THE BIOGEOGRAPHY OF DIEL PATTERNS IN HERPETOFAUNA

By

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ABSTRACT

Animal activity varies greatly during daylight and nighttime hours, with species ranging from strictly diurnal or nocturnal, to cathemeral or crepuscular. Which of these categories a species falls into may be determined by a variety of factors, including temperature, and biogeographic location. In this study I analyzed diel activity patterns at 13 sites distributed around the world, encompassing a total of 901 species of reptile and amphibians. I compared these activity patterns to the absolute latitudes of each site and modeled diel behavior as a function of distance from the equator. I found that latitude does correlate with the presence of nocturnal snake and lizard species. However, I did not find significant results correlating latitude to any other reptile or amphibian lineage.

INTRODUCTION

Cycles of light and darkness are important for the activity and behaviors of many organisms, both eukaryotic and prokaryotic (Johnson et al. 1995; Bennie et al. 2012). As the Earth rotates, duration of light and darkness as a function of sun, moon, and cloud cover, vary across latitudes (Bennie et al. 2012). Organism behavior is influenced by this change in light and plays a major role in determining niche partitioning (Bennie et al. 2012). Niches are often categorized by environmental factors, such as climate, biotic communities, and resource use. However, niches are also determined by temporal activity, a concept referred to as the diel niche (Hut et al. 2012).

Animal activity patterns are shaped by evolution, and can be adjusted according to environmental cues such as predation, resource availability, and climate (Monterroso et al. 2013). The diel activity niche explains animal behavior in terms of regulation via dark and light cycles, within a 24 hour period (Dalosto and Santos 2011). It has been suggested that diel activity has evolved as a strategy to avoid competition between species filling similar ecological roles (e.g., Bethge et al. 2009). Temporal partitioning among closely related species may allow for interspecific coexistence, and reduce resource use overlap (Kronfeld-Schor and Dayan 1999). There is strong phylogenetic signal in diel activity, such that closely related tetrapod species tend to share similar diel activity patterns, with nocturnality being the likely ancestral state (Anderson and Wiens 2017). The use of nocturnal over diurnal behavior (or vice versa) in different species has potential important consequences for resource use and requirements, and may speak to the intrinsic value of different biotic communities (Albrecht and Gotelli 2001).

There is a lack of literature concerning patterns in diel activity based on biogeographic location. This is in part because some species do not follow strict temporal partitioning all throughout the year. For example, migratory species that can be found in different communities based on seasonality may be more likely to be opportunistically cathemeral (e.g., elephants- Shoshani et al. 2004; Gunn et al. 2004). Patterns of diel activity can be influenced by a variety of factors, including season, predator avoidance, anthropogenic influence, energy constraints, and biogeography (van Orsdol 1984; Albrecht and Gotelli 2001; Bennie et al. 2012). The relationship between biogeography and diel behavior has not been well researched. One study (Bennie et al. 2012) found more nocturnal mammal species in arid regions, and more diurnal species at higher altitudes. However there have not been any comprehensive studies analyzing similar patterns within other tetrapod lineages.

Information on the proportion of diurnal to nocturnal species (as well as cathemeral and crepuscular) is important to understand because it may provide some insight into habitat selection based on activity pattern. However, there have been no tests of how diel activity varies with latitude in different groups of reptiles and amphibians. This is what I attempted to do in this study. I used various sites around the globe with well-studied species lists, across a variety of latitudes. I then estimated these species' diel activity patterns, and tested how diel activity patterns varied latitudinally within each group.

Temperature at the equator is known to display high night-time values, and is generally constant throughout the year (Caccin et al. 1970). As ectotherms, reptile and amphibian species regulate their body temperature either at specific set-point temperatures, or between some high and low value (Pough et al. 2004). Lizards, for example, have set-point ranges that may vary by only 2^0-3^0 (Pough et al. 2004). Given that ectotherms are known to require such strict temperature ranges, and that the equator has constant warm temperatures throughout the day and night, I expected to find high proportions of nocturnal species at the lowest latitudes. I expected to find higher proportions of diurnal species in temperate zones, and I expected to find highest rates of cathemeral species at the highest latitudes, where sunlight quantity and temperature is most variable throughout the year. I analyzed diel activity of herpetofauna across 13 sites, spanning absolute latitudes of 5.6922^{o}-43.6225^{0}. I found that latitude may in fact impact diel activity patterns, specifically for snake and lizard species.

METHODS

I collected terrestrial reptile and amphibian species lists for a total of thirteen different sites around the globe. I collected all of the data for this study using an extensive literature search. Literature in this case included scientific journal articles, field reports, and field guides. I conducted these literature searches using Google Scholar, and the Web of Science databases. Species included 1 caecilian, 8 crocodiles, 354 frogs, 227 lizards, 26 salamanders, 250 snakes, and 35 turtles.

Site Selection and Species Lists

I chose sites for this study based on biogeographic location (latitude), as well as availability of species data (presence of species at sites, and their diel behavior). I chose sites that either included protected land (i.e., national parks), or that had well-known research sites present. This was to ensure that there would be an adequate amount of existing data pertaining to species in these areas. The goal of site selection was to create a collection of sample units that were representative of an array of latitudinal gradients (latitudes for each site found on Google Maps). I first selected sites from different regions around the world, and then performed a literature search to determine which of these sites had comprehensive species lists. Species lists were either found in scientific journal articles, or within field guides. The chosen sites are as follows, with region followed by site name (Figure 1)

Afrotropical: Kruger National Park (South Africa); Australasia: Kakadu National Park (Australia); Middle America: La Selve Research Station (Costa Rica); Nearctic: Badlands National Park (USA), and Cuyahoga Valley National Park (USA); South Asia: Similipal Biosphere Reserve (India); Southeast Asia: Crocker Range National Park (Borneo); Temperate South America: Coastal Dunes of Buenos Aires Province (Argentina); Tropical South America: Manu National Park (Peru); Eastern Palearctic: Northern Kyushu Island (Japan); Madagascar: Marojejey National Park (Madagascar); West Indies: Sierra de Cubitas (Cuba); Western Palearctic: Dadia-Lefkimi-Soufli Forest National Park (Greece).

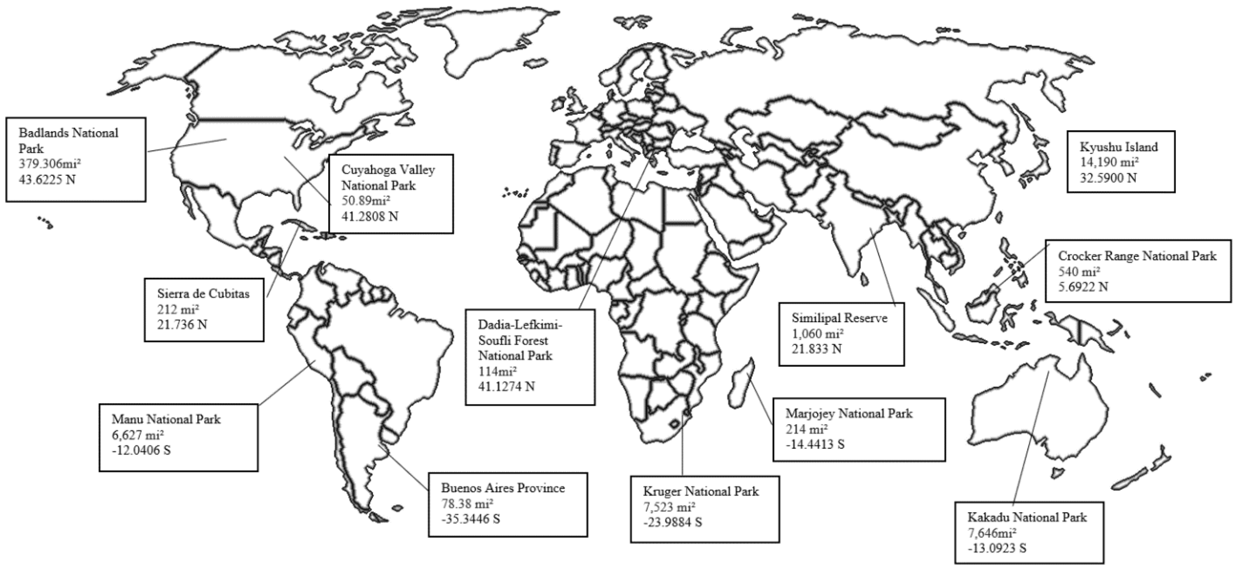


Figure 1. Map of the thirteen sample sites from across the globe, showing site size and latitude.

Defining Diel Activity

Species were each assigned to one of four diel activity categories; nocturnal, diurnal, cathemeral, or crepuscular. I classified species based on either explicit statements of their activity within source literature (i.e., field guides which state diurnality vs. nocturnality, etc.) or based on descriptions of their behavior patterns. In the latter case, categorization was based on a standard set of activity descriptions (Anderson and Wiens 2017). I characterized nocturnal species as those primarily active after sunset and before sunrise. I delineated diurnal species as those active after sunrise and before sunset. Crepuscular species were those described as primarily active during twilight or in the early morning and at dusk. I described cathemeral species as those with variable activity patterns, active throughout daylight and/or nighttime hours, or with activity patterns that changed based on season, weather, or resource availability. If a species was described as being active at both twilight and after sunset, or after sunset into early morning, I designated this species as nocturnal. Similarly, if a species was described as being active during the early morning and after sunrise, or after sunrise into twilight, I classified this species as diurnal.

For some frog species, activity patterns were not explicitly described, and in these cases I made inferences about diel activity based on calling patterns. I did this because calling behavior of frogs is indicative of their diel behavior (Drewry and Rand 1983; Todd et al. 2003; Ospina et al. 2013). In these cases, calling behavior was used to classify diel activity using the same behavior criteria described above.

Diel Activity Data Collection

I searched for diel data for each species using several online catalogs, databases, and field guides including; Amphibia Web, The Reptile Database, Animal Diversity Web, Namibia Biodiversity Database, Encyclopedia of Life, IUCN Red List, Google Scholar, Web of Science, and field guides specific to each site.

When using field guides to gather diel activity, I would determine if generalizations could be made about the diel activity patterns of each family. If this was the case, I would then assign that diel activity to every member of that family at that site. If no generalization could be made at the family level, I would repeat this process at the genus level. If no generalizations could be made about diel activity at the genus level, I would obtain data for the individual species behavior descriptions provided by each field guide.

When using literature databases to gather diel activity (Google Scholar and Web of Science), I followed a similar approach. I first sorted species lists by site, and then by family. I would then perform a literature search to see if generalizations could be made about the diel activity patterns of each family. I would enter the name of the family in question, followed by either the words “nocturnal”, “diurnal”, “crepuscular”, “cathemeral”, or “diel activity” in parenthesis. If I could not find information at the family-level, I then repeated the search using the genus name. Again, if I could not find information at the genus level, I concluded my search by following the same methods at the species level. One exception was made to this search method when looking for the diel activity of some frogs, in which case I used the key words “calling activity”, for reasons discussed above.

Statistical Analysis

Results were analyzed in R. In R, I performed general linear regression to determine relationships between the proportion of species with each diel activity type at each site, and the latitude of that site. I performed analysis for snake, lizard, salamander, turtle and frog groups. I did not analyze the single caecilian species, or the 8 crocodilians. Every crocodile species was found to be nocturnal.

