An evaluation of the diet of *Cyclura* iguanas in the Dominican Republic

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ABSTRACT - Understanding the diet of endangered species can benefit conservation efforts that involve habitat preservation and restoration. Caribbean rock iguanas, *Cyclura* spp., are among the most endangered lizards in the world, yet little is known about the diets of many of these species. In particular, the diets of the Rhinoceros rock iguana, *Cyclura cornuta*, and Ricord's rock iguana, *C. ricordii*, from the Dominican Republic, are poorly understood. Here we present diet information from scat analyses of these two threatened endemic species. We report on a variety of new dietary items and identify seasonal core plant species (*Consolea moniliformis*, *Stenocereus hystrix*, *Ximeniopsis horridus*, *Capparis flexuosa* and *Acacia* sp.). *Cyclura* from the Dominican Republic are generalist herbivores, although animal matter is consumed at times and preference for particular vegetation exists. Variation in diet likely exists between the two species and is discussed. The information presented here advances our understanding of the ecology of these two species and will aid in management decisions and activities.

INTRODUCTION

Within reptiles, iguanas of the subfamily Iguaninae are known for their unique herbivorous feeding strategy (Iverson, 1982). While most reptiles have adopted a more omnivorous strategy, many iguana species are known to specialise on fruits, seeds, and leaves, making them "truly herbivorous" (Alberts, 2004; Iverson, 1982). Indeed these herbivorous lizards have a distinct enlarged colon that is likely related to this ecologically important life strategy (Iverson, 1982). Herbivory plays a key role in plant growth and reproduction, aiding in seed dispersal and germination. Thus, this feeding strategy is essential to maintaining and perpetuating healthy ecosystems (Hartley et al., 2000).

Understanding the diet and feeding behaviour of herbivorous lizards, such as iguanas, will not only improve our understanding of their ecological role in a given environment, but can also provide useful information for conservation planning. Given that iguanas are some of the most endangered lizards in the world (ITWG, 2016), dietary information is vital to management efforts focused on the restoration of current and future habitats, as well as translocation strategies, as these data will ensure that the proper food sources can be made available. Restoration and translocation are both common approaches explored in iguana conservation programs (Knapp & Hudson, 2004).

To date, detailed information regarding the diet of many iguana species, such as those endemic to Hispaniola, is unavailable. Hispaniola is unique in that it is the only Caribbean island where two native species of *Cyclura* co-occur: *Cyclura cornuta* (Bonaterre) (Rhinoceros iguana) and *C. ricordii* (Duméril & Bibron)(Ricord´s iguana). The broadly sympatric distribution of *C. cornuta* and *C. ricordii* likely arose when Hispaniola was formed through the joining of North and South Paleoislands (Banbury & Ramos, 2005). *C. cornuta* occurs throughout Hispaniola; however, many populations seem to be dwindling (Powell et al., 2000; SAP pers. obs.). *C. ricordii* is restricted to four populations: three in southwestern Dominican Republic (Los Olivares, Lago Enriquillo and Isla Cabritos) and one in southeastern Haiti (Alberts, 2000). *C. cornuta* is categorised as Vulnerable under IUCN Red List criteria and *C. ricordii* is listed as Critically Endangered (Ottenwalder, 1996 a, b). The introduction of exotic mammals, illegal pet trade, human consumption, and most prominently, habitat alteration and degradation are the main threats to these iguanas (Ottenwalder 1996 a, b).

Cyclura spp. are thought to be generally herbivorous; however, precise feeding strategies may differ depending on food availability and preference. Previous studies of *Cyclura* on Hispaniola have produced limited observations of diet (reviewed by Iverson, 1979). Herein we evaluate the diet of *C. cornuta* and *C. ricordii* through an in-depth scat analysis, in an effort to characterise the diet and address the aforementioned factors affecting feeding behaviour. Specifically we aimed to: (1) qualitatively and quantitatively describe the diet of *Cyclura* in the study area and (2) determine if preference for certain plant species occurs by comparing the resources used to those available during the study period.

