samples analyzed (N).

Supporting Information S4. Capture and sampling of common vampire bats (*D. rotundus*) and potential prey (1) capybaras (*H. hydrochaeris*) and (2) coati (*N. nasua*) on Anchieta Island, southeastern Brazil.

Supporting Information S5. Number of events of common vampire bats (*Desmodus rotundus*) feeding on capybaras (*Hydrochoerus hydrochaeris*) on Anchieta Island, southeastern Brazil.

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