I ran 4 different models for the frog, snake, and turtle groups, and 3 different models for the salamander group, for a total of 19 different models. I ran a total of 8 different models for the lizard group, 4 of which compared diel activity patterns across all 13 sites, and 4 of which compared diel activity patterns across only 12 sites, with Kyushu Island having been removed as an outlier. I made the decision to remove Kyushu as an outlier only from the lizard group based on graphical appearance of plots comparing diel activity to latitude (Figures 2a-2l). I modeled the proportion of each diel category (nocturnal, diurnal, cathemeral, crepuscular) as a function of biogeographic location (latitude) for each of the five animal types (snake, salamander, lizard, frog, turtle). I ran the models using the absolute values of the latitudes, such that latitude represented an explanatory variable describing distance from the equator. I based conclusions of significance off of the resulting p-values for these models, following the standard of $p < 0.05$.

RESULTS

I obtained data for a total of 354 frogs, 227 lizards, 26 salamanders, 250 snakes, and 35 turtles. Snakes, frogs, and lizards were recorded at all thirteen sites. Salamanders were recorded at only six sites, and turtles at only ten sites. The proportions of highest diurnal and nocturnal activity for each respective group can be seen in Table 1. The statistical results summary can be seen in table 2. The complete proportion list of diel activities for each group per site can be seen in Appendix A.

Snakes

I sampled a total of 108 nocturnal snakes, 100 diurnal, 36 cathemeral, and 6 crepuscular. I found the highest proportion of nocturnal species (0.667) in Kyushu Island, Japan, at a latitude of 32.59^{o}. I found the highest proportion of diurnal species (0.692) was in Dadia-Lefkimi-Soufli Forest National Park, Greece, at a latitude of 41.1274^{o}. The linear model comparing the proportion of nocturnal snakes as a function of latitude resulted in a p-value of 0.0241 (Figure 2a). This model had a negative slope of -0.010208. This indicates a negative correlation between the response and explanatory variable. This means that for every one-unit decrease in latitude, the proportion of nocturnal snakes should decrease by a rate of 1.02%. This signifies that as distance from the equator increases, the proportion of nocturnal snakes per site will decrease.

The linear model comparing the proportion of cathemeral snakes as a function of latitude resulted in a p-value of 0.0492 (Figure 2b). This model had a positive slope of 0.007511, indicating a positive correlation between cathemeral snake activity and increased latitude. This estimate indicates that for every one-unit increase in latitude, the proportion of cathemeral snakes should increase by a rate of 0.75%. This means that as distance from the equator increases, the proportion of cathemeral snakes per site will increase as well.

These are the only models that resulted in a p-values indicating significant correlation between latitude and respective diel activity. The linear models comparing latitude to proportion of diurnal and crepuscular snakes resulted in the respective p-values of 0.56676, and 0.712.

Lizards

I sampled a total of 52 nocturnal lizard species, 161 diurnal, 5 cathemeral, and 9 crepuscular. I found the highest proportion of nocturnal lizards (0.571) in Crocker Range National Park, Borneo, at a latitude of 5.4008^0. I found the highest proportion of diurnal lizard species (0.94) in Sierra de Cubita, Cuba, at a latitude of 21.7361^0. Without accounting for outlier, the linear models comparing the proportion of nocturnal, diurnal, cathemeral, and crepuscular lizards resulted in the following respective p-values; 0.12476, 0.108972, 0.629, and 0.2066.

I ran an additional 4 models accounting for the outlier, Northern Kyushu Island, latitude 32.5900. In this case, with only 12 of the 13 sites being functioned, the linear model comparing the proportion of nocturnal lizards to latitude resulted in a significant p-value of 0.05020. This model had a slope of -0.0076, indicating a negative relationship between distance from the equator and nocturnal lizards. The linear model comparing the proportion of diurnal lizards to latitude resulted in a significant p-value of 0.0184. This model had a slope of 0.0083, indicating a positive relationship between distance from the equator and diurnal lizards. The linear models comparing the proportion of cathemeral and crepuscular lizards species resulted in the respective non-significant p-values of 0.890 and 0.2522.

Frogs

I sampled a total of 255 nocturnal frog species, 46 diurnal, 8 crepuscular, and 45 cathemeral. I found the highest proportion of nocturnal frogs (0.765) in Crocker Range National Park, Borneo, at a latitude of 5.4008^0. However, I also found proportions of nocturnal frogs equivalent to 0.75 at Kakadu National Park, Australia, Badlands National Park, USA, Kyushu Island, Japan, and La Selva, Costa Rica. I found the highest proportion of diurnal frogs in Dadia-Lefkimi-Soufli Forest National Park, Greece, at a latitude of 41.1274^o. The linear models comparing the proportion of nocturnal, diurnal, cathemeral, and crepuscular frogs resulted in the following respective p-values; 0.252, 0.723, 0.211, 0.795.

Turtles

I sampled a total of 5 nocturnal turtle species, 18 diurnal, 4 crepuscular, and 8 cathemeral. I found the highest proportion of nocturnal turtle species (0.667) equivalently in both Similipal National Park, India, latitude 21.8333^o, and La Selva, Costa Rica, latitude 10.4306^o. I found the highest proportion of diurnal turtle species (1.0) in both Kruger National Park, South Africa, latitude 23.9884^o, and in Manu National Park, Peru, latitude 12.0406^o. The linear models comparing the proportion of nocturnal, diurnal, cathemeral, and crepuscular turtles resulted in the following respective p-values; 0.662, 0.7274, 0.758, and 0.0753.

Salamanders

I sampled a total of 20 nocturnal salamander species, 2 diurnal, and 4 cathemeral. I did not find any crepuscular salamander species. I found the highest proportion of nocturnal salamander species (1.0) at Badlands National Park, USA, latitude 43.8554^o, La Selva, Costa Rica, latitude 10.4306^o, and Dadia-Lefkimi-Soufli Forest National Park, Greece, at a latitude of 41.1274^o. I found the highest proportion of diurnal salamanders (0.5) at Manu National Park, Peru, latitude 12.0406^o. The linear models comparing the proportion of nocturnal, diurnal, and cathemeral salamanders resulted in the following respective p-values; 0.5117, 0.2632, 0.7312.

		Snake		Lizards		Frogs		Turtles		Salamanders	
Site	Latitude	**Highest proportion diurnal**	**Highest proportion nocturnal**	**Highest proportion diurnal**	**Highest proportion nocturnal**	**Highest proportion diurnal**	**Highest proportion nocturnal**	**Highest proportion diurnal**	**Highest proportion nocturnal**	**Highest proportion diurnal**	**Highest proportion nocturnal**
Borneo: Crocker Range National Park	5.6922				*		*				
Costa Rica: La Selva	10.4306								*		*
Peru: Manu National Park	12.0406							*		*	
Australia: Kakadu National Park	13.0923										
Madagascar: Marojejey National Park	14.4413										
Cuba: Sierra de Cubitas	21.7361			*							
India: Similipal Biosphere Reserve	21.8333								*		
Kruger National Park	23.9884							*			
Japan: Northern Kyushu Island	32.59		*								
Coastal Dunes, Buenos Aires Province, Argentina	35.3446										
Greece: DadiaLefkimiSoufli Forest National Park	41.1274	*				*					*
USA: Cuyahoga Valley National Park	41.2808										
Badlands National Park	43.6225										*

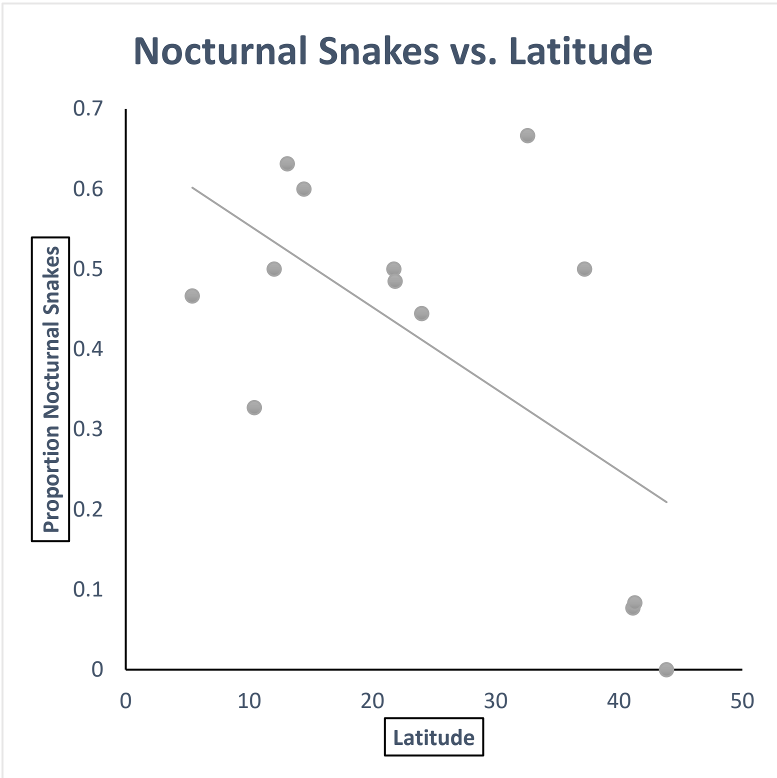
Table 1. The highest proportions (*) of diurnal and nocturnal species across all thirteen sites.

Table 2a. Statistical results of 19 models run without outlier exclusion. Model column describes which variable was being compared to absolute latitude. Significant results denoted "*"

Model	P-Value	R^2	Slope
Nocturnal lizards	0.12476	0.128	-0.0064
Diurnal lizards	0.10897	0.1454	-0.0701
Cathemeral Lizards	0.629	-0.0669	0.0004
Crepuscular Lizards	0.2066	0.0626	-0.0009
Nocturnal snakes	0.0241*	0.3269	-0.0102
Diurnal snakes	0.56676	0.5668	0.00209
Cathemeral snakes	0.0492*	0.2447	0.0075
Crepuscular snakes	0.712	0.7118	0.0006
Nocturnal frogs	0.252	0.03708	-0.0044
Diurnal frogs	0.723	-0.0779	0.0007
Cathemeral frogs	0.211	0.0596	0.00302
Crepuscular frogs	0.795	-0.0839	-0.0002
Nocturnal turtles	0.662	-0.0967	-0.00315
Diurnal turtles	0.7274	-0.107	-0.0029
Cathemeral turtles	0.0758	-0.1109	-0.0027
Crepuscular turtles	0.0753	0.2607	0.00883
Nocturnal salamanders	0.5117	-0.1068	0.0046
Diurnal salamanders	0.263	0.1215	-0.0071
Cathemeral salamanders	0.731	-0.209	0.00119

Table 2b. Statistical results of the 4 models run comparing proportions of diel lizard activity against 12 of the 13 sites, forfeiting Northern Kyushu Island as an outlier. Model column describes which variable was being compared to absolute latitude. Significant results denoted "*"

Model	**P-Value**	**R^2**	**Slope**
Nocturnal lizards	0.0502	0.2644	-0.0076
Diurnal lizards	0.0184	0.3856	-0.1001
Cathemeral lizards	0.890	-0.0977	-0.0165
Crepuscular lizards	0.2552	0.04154	-0.009