FIELD-SITE DESCRIPTION

We conducted our study in the southwest portion of the Dominican Republic, in the province of Pedernales, where *C. cornuta* and *C. ricordii* are found in both sympatry and allopatry. Our three focal study sites are within, or border, Jaragua National Park (17º 47' 22" N and 71º 29' 56" W). Limestone terraces, with deep soil depressions (fondos) interspersed, characterise this region (Rupp et al., 2008). Iguanas use the fondos year round but they concentrate their activity there during the nesting season (*C. ricordii* from mid-March to early June and *C. cornuta* from mid-September to mid-October; Rupp et al., 2008), and thus

our capture success was relatively high during those time periods. We focused our efforts on Sites A (47 ha) and B (10 ha) with 1.5 km distance apart and opportunistically visited a third site, Site C, but were unable to conduct the same level of research due to time constraints. Site A was a known location for *C. ricordii*, but may have supported *C. cornuta* around the periphery, whereas Site B was a well-known sympatric location. Site C only supported *C. cornuta*. Both Sites A and B were impacted by livestock grazing, as well as feral dogs, cats, and mongoose. Plant species such as Cayuco (*Stenocereus hystrix*), Alpargata (*Consolea moniliformis*), Bayahonda (*Prosopis juliflora*), and Guasabara (*Cylindropuntia caribea*) were common in the fondo areas of Site A and B. In the limestone terraces surrounding the fondos of Sites A and B there was a greater diversity of plants and in general open canopy vegetation (see Arias et al., 2004). Site C was characterised by a high abundance of Acacia trees and heavily impacted by a nearby highway.

MATERIALS AND METHODS

Data collection

We obtained dietary data from scats that we collected during the summer of 2015 (June, July and August). We walked two loops of approximately 1.5 – 2 km each within Sites A and B, opportunistically collecting scat samples from the ground throughout the study period. We also collected limited scat samples along the paths leading to Sites A and B. On two separate occasions in July we visited Site C and opportunistically collected scat samples over the course of one hour. We verified that all scat samples were from iguanas by checking for the presence of urea, the absence of hair, and noting the level of digestion. We collected scats that were dry but deposited recently (1-2 days). We noted the site, date, and GPS coordinates whenever possible. In many instances it was not possible to definitively determine which species of iguana the scat belonged to while using this opportunistic collecting method. This is most relevant to the sympatric Site B, but should also be considered for Site A as the level of allopatry is not entirely understood. However, no *C. cornuta* were captured at Site A over the four year course (2012-2015) of study by SAP.

To supplement scat samples from individuals of unknown origin, we simultaneously carried out trapping at Sites A and B for the last 25 days of our field season in order to obtain scats from known individuals. We used Tomahawk cage-traps baited with mango and sardines, and we hid the traps within the vegetation. We checked and re-baited traps daily. Upon capture of an iguana, we collected scat samples from the traps or maintained iguanas in a cloth bag to allow scat deposition. For all scats collected we classified and counted each leaf, seed, and fruit present, as well as other elements that appeared, such as vertebrate parts, shells, arthropods and human-made materials. We took into account both full-bodied individuals and arthropod parts when counting arthropod individuals, but carefully accounting for possible oversampling of different arthropod parts. We refer to these total counts as the "abundance of a given item" both within and across all scats.

During scat collection, we simultaneously collected and classified the leaves, fruits, and seeds from the majority of plant species in Sites A and B to aid in the identification of plant material from scats. We assessed the plant availability in Sites A and B through an evaluation of 20 randomly selected vegetation plots (10 in each site) of 10 m² each, within the fondos and a buffer of 100 m². Our design included both typical fondo habitat and the rocky limestone area surrounding the fondo in order to encompass the likely foraging grounds for these iguanas. Within the plots, we identified all plant species and recorded their abundance. We did not collect grass samples because we were unable to identify them confidently to the species level and because grasses were never observed within the scat samples.