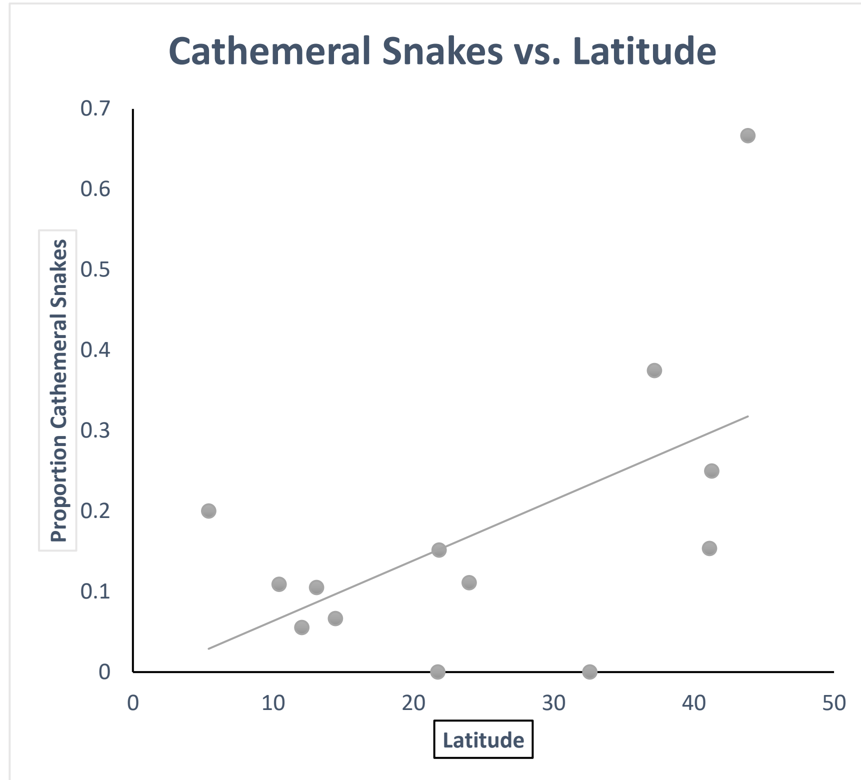


Figure 2a-b. Plot of linear model comparing proportion nocturnal snake species to absolute latitude values (left); p-value= 0.0241, and slope= -0.010208.

Plot of linear model comparing proportion cathemeral snake species to absolute latitude values (right); p-value =0.0492, and slope = 0.007511.

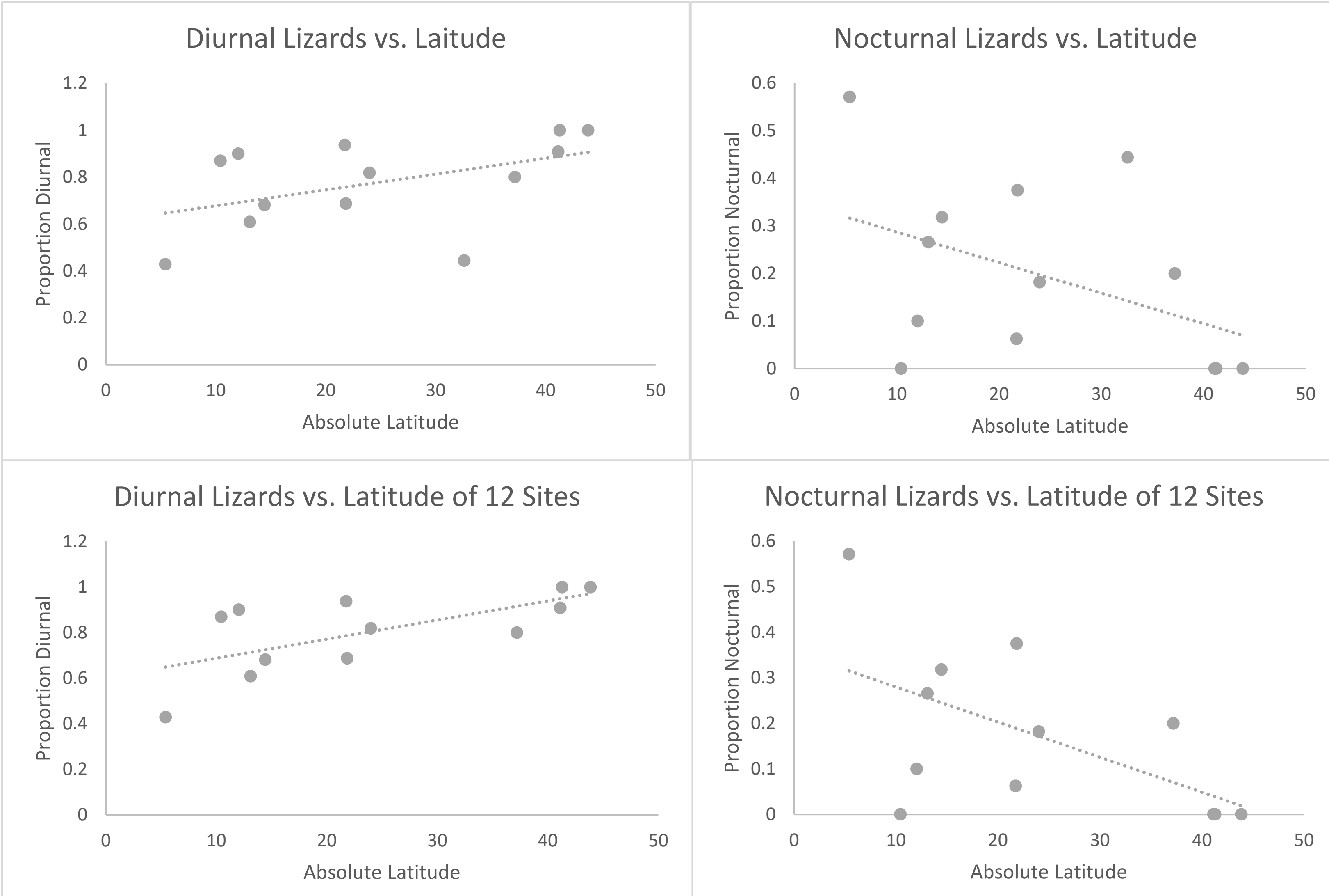
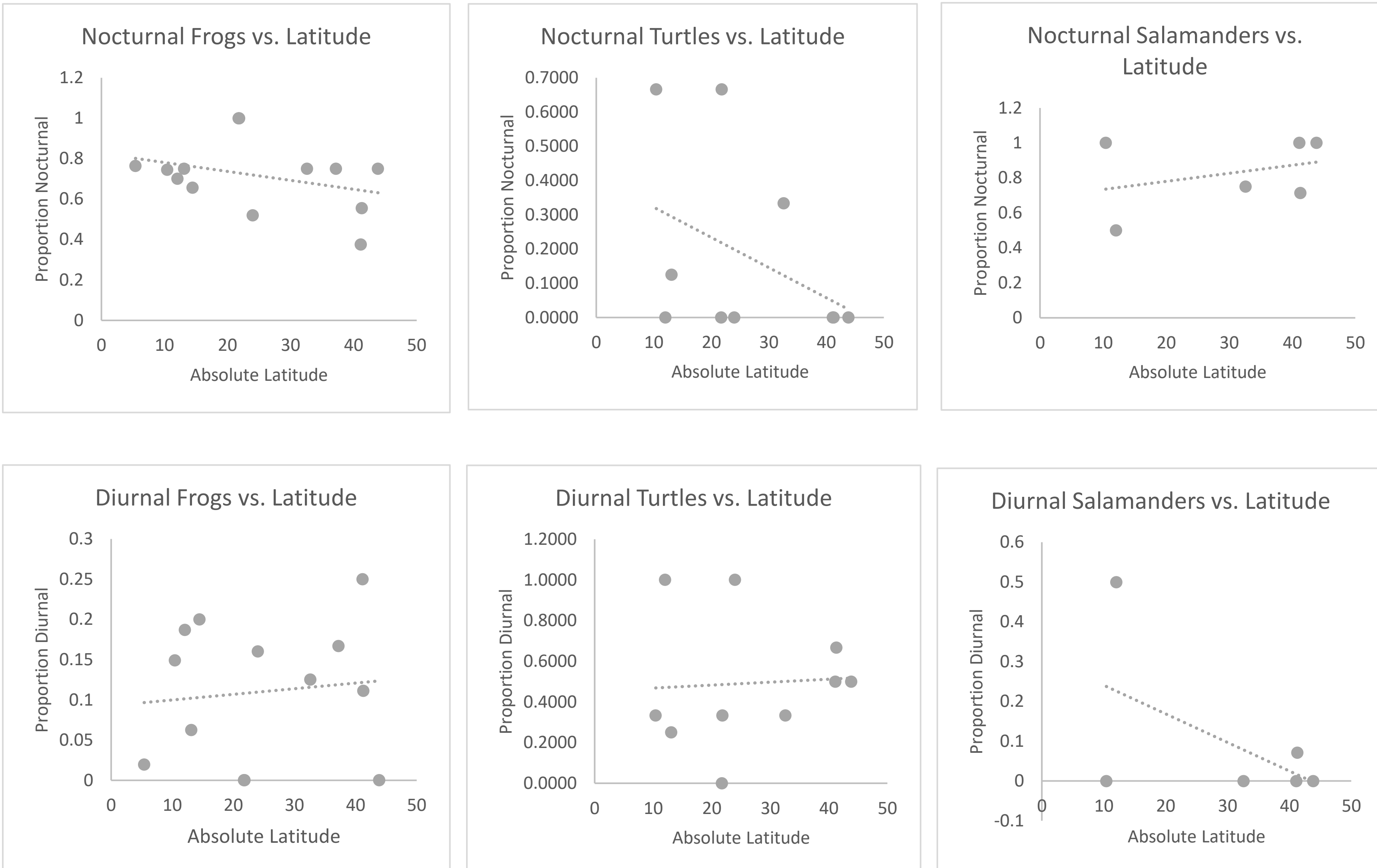


Figure 2c-f. Top left, linear model of diurnal lizards vs. all 13 sites. Top right, linear model of nocturnal lizards vs. all 13 sites. Bottom left, diurnal lizards vs. 12 sites (Kyushu removed). Bottom right, linear model of nocturnal lizards vs. 12 sites (Kyushu removed).



Figures 2g-l. Top left- bottom right; the linear models comparing nocturnal and diurnal diel activity patterns to latitude, for the frog, turtle, and salamander groups.

DISCUSSION

Of the 19 models comparing latitude to diel activity patterns, only two showed any significance; the proportion of nocturnal snakes and the proportion of cathemeral snakes. The model comparing the proportion of nocturnal snakes to latitude showed a negative relationship between nocturnality and increased latitude. The model comparing the proportion of cathemeral snakes to latitude showed a positive relationship between cathemeral activity and increased latitude.

However, of the 4 models comparing latitude to lizard diel activity patterns *after* removing Northern Kyushu Island as an outlier, additional significant patterns emerged. The model comparing the proportion of nocturnal lizards showed negative relationship between nocturnality and increased latitude. The model comparing the proportion of diurnal lizards to latitude showed a positive correlation between diurnality and increased latitude.

These results match the predications I made before beginning this study, which were based temperature intensity and variability throughout daytime and nighttime across latitudes. The higher proportion of nocturnal snakes and lizards seen at the equator, is possibly due to these temperature patterns. As ectotherms, reptiles are at risk of either overheating or overcooling when exposed to temperatures outside their set-point range ((Costanzo 1988, Brown and Shine 2002, Pough et al. 2004, Webb et al. 2004). At the equator, nighttime temperatures or both relatively constant, and relatively warm. This may explain why there is selection for nocturnal reptile species at lower latitudes (Cowles 1940, Brattstrom 1965, Webb et al. 2004, Anderson et al. 2005). The model results I found in this study, suggesting that nocturnal snake species should decrease with increased distance from the equator, follow this logic. Similarly, it makes sense for model estimates to project that cathemeral species should increase with increased distance from the equator. As temperature becomes more variable, species may have an adaptive advantage if they can display flexibility in their diel patterns (Hill 2006).

An interesting pattern seen in the data is that of the snake, frog, and salamander species, the highest proportion of diurnal species were all located at the site in Greece, latitude 41.1274°. This is a temperate environment, located in the Western Palearctic. It is unclear if there is a statistical significance correlating diurnal activity to this location. The next closest latitude (41.2808°), located at Cuyahoga National Park, USA did not follow this trend; this location did not contain any of the highest proportions of diurnal species. So, it is unclear if the high proportions of diurnal species seen in Greece is coincidental, or due to some explanatory variable (i.e., altitude, annual precipitation, annual temperature) not explored in this study. Future analysis incorporating these elements may be able to infer further conclusions. Additionally, analysis done across a larger sampling distribution would be beneficial. Increasing species diel activity data to include information from a wider range of sites might allow for more powerful statistical analysis.

CONCLUSION

While there have been numerous studies showing the effects of various aspects of the environment, such as temperature (Sperry et al. 2013), weather (Brown and Shine 2002), and humidity (Costanzo 1988), on species distribution and behavior, there has been almost no research done concerning biogeographic location on diel activity. Except for a single study analyzing the effects of biogeography on mammal activity (Bennie et al. 2012), there is a complete lack of information regarding this topic with respect to tetrapods. This study has shown that latitude may predict diel behavior of snakes and lizard, but not other groups.

Understanding that diel activity patterns may shift as a function of latitude allows us to make inferences about species adaptive characteristics. Given that nocturnality is so highly conserved across most tetrapod lineages(Anderson and Wiens 2017, Bennie et al. 2012), patterns in diurnality versus nocturnality across latitudinal gradients suggest that species may have evolved different diel behaviors as adaptive strategies. This inference is supported by the idea that niches may be prescribed by the diel behavior of species (Albrecht and Gotelli 2001, Bennie et al. 2012). The temporal niche is an understudied concept in ecology, and much remains to be discovered concerning its effect on animal behavior. This study provides a small glimpse into how biogeography relates to diel activity patterns, but it is likely that with future research even more patterns will come to light.

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APPENDIX A: TABLES OF PROPORTIONS OF DIEL ACTIVITY ACROSS SITES

Table 1. Proportion of diel activity patterns for snake species across all thirteen sites. (* indicates highest value)

Site	Absolute Latitude	Proportion Cathemeral	Proportion Crepuscular	Proportion Diurnal	Proportion Nocturnal	Total
Borneo: Crocker Range National Park	5.6922	0.2	0	0.33	0.47	30
Costa Rica: La Selva	10.4306	0.11	0	0.56	0.33	55
Peru: Manu National Park	12.0406	0.06	0	0.44	0.5	18
Australia: Kakadu National Park	13.0923	0.11	0.05	0.21	0.63	38
Madagascar: Marojejey National Park	14.4413	0.07	0	0.33	0.6	15
Cuba: Sierra de Cubitas	21.7361	0	0.25*	0.25	0.5	4
India: Similipal Biosphere Reserve	21.8333	0.15	0.03	0.33	0.48	33
Kruger National Park	23.9884	0.11	0	0.44	0.44	9
Japan: Northern Kyushu Island	32.59	0	0	0.33	0.67*	9
Coastal Dunes, Buenos Aires Province, Argentina	35.3446	0.38	0	0.13	0.5	8
Greece: DadiaLefkimiSoufli Forest National Park	41.1274	0.15	0.08	0.69*	0.08	13
USA: Cuyahoga Valley National Park	41.2808	0.25	0.08	0.58	0.08	12
USA: Badlands National Park	43.6225	0.67*	0	0.33	0	6

Table 2. Proportion of diel activity patterns for lizard species across all thirteen sites. (* indicates highest value)						
Site	Absolute Latitude	Proportion Cathemeral	Proportion Crepuscular	Proportion Diurnal	Proportion Nocturnal	Total
Borneo: Crocker Range National Park	5.6922	0	0	0.43	0.57*	7
Costa Rica: La Selva	10.4306	0.09	0.04	0.87	0	23
Peru: Manu National Park	12.0406	0	0	0.9	0.1	10
Australia: Kakadu National Park	13.0923	0.02	0.11*	0.61	0.27	64
Madagascar: Marojejey National Park	14.4413	0	0	0.68	0.32	44
Cuba: Sierra de Cubitas	21.7361	0	0	0.94*	0.06	16
India: Similipal Biosphere Reserve	21.8333	0	0.06	0.69	0.38	0
Kruger National Park	23.9884	0	0	0.82	0.18	0
Japan: Northern Kyushu Island	32.59	0.11*	0	0.44	0.44	9
Coastal Dunes, Buenos Aires Province, Argentina	35.3446	0	0	0.8	0.2	10
Greece: DadiaLefkimiSoufli Forest National Park	41.1274	0.09	0	0.91	0	11
USA: Cuyahoga Valley National Park	41.2808	0	0	1	0	2
USA: Badlands National Park	43.6225	0	0	1	0	1

Table 3. Proportion of diel activity patterns for frog species across all thirteen sites. (* indicates highest value)						
Site	Absolute Latitude	Proportion Cathemeral	Proportion Crepuscular	Proportion Diurnal	Proportion Nocturnal	Total
Borneo: Crocker Range National Park	5.6922	0.17	0.04	0.02	0.76*	51
Costa Rica: La Selva	10.4306	0.11	0	0.15	0.74	47
Peru: Manu National Park	12.0406	0.11	0	0.19	0.7	107
Australia: Kakadu National Park	13.0923	0.12	0.06	0.06	0.75	16
Madagascar: Marojejey National Park	14.4413	0.06	0.09	0.2	0.66	25
Cuba: Sierra de Cubitas	21.7361	0	0	0	1	12
India: Similipal Biosphere Reserve	21.8333	0	0	0	1	20
Kruger National Park	23.9884	0.28*	0.04	0.16	0.52	25
Japan: Northern Kyushu Island	32.59	0.13	0	0.125	0.75	8
Coastal Dunes, Buenos Aires Province, Argentina	35.3446	0.08	0	0.17	0.75	12
Greece: DadiaLefkimiSoufli Forest National Park	41.1274	0.38	0	0.25*	0.38	8
USA: Cuyahoga Valley National Park	41.2808	0.11	0.11*	0.11	0.56	9
USA: Badlands National Park	43.6225	0.25	0	0	0.75	4

Table 4. Proportion of diel activity patterns for turtle species across ten of the thirteen sites. (* indicates highest value)

Site	Absolute Latitude	Proportion Cathemeral	Proportion Crepuscular	Proportion Diurnal	Proportion Nocturnal	Total
Costa Rica: La Selva	10.4306	0.00	0.00	0.33	0.67*	3
Peru: Manu National Park	12.0406	0.00	0.00	1.00*	0.00	1
Australia: Kakadu National Park	13.0923	0.63	0.00	0.25	0.13	8
Cuba: Sierra de Cubitas	21.7361	1.00*	0.00	0.00	0.00	1
India: Similipal Biosphere Reserve	21.8333	0.00	0.00	0.33	0.67*	3
Kruger National Park	23.9884	0.00	0.00	1.00*	0.00	4
Japan: Northern Kyushu Island	32.59	0.33	0.00	0.33	0.33	3
Greece: DadiaLefkimiSoufli Forest National Park	41.1274	0.00	0.50*	0.50	0.00	2
USA: Cuyahoga Valley National Park	41.2808	0.11	0.22	0.67	0.00	9
USA: Badlands National Park	43.6225	0.00	0.50	0.50	0.00	2

Table 5. Proportion of diel activity patterns for salamander species across six of the thirteen sites.. (* indicates highest value)

Site	Absolute Latitude	Proportion Cathemeral	Proportion Crepuscular	Proportion Diurnal	Proportion Nocturnal	Total
Costa Rica: La Selva	10.4306	0	0	0	1*	3
Peru: Manu National Park	12.0406	0	0	0.5*	0.5	2
Japan: Northern Kyushu Island	32.59	0.25*	0	0	0.75	4
Greece: Dadia-Lefkimi-Soufli Forest National Park	41.1274	0	0	0	1*	2
USA: Cuyahoga Valley National Park	41.2808	0.21	0	0.07	0.71	14
USA: Badlands National Park	43.6225	0	0	0	1*	1

Absolute Latitude	Species	Diel	Diel Source	List Source
41.1274	Ablepharus kitaibelii	DIU	79	8
23.9884	Acanthocercus atricollis	DIU	129	11
13.0923	Acanthophis praelongus	CAT	80	17
32.59	Achalinus rufescens	NOC	57	6
32.59	Achalinus spinalis	NOC	176	7
13.0923	Acrochordus arafurae	NOC	7	17
13.0923	Acrochordus granulatus	NOC	119	17
5.6922	Aeluroscalabotes felinus	NOC	50	3
23.9884	Afrixalus aureus	DIU	3	10
10.4306	Agalychnis callidryas	NOC	3	13
10.4306	Agalychnis saltator	NOC	78	13
21.8333	Ahaetulla nasuta	DIU	172	4
5.6922	Ahaetulla prasina	DIU	79	3
12.0406	Allobates alessandroi	DIU	3	2
12.0406	Allobates conspicuus	DIU	145	2
12.0406	Allobates femoralis	DIU	145	2
12.0406	Allobates trilineatus	DIU	145	2
14.4413	Alluaudina bellyi	NOC	53	12
12.0406	Alopoglossus angulatus	DIU	140	2
12.0406	Alopoglossus buckleyi	DIU	140	2
21.7361	Alsophis cantherigerus schwartzi	CRE	141	9
10.4306	Amastridium veliferum	CAT	94	13
12.0406	Amazophrynella minuta	DIU	3	2
41.2808	Ambystoma jeffersonianum	CAT	3	15
41.2808	Ambystoma maculatum	NOC	3	15
41.2808	Ambystoma opacum	CAT	3	15
41.2808	Ambystoma texanum	NOC	3	15
43.6225	Ambystoma tigrinum	NOC	3	14
41.2808	Ambystoma tigrinum	NOC	3	15
12.0406	Ameerega hahneli	DIU	3	2
12.0406	Ameerega macero	DIU	3	2
12.0406	Ameerega picta	DIU	3	2
12.0406	Ameerega simulans	DIU	3	2
12.0406	Ameerega trivittata	DIU	3	2
21.7361	Ameiva auberi llanensis	DIU	140	9
10.4306	Ameiva festiva	DIU	140	13
10.4306	Ameiva quadrilineata	DIU	140	13
5.6922	Amphiesma flavifrons	CAT	100	3
5.6922	Amphiesma saravacense	DIU	33	3
21.8333	Amphiesma stolatum	DIU	172	4
14.4413	Amphiglossus macrocercus	NOC	52	12
14.4413	Amphiglossus melanopleura	DIU	5	12
14.4413	Amphiglossus melanurus	NOC	52	12
14.4413	Amphiglossus minutus	NOC	5	12
14.4413	Amphiglossus ornaticeps	NOC	52	12
14.4413	Amphiglossus punctatus	DIU	52	12
35.3446	Amphisbaena angustifrons	NOC	161	16
35.3446	Amphisbaena darwini	NOC	38	16