Data analysis

For each fully intact scat collected, we recorded total mass to the nearest 0.1 g with an electric balance before deconstructing the scat for examination. The use of scat examination as a method to determine the diet of iguanas has been commonly used and is a widely accepted noninvasive method (e.g., Beovides-Casas & Mancina, 2006; Hines, 2016; Perera, 1985). In our study system, this method was preferable over stomach flushing and post mortem examination as *C. cornuta* and *C. ricordii* are threatened species. After sorting materials from an individual scat sample, we determined the ratio of the mass of identifiable items to total mass of the scat. We ranked the elements that were present in the scats according to their frequency across scat samples as we felt this most accurately reflected foraging (or used) events. For comparison, we ranked the plant species found in the vegetation quadrats by abundance. Based on frequency of occurrence in scats (used values) and abundance in nature (available values), we determined selection preference for the plants following Manly's selection ratios for design I, using a conservative approach (Manly et al., 2004). We chose the conservative approach, as the available dietary items were assessed from a sample set of plots and not from surveying the entire area of study.

We determined the core plants in the diet during the study season by considering the abundance and frequency of occurrence of each taxon in the scats. We tested for differences in abundance of the core plant species and arthropods between Sites A and Site B using t-tests and Mann-Whitney U tests. We used R package adehabitatHS for the Manly's Selection Ratio analysis (Calenge, 2006), and the statistical program SPSS 20 IBM for all other analyses with an alpha level of 0.05.

RESULTS

We opportunistically collected 158 scat samples across the three study locations (69 from Site A, 69 from Site B and 20 from Site C) and 10 additional scats by the trapping method (5 from *C. cornuta* and 5 from *C. ricordii*), to qualitatively describe the overall diet of the *Cyclura* in this region (Table 1). No *C. cornuta* were captured at Site A. To avoid pseudoreplication that would result from the inclusion of multiple scats from the same individual over time, we used only a single scat from a given location within 5 meters for all quantitative analyses, which resulted in a reduce sample set (see below for exact numbers for each analysis). Samples from Site C were also excluded from quantitative analyses due to a lack of location information and thus possible pseudo-replication.

From the 168 scats collected, we recovered 21 plant taxa, as well as arthropods, vertebrates, shells, and

Table 1. Dietary elements resulting from 168 *C. cornuta* and *C. ricordii* scats from study sites A, B, and C in the province of Pedernales, southwest Dominican Republic. We report the: abundance of various plant items in the scat, broken down into leaves, seeds, and fruits, RFO (ranked frequency of occurrence across scats [actual frequency]), vegetation abundance rank (VAR) of the 21 plant taxa (total number of individuals), and species specific consumption. All calculations were based on 93 samples (83 opportunistically collected and 10 from the traps) collected in Sites A and B. Superscripts indicate sources identified in the footnote.

Diet elements	Abundance	% Leaves	% Seeds	% Fruits	RFO (frequency)	VAR (total number of individuals)	Known consumption by species
Consolea moniliformis	1675	0	93.1	6.9	**1** (51)	**2** (646)	*C. cornuta*; *C. ricordii*
Stenocereus hystrix	436	0	96.6	3.4	**2** (38)	**5** (323)	*C. cornuta*; *C. ricordii*
Capparis flexuosa[+, 1,4,5,7]	179	60.5	26.5	13	**3** (31)	**18** (53)	*C. cornuta*
Ximeniopsis horridus	171	10.2	89.8	0	**4** (30)	**33** (10)	*C. cornuta*; *C. ricordii*
Arthropods	55				**5** (28)		*C. cornuta*; *C. ricordii*
Cordia salvifolia •,[1,5,6]	70	4.2	68.1	27.8	**6** (21)	**16** (68)	*C. cornuta*
Acacia sp.[+,1,5,6,7]	156	2.3	78.1	19.6	**7** (16)	**26** (22)	*C. cornuta*
Croton discolor [+,1,3,5,6]	27	44.5	0	54.5	**8** (15)	**7** (248)	*C. cornuta*
Capparis ferruginea[+,1,4,5]	25	24	68	8	**9** (13)	**25** (24)	*C. cornuta*; *C. ricordii*
Guaiacum sp.[+,1,3,7]	23	14.3	85.7	0	**10** (11)	**20** (50)	*C. cornuta*; *C. ricordii*
Prosopis juliflora	76	7.9	92.1	0	**11** (10)	**9** (165)	*C. ricordii*
Cameraria linearifolia	22	100	0	0	**12** (6)	**28** (19)	*C. ricordii*
Vertebrates	7				**12** (6)		*C. cornuta*; *C. ricordii*
Eugenia sp.[+,1,3,5,6,7]	5	100	0	0	**13** (5)	**31** (12)	*C. cornuta*; *C. ricordii*
Bursera simaruba[+,3]	8	0	0	100	**14** (4)		
Lantana sp.[+,1,4,5,6]	3	0	0	100	**15** (3)	**1** (648)	*C. cornuta*; *C. ricordii*
Shells	8				**16** (2)		
Opuntia sp.[+,1,4,5,6,7]	3	0	0	100	**17** (1)	**19** (52)	
Harrisia nashii•,[1,4]	3	0	100	0	**17** (1)	**32** (11)	*C. cornuta*
Colubrina elliptica	1	0	0	100	**17** (1)	**24** (29)	
Man-made material	1				**17** (1)		
*Phyllostilon rhamnoides**						**8** (209)	
*Melochia tomentosa**						**15** (74)	
Hippomane horrida[*,1,5,6]						**34** (8)	
Hippomane mancinella•,[1,5,6]							
Cissus trifoliata[*,+,4,5]						**10** (162)	
Iguana skin*							
Ziziphus rignonii[2]							

*Additional species found in scat samples only used in qualitative assessments
+Species already reported in other *Cyclura* sp.
• Congeners already reported in other *Cyclura* sp.
[1]Iverson, 1979; [2]Hartley et al., 2000; [3]Auffenberg, 1982, [4]Carey, 1975; [5]Lemm et al., 2010; [6]Lemm & Alberts, 2012; [7]Hines, 2016

man-made materials (Table 1). On average 29.77 % (0.15% - 98.8%) of the items in the scats were identifiable. Of the 21 plant taxa identified, we considered *Consolea moniliformis*, *Stenocereus hystrix*, *Capparis flexuosa*, *Ximeniopsis horridus* and *Acacia* sp. as the core diet of the iguanas (Table 1) because the abundances of other plants were discernably less (Table 1). Overall seeds were the most commonly found element from the plants, which is to be expected as they are likely the most difficult to digest (Table 1).

Manly's selection ratios demonstrated that *Cyclura* in this area have a significant preference for four plant taxa (*Capparis* sp., *Ximenopsis horridus*, *Acacia* sp. and *Cordia salvifolia*) as the occurrence in the scats was significantly greater than expected given the availability of those plants in the environment (Table 2). Six plant taxa (*Lantana* sp., *Opuntia* sp., *Phyllostillon rhamnoides*, *Melochia tomentosa*, *Hippomane horrida*, *Cissus trifoliata*) were shown to be avoided by *Cyclura* using this analysis. In fact, the latter four plant species were never observed in *Cyclura* scats (Table 2) despite they are commonly present in the study sites. We collected and classified 56 plant species during our floral surveys, 32 of which were reproductive (flowering, fruiting or both; Table 3).

We used 79 samples (42 from site A and 37 from site B) in regression analyses of location and richness or abundance. Scats collected from the trapping method were excluded due to their deconstructed state. Plant species richness was not dependent on location (F=0.41; P=0.839; d.f.=78). Abundance of *Capparis flexuosa* was significantly greater in scats from Site B (t value=2.790; P=0.007; df=77), whereas *Ximeniopsis horridus* was more abundant in scats from Site A (t-value=-4.647; P=0.001; df=77). These patterns were not simply a reflection of plant abundance across sites as neither *Capparis flexuosa* (Mann–Whitney U =37.5; P=0.328) nor *Ximenopsis horridus* (Mann–Whitney U =48; P=0.829) showed significant differences in vegetation abundance between sites.

Arthropod abundance was significantly increased in the scats from Site A compared to Site B (t-value=-3.054; P =0.003; df= 77). The identifiable arthropods were mainly beetles (11) and ticks (5), and to a lesser extent flies and ants. We also observed hatchling iguana parts, an adult iguana jaw, and a bird bone in the scat samples.