43.6225	Anaxyrus cognatus	NOC	3	14
32.59	Andrias japonicus	NOC	57	6
41.1274	Anguis fragilis	DIU	99	8
21.7361	Anolis allisoni	DIU	142	9
21.7361	Anolis allogus	DIU	142	9
21.7361	Anolis alutaceus	DIU	142	9
21.7361	Anolis angusticeps angusticeps	DIU	142	9
21.7361	Anolis centralis	DIU	142	9
21.7361	Anolis jubar jubar	DIU	142	9
21.7361	Anolis lucius	DIU	142	9
21.7361	Anolis ophiolepis	DIU	142	9
21.7361	Anolis porcatus	DIU	142	9
21.7361	Anolis sagrei	DIU	137	9
21.7361	Anolis thomasi	DIU	142	9
5.6922	Ansonia hanitschi	CAT	86	3
5.6922	Ansonia leptopus	NOC	34	3
5.6922	Ansonia longidigita	NOC	34	3
5.6922	Ansonia spinulifer	NOC	34	3
13.0923	Antaresia childreni	NOC	29	17
21.7361	Antillophis andreai	DIU	142	9
21.8333	Argyrogena fasciolata	DIU	110	4
23.9884	Arthroleptis stenodactylus	CRE	3	10
13.0923	Aspidites melanocephalus	NOC	28	17
5.6922	Asthenodipsas laevis	NOC	33	3
5.6922	Asthenodipsas malaccanus	NOC	33	3
12.0406	Atelopus erythropus	DIU	3	2
12.0406	Atelopus tricolor	CAT	3	2
32.59	Ateuchosaurus pellopleurus	CAT	57	7
21.8333	Atretium schistosum	DIU	172	4
10.4306	Basiliscus plumifrons	DIU	31	13
10.4306	Basiliscus vittatus	DIU	94	13
23.9884	Bitis arietans	NOC	153	11
14.4413	Blaesodactylus antongilensis	NOC	53	12
10.4306	Boa constrictor	NOC	94	13
21.8333	Boiga foresteni	NOC	110	4
13.0923	Boiga irregularis	NOC	28	17
21.8333	Boiga trigonata	NOC	110	4
12.0406	Bolitoglossa altamazonica	DIU	3	2
10.4306	Bolitoglossa colonnea	NOC	140	13
41.1274	Bombina bombina	DIU	3	8
41.1274	Bombina variegata	DIU	68	8
14.4413	Boophis albilabris	NOC	52	12
14.4413	Boophis anjanaharibeensis	NOC	136	12
14.4413	Boophis boehmei	NOC	136	12
14.4413	Boophis brachychir	NOC	136	12
14.4413	Boophis englaenderi	NOC	136	12
14.4413	Boophis madagascariensis	DIU	52	12
14.4413	Boophis mandraka	NOC	136	12
14.4413	Boophis marojezensis	NOC	136	12

14.4413	Boophis rappiodes	NOC	136	12
14.4413	Boophis rappiodes	NOC	136	12
14.4413	Boophis reticulatus	NOC	136	12
14.4413	Boophis septentrionalis	NOC	136	12
14.4413	Boophis sibilans	NOC	136	12
14.4413	Boophis tephraeomystax	NOC	52	12
10.4306	Bothriechis schlegelii	NOC	94	13
35.3446	Bothrops alternatus	NOC	138	16
35.3446	Bothrops ammodytoides	CAT	96	16
10.4306	Bothrops asper	NOC	140	13
12.0406	Bothrops atrox	NOC	118	2
23.9884	Breviceps adspersus adspersus	NOC	77	10
23.9884	Breviceps mossambicus	NOC	51	10
5.6922	Bronchocela cristatella	DIU	33	3
14.4413	Brookesia betschi	DIU	41	12
14.4413	Brookesia griveaudi	DIU	41	12
14.4413	Brookesia karchei	DIU	41	12
14.4413	Brookesia minima	DIU	41	12
14.4413	Brookesia stumpffi	DIU	41	12
14.4413	Brookesia therezieni	DIU	41	12
14.4413	Brookesia vadoni	DIU	41	12
32.59	Buergeria buergeri	CAT	57	6
41.2808	Bufo americanus	CRE	67, 3	15
5.6922	Bufo asper	NOC	3	3
23.9884	Bufo garmani	NOC	51	10
23.9884	Bufo gutturalis	DIU	11	10
32.59	Bufo japonicus	NOC	82	7
23.9884	Bufo maculatus	CAT	11	10
23.9884	Bufo rangeri	CAT	23	10
21.8333	Bungarus caeruleus	NOC	110	4
21.8333	Bungarus fasciatus	NOC	172	4
23.9884	Cacosternum boettgeri	CAT	153	10
12.0406	Caiman crocodilus	NOC	44	2
10.4306	Caiman crocodilus	NOC	44	13
5.6922	Calamaria leucogaster	CAT	100	3
5.6922	Calamaria suluensis	CAT	100	3
5.6922	Calliophis intestinalis	NOC	33	3
21.8333	Calotes versicolor	DIU	179	4
14.4413	Calumma boettgeri	DIU	41	12
14.4413	Calumma cf. brevicornis	DIU	41	12
14.4413	Calumma cf. gastrotaenia	DIU	41	12
14.4413	Calumma cf. malthe	DIU	41	12
14.4413	Calumma cucullata	DIU	41	12
14.4413	Calumma gastrotaenia	DIU	41	12
14.4413	Calumma guillaumeti	DIU	41	12
14.4413	Calumma nasuta	DIU	41	12
14.4413	Calumma peyrierasi	DIU	41	12
13.0923	Caretta caretta	CAT	159	17
13.0923	Carettochelys insculpta	CAT	36	17

13.0923	Carlia amax	DIU	81	17
13.0923	Carlia gracilis	DIU	158	17
13.0923	Carlia rufilatus	DIU	158	17
13.0923	Carlia triacantha	DIU	158	17
10.4306	Celestus hylaius	CAT	140	13
12.0406	Centrolene sabini	NOC	132	2
10.4306	Centrolenella granulosa	NOC	140	13
10.4306	Centrolenella prosoblepon	NOC	140	13
10.4306	Centrolenella pulverata	NOC	133	13
10.4306	Centrolenella spinosa	NOC	133	13
10.4306	Centrolenella valerioi	NOC	133	13
12.0406	Ceratophrys cornuta	NOC	42	2
35.3446	Ceratoprhys ornata	NOC	162	1
13.0923	Cerberus rynchops	NOC	173	17
12.0406	Cercosaura argulus	DIU	141	2
12.0406	Cercosaura ocellata	DIU	141	2
35.3446	Cercosaura schreibersii	DIU	141	16
23.9884	Chamaeleo dilepis	DIU	70	11
21.8333	Chamaeleo zeylanicus	DIU	110	4
5.6922	Chaperina fusca	NOC	32	3
13.0923	Chelodina rugosa	DIU	59	17
13.0923	Chelodina rugosa	NOC	88	17
13.0923	Chelonia mydas	CAT	143	17
43.6225	Chelydra serpentina	CRE	148	14
41.2808	Chelydra serpentina	CRE	148	15
12.0406	Chiasmocleis bassleri	NOC	3	2
12.0406	Chiasmocleis ventrimaculata	NOC	3	2
21.8333	Chiromantis sp.	NOC	25	4
23.9884	Chiromantis xerampelina	NOC	25	10
10.4306	Chironius grandisquamis	DIU	140	13
43.6225	Chrysemys picta	DIU	67	14
41.2808	Chrysemys picta	DIU	67	15
21.8333	Chrysopelea ornata	DIU	172	4
12.0406	Clelia clelia	CAT	94	2
10.4306	Clelia clelia	CAT	94	13
35.3446	Clelia rustica	NOC	6	16
41.2808	Clemmys guttata	DIU	67	15
35.3446	Cnemidophorus longicaudus	DIU	12	16
5.6922	Coelognathus flavolineatus	DIU	100	3
21.8333	Coelognathus helena	CAT	94	4
21.8333	Coelognathus radiatus	DIU	172	4
41.1274	Coluber caspius	DIU	8	8
43.6225	Coluber constrictor	DIU	18	14
41.2808	Coluber constrictor	DIU	18	15
41.1274	Coluber najadum	DIU	8	8
10.4306	Coniophanes fissidens	DIU	140	13
10.4306	Corallus annulatus	NOC	45	13
12.0406	Corallus hortulanus	NOC	44	2
41.1274	Coronella austriaca	DIU	8	8

10.4306	Corytophanes cristatus	DIU	140	13
5.6922	Cosymbotus platyurus	NOC	33	3
10.4306	Crocodylus acutus	NOC	101	13
13.0923	Crocodylus johnstoni	NOC	101	17
23.9884	Crocodylus niloticus	NOC	101	11
21.8333	Crocodylus palustris	NOC	101	4
13.0923	Crocodylus porosus	NOC	27	17
43.6225	Crotalus viridis	CAT	24	14
23.9884	Crotaphopeltis hotamboeia	NOC	48	11
10.4306	Cruziohyla calcarifer	NOC	3	13
13.0923	Cryptoblepharus megastictus	DIU	75	17
13.0923	Cryptoblepharus plagiocephalus	DIU	75	17
12.0406	Ctenophryne geayi	NOC	141	2
13.0923	Ctenotus arnhemensis	DIU	84	17
13.0923	Ctenotus borealis	DIU	84	17
13.0923	Ctenotus coggeri	DIU	84	17
13.0923	Ctenotus decaneurus	DIU	84	17
13.0923	Ctenotus essingtonii	DIU	84	17
13.0923	Ctenotus gagudji	DIU	84	17
13.0923	Ctenotus hilli	DIU	84	17
13.0923	Ctenotus inornatus	DIU	84	17
13.0923	Ctenotus kurnbudj	DIU	84	17
13.0923	Ctenotus robustus	DIU	61	17
13.0923	Ctenotus saxatilis	DIU	84	17
13.0923	Ctenotus spaldingi	DIU	84	17
13.0923	Ctenotus storri	DIU	84	17
13.0923	Ctenotus vertabralis	DIU	84	17
13.0923	Cyclorana australis	NOC	130	5
13.0923	Cyclorana longipes	NOC	30	5
32.59	Cynops pyrrhogaster	CAT	111	7
5.6922	Cyrtodactylus baluensis	NOC	33	3
5.6922	Cyrtodactylus matsuii	NOC	100	3
21.8333	Cyrtodactylus nebulosus	NOC	110	4
41.1274	Cyrtopodion kotschyi	CAT	8	8
21.8333	Daboia russelii	NOC	172	4
41.1274	Darevskia praticola	DIU	8	8
13.0923	Delma borea	NOC	103	17
13.0923	Delma tincta	DIU	50	17
13.0923	Demansia atra	DIU	144	17
13.0923	Demansia olivacea	DIU	144	17
13.0923	Demansia papuensis	DIU	154	17
13.0923	Demansia torquata	DIU	144	17
13.0923	Dendrelaphis punctulatus	DIU	49	17
21.8333	Dendrelaphis tristis	NOC	110	4
23.9884	Dendroaspis polylepis	DIU	151	11
10.4306	Dendrobates auratus	DIU	140	13
10.4306	Dendrobates pumilio	DIU	140	13
10.4306	Dendrophidion percarinatum	DIU	140	13
10.4306	Dendrophidion vinitor	DIU	140	13