DISCUSSION

Understanding the dietary requirement of a species allows for a better understanding of the role that species plays in its environment. In addition, this information aids in conservation and management decisions focused on habitat restoration and translocation, as these data will ensure that the appropriate dietary items are provided in the new or restored habitat. In light of the increasing threats to these iguanas and on-going plans to restore their habitat, dietary information for *Cyclura* in the Dominican Republic is necessary in order to make informed management decisions.

Of the 21 plant taxa discovered in the diet of *Cyclura* across Sites A and B, several (or their congeners) have been previously reported in the diets of other *Cyclura* species (Table 1). Plant endemism can often explain the pattern of differing congeneric plant species consumed by *Cyclura* on different islands, as closely related congeneric plant species likely serve similar ecological roles. However, many plants species prominently identified in this study (*C. moniliformis*, *X. horridus*, *S. hystrix*, *P. juliflora*, *P. rhamnoides*, *C. elliptica* and *M. tomentosa*) have not been previously recorded from other *Cyclura* (Hines, 2016), though they occur sympatrically with other *Cyclura* species.

Dietary species richness varies greatly across Rock iguanas species. *C. lewisi* is reported to consume 105 different plant species (Burton, 2011), 54 plant species are reported for *C. carinata* (Iverson, 1979), and 54 plant species for *C. cychlura* (Hines, 2016). Other *Cyclura* species have fewer dietary species reported, such as *C. collei* (13 species) and *C. riley* (8 species); however, these studies were not exhaustive (Carey, 1975; Cyril, 2001; Hayes et al., 2004; Iverson, 1979; Vogel, 2000). With plant 21 species reported herein, the dietary richness of *Cyclura* in the Dominican Republic is comparatively low. However, we are likely underrepresenting the overall diet of these species since we did not examine all seasons or the full geographic range of the two species. Seasonal differences in diet have been noted for other species of *Cyclura* (Auffenberg, 1982; Hines, 2016; Iverson, 1979), and were also observed during the short time frame of this study. For example, it was not until the end of the field season that *Lantana* spp. and *Harrisia nashii* began fruiting, and only then, were first present in the scats. In addition, differences in digestibility between species could be a factor in observed dietary richness. Hines (2016) was able to identify 94% of the dietary items in *C. cychlura*. However, we were only able to identify on average 30% of the fecal material, the remainder of which was an unidentifiable powdery substance.

Despite the dietary richness recorded, we observed a seasonal core diet of five floral species in our study: *Consolea moniliformis*, *Stenocereus hystrix*, *Capparis flexuosa*, *Ximeniopsis horridus* and *Acacia* sp. The presence of a core diet has been shown previously in *Cyclura* (Auffenberg, 1982; Hines, 2016; Wiewandt, 1977). *C. moniliformis* and *S. hystrix* were common in both the vegetative surveys and the scat sampling, demonstrating generalised foraging by iguanas on these species (Table 2). However, iguanas demonstrated preferential foraging for *X. horridus* and *C. flexuosa*, as these plant species were selected more than expected given their availability in nature (Table 2). Iguanas also showed a significant

preference for *Acacia* sp. (Table 2); however, given the high abundance in habitat and relatively low frequency of *Acacia* sp. in the scats, this pattern may be indicative of individual preference rather than species level preference (Table 1). *Cordia salvifolia* and *Capparis ferruginea* were also significantly preferred by *Cyclura* but these were not included in the core diet due to their relatively low abundance in the scats (Tables 1 and 2); however, they should be considered in management planning.

All of the aforementioned preferred plant species were reproductive at the time of this study (Table 3). As previously mentioned *Lantana* spp. did not begin to fruit until the end of the study, which may account for the observed "avoidance" of this species. Likewise, *Hippomane horrida* and *Cissus trifoliata* were not reproductive during the time of the study, which likely accounts for the lack of observed consumption of these species. However, *Phyllostylon rhamnoides* and *Melochia tomentosa* were not preferably consumed by *Cyclura* even though they were reproductive. These two plants are not known to be toxic; however, the specific characteristics of their fruits may have made them less attractive food items. The fruit of *Melochia tomentosa* is extremely small and the fruit of *Phyllostylon rhamnoides* is not fleshy as it is a wind-dispersed plant. Although *Opuntia* sp. have been noted in the diets of various *Cyclura* sp. (Table 1; see also Hines, 2016) and these cacti were reproductive at the time of the study, we only observed consumption by one individual iguana.

We could not elucidate species-specific diet patterns for iguanas given our opportunistic sampling strategy, the small trapping sample size, and the undetermined range boundaries of *C. cornuta*. However, *C. cornuta* was not present in Site A based on four years of trapping effort in the area (2012-2015). Therefore, we feel that a cautious mention of potential species differences is warranted. *Ximeniopsis horridus* was more abundant in the scats found in Site A although it was equally available across sites, which may indicate that *C. ricordii* has a distinct preference for *X. horridus*, more so than *C. cornuta*. Likewise, arthropods were more abundant in the scats found in Site A than Site B, which may indicate that *C. ricordii* consumes more insect material than *C. cornuta*. Given the proximity and similarity of Site A and B, it is unlikely that this is simply a reflection of differences in arthropod availability. The presence of arthropods in the diet has been commonly reported for other *Cyclura* species (Burton, 2011; Cyril, 2001; Hines, 2016) and specifically in *C. cornuta* and *C. ricordii* at the National Zoo in Santo Domingo (Perera, 1985). Although arthropod parts (beetles, ticks, flies) were present in 30% of the scats, other animal parts (shells, iguana parts, bird parts) were also present to a lesser extent.

Reptile parts (including iguana) have been reported previously in the diets of iguanas (Hines, 2016; Iverson, 1979; Lemm & Alberts, 2012; Murphy, 1969). We encountered shed skin as well as hatchling scales and claws of *C. ricordii*, and lower jaw of a large adult *C. cornuta*. *Cyclura* is known to be mainly herbivorous (Iverson, 1979) and some authors suggest that arthropod consumption is accidental (Auffenberg, 1982; Perera, 1985; Wiewandt, 1977); however, given the abundance of arthropods and the presence of other vertebrate parts in the scats assessed herein we feel the consumption of animal matter is intentional as reported previously by Hines

Table 2. Dietary preference resulting from Manly Selection ratios design I within a conservative approach in Pedernales, southwest Dominican Republic. We report: Used plants (% frequency of occurrence in scats); available plants (% occurrence of plants in nature); Wi preference values; and p-values. All calculations were based on 93 samples (83 opportunistically collected and 10 from the traps) collected in Sites A and B. Bold p-values reflect those that are significant. Species highlighted in bold are preferred, while those underlined are avoided.

Species	Used plants (% freq. scats)	Available plants (% nature)	Wi	P-value
Consolea moniliformis	0.202	0.228	0.887	0.325
Stenocereus hystrix	0.151	0.114	1.320	0.126
Capparis flexuosa	0.123	0.019	6.568	**0.000**
Ximenopsis horridus	0.119	0.004	33.765	**0.007**
***Acacia* sp.**	0.063	0.008	8.173	**0.006**
Prosopis juliflora	0.040	0.058	0.684	0.147
Cordia salvifolia	0.083	0.024	3.474	**0.003**
Croton discolor	0.059	0.088	0.679	0.066
Capparis ferruginea	0.048	0.008	5.619	**0.018**
Guaiacum sp.	0.044	0.018	2.467	0.069
Cameraria linearifolia	0.024	0.007	3.576	0.119
Eugenia sp.	0.020	0.004	4.704	0.135
<u>*Lantana* sp.</u>	0.012	0.229	0.052	**0.000**
<u>*Opuntia* sp.</u>	0.004	0.018	0.221	**0.000**
Harrisia hashii	0.004	0.004	1.045	0.966
Collubrina elliptica	0.004	0.010	0.397	0.129
<u>*Phyllostilon rhamnoides*</u>	0.000	0.074	0.000	**0.000**
<u>*Melochia tomentosa*</u>	0.000	0.026	0.000	**0.000**
<u>*Hippomane horrida*</u>	0.000	0.003	0.000	**0.000**
<u>*Cissus trifoliata*</u>	0.000	0.057	0.000	**0.000**