12.0406	Dendropsophus acreanus	NOC	167	2
12.0406	Dendropsophus koechlini	NOC	168	2
12.0406	Dendropsophus leali	NOC	44	2
12.0406	Dendropsophus leucophyllatus	NOC	44	2
12.0406	Dendropsophus marmoratus	NOC	168	2
12.0406	**Dendropsophus minutus**	NOC	167	2
12.0406	Dendropsophus parviceps	NOC	168	2
12.0406	Dendropsophus rhodopeplus	NOC	44	2
12.0406	Dendropsophus sarayacuensis	NOC	44	2
12.0406	**Dendropsophus schubarti**	NOC	167	2
12.0406	Dendropsophus triangulum	NOC	44	2
41.2808	Desmognathus fuscus	NOC	7	15
41.2808	Diadophis punctatus	DIU	18	15
32.59	Dinodon orientale	NOC	57	7
32.59	Dinodon rufozonatum	NOC	57	6
13.0923	Diplodactylus ciliaris	NOC	125	17
13.0923	Diplodactylus conspicillatus	NOC	125	17
13.0923	Diplodactylus immaculatus	NOC	26	17
13.0923	Diplodactylus stenodactylus	NOC	125	17
10.4306	Diploglossus bilobatus	DIU	140	13
10.4306	Diploglossus monotropis	DIU	140	13
12.0406	Dipsas catesbyi	NOC	44	2
23.9884	Dispholidus typus	DIU	153	11
5.6922	Draco haematopogon	DIU	33	3
12.0406	Drepanoides anomalus	NOC	44	2
12.0406	Drymarchon corais	DIU	94	2
10.4306	Drymarchon corais	DIU	140	13
10.4306	Drymobius margaritiferus	DIU	140	13
10.4306	Drymobius melanotropis	DIU	140	13
12.0406	Drymobius rhombifer	DIU	44	2
10.4306	Drymobius rhombifer	DIU	140	13
12.0406	Drymoluber dichrous	DIU	44	2
21.8333	Duttaphrynus melanostictus	NOC	7	4
21.8333	Duttaphrynus scaber	NOC	110	4
21.8333	Duttaphrynus stomaticus	NOC	110	4
14.4413	Ebenavia inunguis	NOC	52	12
21.8333	Echis carinata	NOC	172	4
12.0406	Edalorhina perezi	CAT	141	2
13.0923	Egernia arnhemensis	DIU	29	17
35.3446	Elachistocleis bicolor	NOC	113	1
12.0406	Elachistocleis muiraquitan	DIU	167	2
32.59	Elaphe climacophora	DIU	160	7
32.59	Elaphe conspicillata	DIU	160	7
41.1274	Elaphe longissimus	DIU	8	8
41.2808	Elaphe obsoleta	DIU	37	15
32.59	Elaphe quadrivirgata	DIU	160	7
41.1274	Elaphe sauromates	DIU	8	8
41.1274	Elaphe situla	DIU	8	8
10.4306	Eleutherodactylus altae	CAT	140	13

21.7361	Eleutherodactylus atkinsi	NOC	135	9
10.4306	Eleutherodactylus biporcatus	NOC	140	13
10.4306	Eleutherodactylus bransfordii	DIU	140	13
10.4306	Eleutherodactylus caryophyllaceus	NOC	140	13
10.4306	Eleutherodactylus cerasinus	CAT	140	13
10.4306	Eleutherodactylus crassidigitus	CAT	140	13
10.4306	Eleutherodactylus cruentus	NOC	140	13
10.4306	Eleutherodactylus diastema	NOC	140	13
21.7361	Eleutherodactylus dimidiatus	NOC	40	9
21.7361	Eleutherodactylus eileenae	NOC	135	9
10.4306	Eleutherodactylus fitzingeri	CAT	140	13
10.4306	Eleutherodactylus megacephalus	NOC	140	13
10.4306	Eleutherodactylus mimus	DIU	140	13
10.4306	Eleutherodactylus noblei	DIU	140	13
21.7361	Eleutherodactylus planirostris	NOC	124	9
10.4306	Eleutherodactylus ridens	NOC	140	13
10.4306	Eleutherodactylus rugulosus	NOC	140	13
10.4306	Eleutherodactylus talamancae	NOC	140	13
21.7361	Eleutherodactylus thomasi	NOC	135	9
21.7361	Eleutherodactylus varians	NOC	135	9
21.7361	Eleutherodactylus varleyi	NOC	142	9
13.0923	Elseya dentata	CAT	170	17
13.0923	Elseya latisternum	DIU	90	17
41.2808	Emydoidea blandingii	CAT	67	15
12.0406	Engystomops freibergi	NOC	135	2
21.8333	Enhydris enhydris	CAT	110	4
13.0923	Enhydris polylepis	NOC	58	17
10.4306	Enulius sclateri	DIU	140	13
10.4306	Erythrolamprus mimus	DIU	140	13
41.1274	Eryx jaculus	NOC	8	8
21.8333	Eryx johnii	NOC	173	4
21.8333	Eublepharis hardwickii	NOC	110	4
41.2808	Eumeces fasciatus	DIU	7	15
32.59	Eumeces latiscutatus	DIU	57	7
21.8333	Euphlyctis cyanophlyctis	NOC	89	4
41.2808	Eurycea bislineata	NOC	3	15
41.2808	Eurycea longicauda	CAT	17	15
21.8333	Eutropis beddomii	CRE	110	4
21.8333	Eutropis carinata	DIU	110	4
21.8333	Eutropis macularia	DIU	110	4
5.6922	Fejervarya limnocharis	NOC	98	3
32.59	Fejervarya limnocharis	NOC	115	7
21.8333	Fejervarya syhadrensis	NOC	115	4
13.0923	Fordonia leucobalia	NOC	28	17
14.4413	Furcifer pardalis	DIU	87	12
13.0923	Furina orrnata	NOC	29	17
10.4306	Gastrophryne pictiventris	NOC	140	13
12.0406	Gastrotheca excubitor	NOC	167	2
12.0406	Gastrotheca marsupiata	NOC	146	2

12.0406	Gastrotheca nebulanastes	NOC	167	2
14.4413	Geckolepis maculata	NOC	53	12
13.0923	Gehyra australis	NOC	20	17
13.0923	Gehyra nana	NOC	29	17
13.0923	Gehyra pamela	NOC	29	17
32.59	Gekko hokouensis	NOC	116	7
32.59	Gekko japonicus	NOC	171	7
32.59	Gekko tawaensis	NOC	171	7
32.59	Gekko yakuensis	NOC	171	7
14.4413	Geodipsas boulengeri	DIU	53	12
14.4413	Geodipsas infralineata	NOC	53	12
14.4413	Geodipsas laphystia	NOC	53	12
10.4306	Geophis hoffmani	DIU	65	13
23.9884	Gerrhosaurus major	DIU	15	11
23.9884	Gerrhosaurus nigrolineatus	DIU	15	11
23.9884	Gerrhosaurus validus	DIU	76	11
13.0923	Glaphyromorphus darwiniensis	CRE	27	17
13.0923	Glaphyromorphus douglasi	CRE	107	17
13.0923	Glaphyromorphus isolepis	NOC	27	17
32.59	Gloydius blomhoffii	NOC	73	7
12.0406	Gonatodes hasemani	DIU	44	2
12.0406	Gonatodes humeralis	DIU	141	2
21.8333	Gongylophis conicus	NOC	110	4
5.6922	Gongylosoma baliodeirum	NOC	33	3
5.6922	Gongylosoma longicauda	DIU	33	3
5.6922	Gonyophis margaritatus	DIU	33	3
21.8333	Grypotyphlops acutus	NOC	110	4
10.4306	Gymnopis multiplicata	NOC	140	13
12.0406	Hamptophryne alios	NOC	167	2
12.0406	Hamptophryne boliviana	CAT	141	2
12.0406	Helicops angulatus	NOC	44	2
41.2808	Hemidactylium scutatum	NOC	17	15
21.8333	Hemidactylus brookii	NOC	110	4
21.8333	Hemidactylus flaviviridis	NOC	50	4
13.0923	Hemidactylus frenatus	NOC	94	17
21.8333	Hemidactylus frenatus	NOC	110	4
21.8333	Hemidactylus leschenaultii	NOC	110	4
12.0406	Hemiphractus helioi	NOC	3	2
12.0406	Hemiphractus scutatus	NOC	168	2
23.9884	Hemisus marmoratus marmoratus	CAT	11	10
43.6225	Heterodon nasicus	DIU	18	14
13.0923	Heteronotia binoei	NOC	29	17
13.0923	Heteronotia planiceps	NOC	29	17
23.9884	Hildebrandtia ornata ornata	NOC	23	10
23.9884	Homopholis wahlbergii	NOC	174	11
21.8333	Hoplobatrachus crassus	NOC	3	4
21.8333	Hoplobatrachus tigerinus	NOC	1	4
5.6922	Huia cavitympanum	NOC	32	3
12.0406	Hyalinobatrachium bergeri	NOC	64	2

12.0406	Hyalinobatrachium carlesvilai	NOC	64	2
10.4306	Hyalinobatrachium fleischmanni	NOC	3	13
5.6922	Hydrablabes periops	DIU	33	3
10.4306	Hydromorphus concolor	DIU	140	13
13.0923	Hydrophis hardwickii	DIU	69	17
13.0923	Hydrophis stokesii	DIU	69	17
41.1274	Hyla arborea	NOC	3	8
10.4306	Hyla ebraccata	NOC	140	13
32.59	Hyla japonica	NOC	3	7
10.4306	Hyla loquax	NOC	140	13
10.4306	Hyla phlebodes	NOC	140	13
10.4306	Hyla rufitela	NOC	140	13
41.2808	Hyla versicolor	NOC	67	15
5.6922	Hylarana luctuosa	NOC	100	3
21.8333	Hylarana malabarica	NOC	110	4
12.0406	Hyloscirtus armatus	NOC	43	2
12.0406	Hyloscirtus phyllognathus	NOC	43	2
32.59	Hynobius naevius	NOC	57	7
32.59	Hynobius nebulosus	NOC	57	6
23.9884	Hyperolius marmoratus	CAT	3	10
23.9884	Hyperolius pusillus	NOC	43	10
23.9884	Hyperolius tuberilinguis	NOC	120	10
12.0406	Hypsiboas boans	NOC	140	2
12.0406	Hypsiboas calcaratus	NOC	43	2
12.0406	Hypsiboas cinerascens	NOC	109	2
12.0406	Hypsiboas fasciatus	NOC	168	2
12.0406	Hypsiboas geographicus	NOC	44	2
12.0406	Hypsiboas gladiator	NOC	43	2
12.0406	Hypsiboas lanciformis	NOC	44	2
35.3446	Hypsiboas pulchellus	NOC	43	1
12.0406	Hypsiboas punctatus	NOC	43	2
10.4306	Iguana iguana	DIU	140	13
12.0406	Imantodes cenchoa	NOC	94	2
10.4306	Imantodes cenchoa	NOC	94	13
10.4306	Imantodes inornatus	NOC	140	13
21.8333	Indotestudo elongata	DIU	110	4
5.6922	Ingerana baluensis	NOC	32	3
5.6922	Kalophrynus heterochirus	NOC	102	3
5.6922	Kalophrynus pleurostigma	NOC	102	3
5.6922	Kalophrynus subterrestris	NOC	102	3
21.8333	Kaloua taprobanica	NOC	83	4
5.6922	Kaloula pulchra	NOC	83	3
23.9884	Kassina maculata	NOC	83	10
23.9884	Kassina senegalensis	NOC	83	10
23.9884	Kinixys spekii	DIU	66	11
10.4306	Kinosternon leucostomum	NOC	140	13
41.1274	Lacerta trilineata	DIU	157	8
41.1274	Lacerta viridis	DIU	157	8
10.4306	Lachesis muta	NOC	140	13