(2016). Furthermore, it is likely that we underestimated the consumption of insects by assessing only scat rather than gut contents (Iverson, 1979). For example, Wiewandt (1977) reported the presence of *Pseudosphinx tetrio* larvae (a moth that is host specific to *Plumeria obtusa*) in the diet of *Cyclura* on nearby Mona Island. These larvae were very abundant on the *Plumeria obtusa* in our study sites; however, we did not discover them in our scat samples, likely because their soft bodies were fully digested.

We characterised the diet of *Cyclura* in the SW of DR during the most vital time of the year, nesting and hatching season. However, understanding how resources are being partitioned between these sympatric iguana species needs further investigation. In addition, future research should include all seasons and account for differences in seed, leave, and fruit size, as well as nutritional value, in order to obtain a better understanding of the preferences that these iguanas have for certain plant taxa and for their parts. Furthermore, addressing a more rigorous assessment of food availability would benefit further studies. Managers should consider the plant species that shape the core diet and those given preference as vital to maintain in the range of these iguana species and when contemplating reintroduction sites. Likewise, these plant species should be considered of upmost importance in on-going and future habitat restoration projects aimed at the conservation of these iguanas.

This study presents the first step in understanding the role that these Rock iguanas play in the tropical dry forest ecosystem of the Dominican Republic. Iguanas are known to be important seed dispersers in the areas in which they live (Benítez-Malvido et al., 2003; Hartley, 2000), aiding in maintenance and perpetuation of native plant communities. Two core dietary species, *Capparis* sp. and *Consolea moniliformis*, are known to play a key role in this dry forest ecosystem (García-Fuentes et al., 2015), and

thus these iguanas may be important seed dispersers for these species. Targeting management efforts towards these iguanas as flagships for conservation will aid in preserving the dynamics of this unique ecosystem.

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Table 3. Plant species identified from Sites A and B in the province of Pedernales, southwest Dominican Republic (DR). DR Red List status includes: VU (Vulnerable), EN (Endangered), CE (Critically Endangered). Vegetation abundance was ranked (VAR) from the most abundant to the least by considering the total number of individuals (Total Num. Ind.) observed. Species in bold represent the core diet.

Family	Species	Common name	DR Red List Status	Reproductive stage	VAR (Total Num. Ind.)
Apocynaceae	*Cameraria linearifolia*		Endemic	Not recorded	**28** (19)
Apocynaceae	*Pentalinon luteum*	Ahogavaca	Native	Flower	**20** (50)
Apocynaceae	*Plumeria obtusa*	Aleli	Native	Flower, Fruit	**22** (33)
Asparagaceae	*Agave antillarum*	Maguey	Endemic (EN)	Flower	
Bignoniaceae	*Jacaranda ekmanii*	Abey	Endemic (CE)	Fruit	
Boraginaceae	*Cordia salvifolia*		Endemic	Flower, Fruit	**16** (68)
Boraginaceae	*Heliotropium angiospermum*	Alacrancillo	Native	Not recorded	**5** (323)
Burseraceae	*Bursera simaruba*	Almacigo	Native	Fruit	
Cactaceae	***Consolea moniliformis***	Alpargata	Native	Flower, Fruit	**2** (646)
Cactaceae	*Cyindropuntia Caribaea*	Guazabara	Native	Fruit	**6** (251)
Cactaceae	*Dendrocereus undulosus*	Caguey	Endemic (EN)	Not recorded	
Cactaceae	*Harrisia divaricata*			Fruit	**21** (34)
Cactaceae	*Harrisia nashii*		Endemic	Flower, Fruit	**32** (11)
Cactaceae	*Mammilaria prolifera*	Bombilito	Native (VU)	Not recorded	**11** (129)
Cactaceae	*Melocactus intortus*	Melon espinoso	Endemic (EN)	Flower, Fruit	**14** (76)
Cactaceae	*Opuntia dilleni*	Tuna brava	Native	Flower, Fruit	**19** (52)
Cactaceae	*Opuntia* sp.			Flower	**19** (52)
Cactaceae	*Pilosocereus polygonus*		Native	Fruit	**28** (19)
Cactaceae	***Stenocereus hystrix***	Cayuco	Endemic	Flower, Fruit	**5** (323)
Caesalpiniaceae	*Caesalpinia ciliata*		Native	Fruit	
Caesalpiniaceae	*Caesalpinia sphaerosperma*		Endemic (VU)	Fruit	**39** (1)
Caesalpiniaceae	*Senna atomaria*	Palo de chivo	Native	Flower	**11** (129)
Caesalpiniaceae	*Senna uniflora*			Not recorded	**38** (2)
Capparaceae	*Capparis cyphallanophora*		Native	Fruit	**39** (1)
Capparaceae	*Capparis ferruginea*	Olivo	Native	Flower, Fruit	**25** (24)
Capparaceae	***Capparis flexuosa***	Mostazo	Native	Fruit	**18** (53)
Commeliaceae	*Commelina erecta*		Native	Not recorded	**17** (67)
Euphorbiaceae	*Croton discolor*		Native	Flower	**7** (248)
Euphorbiaceae	*Croton polytomus*		Endemic	Flower	**3** (638)
Euphorbiaceae	*Hippomane horrida*		Endemic	Not recorded	**34** (8)
Euphorbiaceae	*Jatropha gossypifolia*	Tuatua	Introduced	Flower	**23** (31)
Fabaceae	*Galactia* sp.			Not recorded	**13** (78)
Flacourtiaceae	*Samyda dodencandra*		Native	Flower	**37** (3)
Leguminosae	***Acacia macracantha***		Native	Flower	**26** (22)
Leguminosae	***Acacia skleroxyla***	Candelon	Endemic	Fruit	**37** (3)
Leguminosae	*Coursetia caribaea*	Roblecillo		Flower, Fruit	**36** (5)
Leguminosae	*Prosopis juliflora*	Bayahonda	Native	Flower, Fruit	**9** (165)
Malvaceae	*Abutilon umbellatum*		Native	Flower	**30** (16)
Malvaceae	*Corchorus hirsutus*	Tremolina	Native	Flower	**12** (95)
Malvaceae	*Hibiscus brasiliensis*			Flower	
Meliaceae	*Trichilia* sp.	Guau		Not recorded	**33** (10)
Mimosaceae	*Calliandra pedicellata*		Native	Not recorded	**36** (5)
Myrtaceae	*Eugenia pitrensis*		Native (VU)	Not recorded	**39** (1)
Myrtaceae	*Eugenia* sp.		Native	Fruit	**31** (12)
Olacaceae	***Ximeniopsis horridus***	Me voy contigo	Endemic	Fruit	**33** (10)
Portulacaceae	*Portulaca rubricalis*	Verdolaguilla	Native	Not recorded	**27** (21)
Rhamnaceae	*Colubrina elliptica*		Native	Fruit	**24** (29)
Rubiaceae	*Scolosanthus triacanthus*		Native	Not recorded	**35** (6)
Sapindaceae	*Thouinia domingensis*		Endemic	Fruit	**35** (6)
Sterculiaceae	*Melochia tomentosa*	Malva cimarrona	Native	Flower, Fruit	**15** (74)
Turneraceae	*Turnera diffusa*		Native	Flower	**4** (423)
Ulmaceae	*Phyllostilon rhamnoides*		Native	Fruit	**8** (209)
Vebernaceae	*Lantana* sp.*		Endemic	Flower	**1** (648)
Vitaceae	*Cissus trifoliata*		Native	Not recorded	**10** (162)
Zygophyllaceae	*Guaiacum officinale*	Guayacan	Native (CE)	Fruit	**20** (50)
Zygophyllaceae	*Guaicum sanctum*	Vera, Guacayancillo	Native (VU)	Flower	**29** (17)

*Two species of Lantana were found: L. ciferrania (Endemic) and L. reticulata (Native), but we were unable to differentiate them in the vegetation plots.

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