10.4306	Lampropeltis triangulum	CAT	46	13
43.6225	Lampropeltis triangulum	CAT	7	14
41.2808	Lampropeltis triangulum	CAT	140	15
23.9884	Lamprophis capensis	NOC	152	11
10.4306	Leimadophis epinephalus	DIU	140	13
10.4306	Lepidoblepharis xanthostigma	DIU	140	13
13.0923	Lepidochelya olivacea	CAT	106	17
10.4306	Lepidophyma flavimaculata	CRE	140	13
5.6922	Leptobrachella baluensis	CAT	100	3
5.6922	Leptobrachium montanum	CRE	100	3
12.0406	**Leptodactylus bolivianus**	NOC	167	2
12.0406	**Leptodactylus didymus**	NOC	167	2
35.3446	Leptodactylus gracilis	NOC	9	1
12.0406	**Leptodactylus knudseni**	NOC	167	2
35.3446	Leptodactylus latinasus	NOC	9	1
35.3446	Leptodactylus latrans	CAT	3	1
10.4306	Leptodactylus melanonotus	NOC	94	13
35.3446	Leptodactylus mystacinus	NOC	9	1
12.0406	Leptodactylus pentadactylus	NOC	141	2
10.4306	Leptodactylus pentadactylus	NOC	141	13
12.0406	**Leptodactylus petersii**	CAT	167	2
12.0406	Leptodactylus rhodomystax	NOC	141	2
10.4306	Leptodeira annulata	NOC	140	13
10.4306	Leptodeira septentrionalis	NOC	94	13
5.6922	Leptolalax gracilis	NOC	100	3
5.6922	Leptolalax pictus	NOC	100	3
12.0406	Leptophis ahaetulla	DIU	94	2
10.4306	Leptophis ahaetulla	DIU	94	13
10.4306	Leptophis depressirostris	DIU	140	13
10.4306	Leptophis nebulosus	DIU	140	13
13.0923	Lerista karlschmidti	CRE	84	17
13.0923	Lerista orientalis	CRE	84	17
13.0923	Lerista stylis	CRE	84	17
13.0923	Lialis burtonis	CAT	169	17
13.0923	Liasis fuscus	NOC	28	17
13.0923	Liasis olivaceous	NOC	29	17
5.6922	Limnonectes finchi	NOC	32	3
5.6922	Limnonectes ingeri	NOC	100	3
5.6922	Limnonectes kuhlii	NOC	163	3
5.6922	Limnonectes leporinus	NOC	32	3
5.6922	Limnonectes palavanensis	NOC	100	3
35.3446	Liolaemus darwinii	DIU	7	16
35.3446	Liolaemus gracilis	DIU	7	16
35.3446	Liolaemus multimaculatus	DIU	7	16
35.3446	Liolaemus wiegmanni	DIU	7	16
14.4413	Liophidium rhodogaster	DIU	53	12
35.3446	Liophis poecilogyrus	CAT	38	16
12.0406	Liophis reginae	DIU	44	2
14.4413	Liopholidophis dolicocercus	DIU	53	12

14.4413	Liopholidophis epistibes	DIU	53	12
14.4413	Liopholidophis stumpffi	DIU	53	12
43.6225	Lithobates pipiens	CAT	150	14
13.0923	Litoria bicolor	NOC	175	5
13.0923	Litoria caerulea	DIU	61	5
13.0923	Litoria coplandi	NOC	164	5
13.0923	Litoria dahlii	CAT	164, 165	5
13.0923	Litoria dorsalis microbelos	NOC	164	5
13.0923	Litoria inermis	CRE	27	5
13.0923	Litoria meiriana	CAT	164	5
13.0923	Litoria nasuta	NOC	27	5
13.0923	Litoria pallida	NOC	27	5
13.0923	Litoria personata	NOC	130	5
13.0923	Litoria rothi	NOC	30	5
13.0923	Litoria rubella	NOC	30	5
13.0923	Litoria tornieri	NOC	27	5
13.0923	Litoria wotjulumensis	NOC	27	5
13.0923	Lucasium damaeum	NOC	27	17
5.6922	Lycodon albofuscus	NOC	33	3
21.8333	Lycodon aulicus	NOC	110	4
5.6922	Lycodon effraenis	CAT	33	3
21.8333	Lycodon jara	NOC	110	4
21.8333	Lycodon striatus	NOC	110	4
5.6922	Lycodon subcinctus	NOC	33	3
23.9884	Lycophidion capense	NOC	152	11
14.4413	Lygodactylus madagascariensis	DIU	53	12
14.4413	Lygodactylus miops	DIU	21	12
35.3446	Lygophis anomalus	NOC	121	16
21.8333	Lygosoma punctata	DIU	110	4
14.4413	Mabuya gravenhorstii	DIU	53	12
10.4306	Mabuya unimarginata	DIU	140	13
23.9884	Mabuya varia	DIU	108	11
21.8333	Macropisthodon plumbicolor	NOC	110	4
41.1274	Malpolon monspessulanus	DIU	8	8
14.4413	Mantella laevigata	DIU	52	12
14.4413	Mantella madagascariensis	DIU	3	12
14.4413	Mantella manery	DIU	3	12
14.4413	Mantella nigricans	DIU	3	12
14.4413	Mantidactylus aglavei	NOC	53	12
14.4413	Mantidactylus betsileanus	CAT	53	12
14.4413	Mantidactylus biporus	DIU	53	12
14.4413	Mantidactylus charlotteae	DIU	166	12
14.4413	Mantidactylus grandidieri	NOC	53	12
14.4413	Mantidactylus lugubris	NOC	53	12
14.4413	Mantidactylus opiparis	CAT	53	12
14.4413	Mantidactylus ulcerosus	CRE	127	12
10.4306	Mastigodryas melanolomus	DIU	140	13
32.59	Mauremys japonica	DIU	160	7
41.1274	Mauremys rivulata	DIU	131	8

5.6922	Megophrys kobayashii	CRE	100	3
5.6922	Megophrys nasuta	NOC	32	3
21.8333	Melanochelys tricarinata	NOC	110	4
21.8333	Melanochelys trijuga	NOC	110	4
12.0406	Melanosuchus niger	NOC	101	2
13.0923	Menetia greyii	DIU	26	17
13.0923	Menetia greyii	DIU	27	17
5.6922	Meristogenys kinabaluensis	NOC	100	3
5.6922	Meristogenys orphnocnemis	CAT	100	3
5.6922	Meristogenys whiteheadi	NOC	100	3
5.6922	Metaphrynella sundana	NOC	100	3
5.6922	Microhyla borneensis	CAT	100	3
21.8333	Microhyla ornata	NOC	39	4
14.4413	Microscalabotes bivittis	DIU	53	12
10.4306	Micrurus alleni	CAT	65	13
10.4306	Micrurus mipartitus	CAT	95	13
10.4306	Micrurus nigrocinctus	CAT	95	13
41.1274	Montivipera xanthina	CAT	8	8
13.0923	Morelia oenpelliensis	CRE	26	17
13.0923	Morelia spilota	CRE	26	17
13.0923	Morethia ruficauda	DIU	84	17
13.0923	Morethia storri	DIU	60	17
13.0923	Myron richardsonii	NOC	140	17
21.8333	Naja kaouthia	DIU	110	4
21.8333	Naja naja	CAT	172	4
41.1274	Natrix natrix	DIU	8	8
41.1274	Natrix tessellata	DIU	8	8
41.2808	Necturus maculosus	NOC	123	15
13.0923	Nephrurus asper	NOC	19	17
41.2808	Nerodia sipedon	CAT	117	15
10.4306	Ninia maculata	DIU	140	13
10.4306	Ninia sebae	NOC	140	13
10.4306	Norops biporcatus	DIU	140	13
10.4306	Norops capito	DIU	140	13
10.4306	Norops carpenteri	DIU	140	13
10.4306	Norops humilis	DIU	140	13
10.4306	Norops lemurinus	DIU	140	13
10.4306	Norops limifrons	DIU	140	13
10.4306	Norops lionotus	DIU	105	13
10.4306	Norops pentaprion	DIU	140	13
10.4306	Nothopsis rugosus	DIU	140	13
41.2808	Notophthalmus viridescens	DIU	123	15
13.0923	Notoscincus ornatus	DIU	27	17
23.9884	Nucras taeniolata ornata	DIU	16	11
5.6922	Nyctixalus pictus	NOC	32	3
12.0406	Nymphargus pluvialis	NOC	64	2
12.0406	Nymphargus truebae	NOC	64	2
5.6922	Occidozyga baluensis	CAT	100	3
35.3446	Odontophrynus americanus	NOC	55	1

10.4306	Oedipina pseudouniformis	NOC	140	13
10.4306	Oedipina uniformis	NOC	3	13
13.0923	Oedura gemmata	NOC	29	17
13.0923	Oedura marmorata	NOC	27	17
13.0923	Oedura rhombifer	NOC	26	17
21.8333	Oligodon arnensis	NOC	110	4
5.6922	Oligodon everetti	NOC	33	3
41.2808	Opheodrys vernalis	CRE	7	15
35.3446	Ophiodes vertebralis	DIU	38	16
5.6922	Ophiophagus hannah	DIU	33	3
21.8333	Ophiophagus hannah	DIU	110	4
41.1274	Ophisops elegans	DIU	8	8
21.8333	Ophisops jerdoni	DIU	110	4
12.0406	Oreobates cruralis	NOC	167	2
12.0406	Oreobates gemcare	NOC	167	2
12.0406	Oreobates granulosus	NOC	167	2
12.0406	Oreobates quixensis	NOC	141	2
12.0406	Osteocephalus buckleyi	NOC	135	2
12.0406	Osteocephalus castaneicola	NOC	135	2
12.0406	Osteocephalus leprieurii	NOC	135	2
12.0406	Osteocephalus mimeticus	NOC	135	2
12.0406	Osteocephalus taurinus	NOC	135	2
21.7361	Osteopilus septentrionalis	NOC	140	9
12.0406	Oxybelis aeneus	DIU	94	2
10.4306	Oxybelis aeneus	DIU	140	13
10.4306	Oxybelis brevirostris	DIU	140	13
10.4306	Oxybelis fulgidus	DIU	140	13
12.0406	Oxyrhopus petola	NOC	94	2
10.4306	Oxyrhopus petola	NOC	94	13
35.3446	Oxyrhopus rhombifer	NOC	38	16
13.0923	Oxyuranus scutellatus	CAT	28	17
23.9884	Pachydactylus maculates	NOC	10	11
12.0406	Paleosuchus palpebrosus	NOC	101	2
12.0406	Paleosuchus trigonatus	NOC	44	2
5.6922	Pareas nuchalis	NOC	33	3
5.6922	Parias sumatranus	NOC	33	3
14.4413	Paroedura gracilis	NOC	53	12
32.59	Pelodiscus sinensis	CAT	160	7
41.1274	Pelophylax bedriagae	CAT	3	8
41.1274	Pelophylax ridibundus	CAT	8	8
21.7361	Peltaphryne gundlachi	NOC	142	9
21.7361	Peltaphryne peltacephalus	NOC	142	9
21.7361	Peltaphryne taladai	NOC	142	9
23.9884	Pelusios sinuatus	DIU	99	11
23.9884	Pelusios subniger	DIU	99	11
14.4413	Phelsuma bimaculata	DIU	53	12
14.4413	Phelsuma guttata	DIU	53	12
14.4413	Phelsuma lineata	DIU	53	12
14.4413	Phelsuma madagascariensis	DIU	52	12

14.4413	Phelsuma pusilla	DIU	53	12
14.4413	Phelsuma quadriocellata	DIU	53	12
5.6922	Philautus aurantium	NOC	100	3
5.6922	Philautus bunitus	CAT	100	3
5.6922	Philautus hosii	NOC	100	3
5.6922	Philautus mjobergi	CAT	100	3
5.6922	Philautus petersi	CAT	100	3
21.8333	Philautus similipalensis	NOC	110	4
35.3446	Philodryas patagoniensis	DIU	38	16
23.9884	Phrynobatrachus mababiensis	CAT	152	10
23.9884	Phrynobatrachus natalensis	DIU	152	10
23.9884	Phrynomantis bifasciatus bifasciatus	NOC	153	10
10.4306	Phyllobates lugubris	DIU	140	13
12.0406	Phyllomedusa atelopoides	NOC	44	2
12.0406	Phyllomedusa bicolor	NOC	135	2
12.0406	Phyllomedusa camba	NOC	167	2
12.0406	Phyllomedusa palliata	NOC	141	2
12.0406	Phyllomedusa tomopterna	NOC	141	2
12.0406	Phyllomedusa vaillantii	NOC	141	2
12.0406	Pipa pipa	NOC	168	2
43.6225	Pituophis catenifer	CAT	18	14
14.4413	Platypelis barbouri	NOC	53	12
14.4413	Platypelis grandis	NOC	52	12
14.4413	Platypelis occultans	NOC	53	12
14.4413	Platypelis tsaratananensis	NOC	53	12
14.4413	Platypelis tuberifera	NOC	53	12
41.2808	Plethodon cinereus	NOC	123	15
41.2808	Plethodon glutinosus	NOC	3	15
14.4413	Plethodontohyla notosticta	NOC	52	12
41.1274	Podarcis erhardii	DIU	157	8
41.1274	Podarcis muralis	DIU	157	8
41.1274	Podarcis tauricus	DIU	157	8
12.0406	Podocnemis unifilis	DIU	114	2
10.4306	Polychrus guttorosus	DIU	140	13
5.6922	Polypedates leucomystax	NOC	112	3
5.6922	Polypedates macrotis	NOC	100	3
21.8333	Polypedates maculatus	NOC	89	4
21.8333	Polypedates maculatus	NOC	110	4
5.6922	Polypedates otilophus	NOC	100	3
5.6922	Popeia sabahi	NOC	33	3
10.4306	Porthidium nasutus	NOC	140	13
12.0406	Potamites ecpleopus	DIU	141	2
12.0406	Pristimantis altamazonicus	CAT	141	2
12.0406	Pristimantis buccinator	CAT	167	2
12.0406	Pristimantis carvalhoi	NOC	167	2
12.0406	Pristimantis croceoinguinis	NOC	54	2
12.0406	Pristimantis danae	NOC	167	2
12.0406	Pristimantis diadematus	NOC	168	2
12.0406	Pristimantis divne	NOC	167	2

12.0406	Pristimantis fenestratus	NOC	3	2
12.0406	Pristimantis ockendeni	CAT	141	2
12.0406	Pristimantis platydactylus	NOC	54	2
12.0406	Pristimantis skydmainos	NOC	167	2
13.0923	Proablepharus tenuis	DIU	126	17
5.6922	Psammodynastes pulverulentus	CAT	172	3
21.8333	Psammodynastes pulverulentus	DIU	110	4
21.8333	Psammophilus blanfordanus	DIU	110	4
23.9884	Psammophis mossambicus	DIU	104	11
41.2808	Pseudacris crucifer crucifer	NOC	67	15
41.2808	Pseudacris triseriata	NOC	93	15
13.0923	Pseudechis australis	CAT	28	17
41.1274	Pseudepidalea viridis	CAT	8	8
35.3446	Pseudis minuta	NOC	178	1
12.0406	Pseudogonatodes guianensis	DIU	141	2
13.0923	Pseudonaja nuchalis	CAT	29	17
41.1274	Pseudopus apodus	DIU	160	8
13.0923	Pseudothecadactylus lindneri	NOC	50	17
41.2808	Pseudotriton ruber	NOC	13	15
14.4413	Pseudoxyrhopus heterurus	NOC	53	12
14.4413	Pseudoxyrhopus microps	NOC	53	12
14.4413	Pseudoxyrhopus tritaeniatus	NOC	53	12
10.4306	Pseustes poecilonotus	DIU	140	13
12.0406	Pseustes sulphureus	DIU	44	2
12.0406	Psychrophrynella usurpator	DIU	167	2
5.6922	Ptyas fusca	DIU	100	3
21.8333	Ptyas mucosus	DIU	172	4
23.9884	Ptychadena anchietae	NOC	23	10
12.0406	Ptychoglossus brevifrontalis	DIU	44	2
13.0923	Pygopus nigriceps	CRE	28	17
21.8333	Python molurus molurus	NOC	110	4
23.9884	Python sebae	CAT	147	11
23.9884	Pyxicephalus edulis	NOC	23	10
21.8333	Ramanella variegata	NOC	110	4
21.8333	Ramphotylops braminus	CRE	110	4
32.59	Ramphotyphlops braminus	NOC	28	7
13.0923	Ramphotyphlops grypus	NOC	28	17
13.0923	Ramphotyphlops guentheri	NOC	28	17
13.0923	Ramphotyphlops ligatus	NOC	28	17
13.0923	Ramphotyphlops tovelli	NOC	28	17
13.0923	Ramphotyphlops unguirostris	NOC	28	17
13.0923	Ramphotyphlops wiedii	NOC	28	17
13.0923	Ramphotyphlops yirrikalae	NOC	28	17
21.7361	Rana catesbeiana	NOC	67	9
41.2808	Rana catesbeiana	NOC	67	15
43.6225	Rana catesbeiana	NOC	156	14
41.2808	Rana clamitans	NOC	67	15
41.1274	Rana dalmatina	NOC	97	8
5.6922	Rana erythraea	NOC	2	3

5.6922	Rana hosii	NOC	32	3
32.59	Rana japonica	DIU	57	6
32.59	Rana narina	NOC	57	6
32.59	Rana nigromaculata	NOC	74	7
41.2808	Rana palustris	CAT	67	15
41.2808	Rana pipiens	CAT	117	15
32.59	Rana rugosa	NOC	57	6
5.6922	Rana signata	NOC	32	3
41.2808	Rana sylvatica	DIU	155	15
10.4306	Rana taylori	CAT	140	13
41.1274	Rana temporaria	NOC	139	8
10.4306	Rana vaillanti	NOC	94	13
10.4306	Rana warschewitschii	DIU	140	13
41.2808	Regina septemvittata	DIU	7	15
5.6922	Rhabdophis chrysargos	CAT	100	3
5.6922	Rhabdophis conspicillatus	NOC	100	3
5.6922	Rhacophorus angulirostris	NOC	100	3
5.6922	Rhacophorus baluensis	NOC	100	3
5.6922	Rhacophorus everetti	NOC	100	3
5.6922	Rhacophorus gauni	NOC	100	3
5.6922	Rhacophorus pardalis	NOC	100	3
12.0406	Rhaebo guttatus	NOC	167	2
35.3446	Rhinella arenarum	DIU	63	1
35.3446	Rhinella fernandezae	DIU	63	1
12.0406	Rhinella inca	DIU	63	2
12.0406	Rhinella leptoscelis	DIU	63	2
12.0406	Rhinella manu	DIU	63	2
12.0406	Rhinella margaritifera	DIU	63	2
12.0406	Rhinella marina	DIU	63	2
12.0406	Rhinella poeppigii	DIU	63	2
12.0406	Rhinella veraguensis	DIU	63	2
10.4306	Rhinoclemmys annulata	DIU	140	13
10.4306	Rhinoclemmys funerea	NOC	140	13
13.0923	Rhinoplocephalus pallidiceps	NOC	28	17
21.8333	Riopa albopunctata	DIU	110	4
12.0406	Rulyrana spiculata	NOC	64	2
41.1274	Salamandra salamandra	NOC	61	8
35.3446	Salvator merianae	DIU	122	16
14.4413	Sanzinia madagascariensis	CAT	53	12
10.4306	Scaphiodontophis venustissimus	DIU	140	13
12.0406	Scarthyla goinorum	CAT	44	2
43.6225	Sceloporus undulatus	DIU	149	14
41.2808	Sceloporus undulatus	DIU	149	15
23.9884	Schismaderma carens	DIU	23, 3	10
10.4306	Scinax boulengeri	NOC	140	13
10.4306	Scinax elaeochroa	NOC	140	13
12.0406	Scinax garbei	CAT	141	2
12.0406	Scinax ictericus	NOC	167	2
35.3446	Scinax nasicus	NOC	22	1

12.0406	Scinax pedromedinae	NOC	167	2
12.0406	Scinax ruber	CAT	44	2
10.4306	Sibon annulatus	NOC	35	13
10.4306	Sibon decorata	NOC	140	13
10.4306	Sibon longifrenis	NOC	140	13
10.4306	Sibon nebulata	NOC	94	13
5.6922	Sibynophis geminatus	DIU	33	3
5.6922	Sibynophis melanocephalus	DIU	33	3
21.8333	Sibynophis sagittarius	DIU	110	4
13.0923	Simoselaps roperi	NOC	28	17
12.0406	Siphlophis cervinus	NOC	44	2
12.0406	Siphonops annulatus	NOC	141	2
41.2808	Sistrurus catenatus	DIU	7	15
21.8333	Sitana ponticeriana	DIU	110	4
10.4306	Smilisca baundinii	NOC	140	13
10.4306	Smilisca phaeota	NOC	140	13
10.4306	Smilisca puma	NOC	140	13
10.4306	Smilisca sordida	NOC	140	13
43.6225	Spea bombifrons	NOC	155	14
12.0406	Sphaenorhynchus dorisae	NOC	135	2
12.0406	Sphaenorhynchus lacteus	NOC	135	2
21.7361	Sphaerodactylus elegans	DIU	50	9
10.4306	Sphaerodactylus homolepis	DIU	140	13
10.4306	Sphaerodactylus millepunctatus	DIU	140	13
21.7361	Sphaerodactylus nigropunctatus lissodesmus	DIU	140	9
21.7361	Sphaerodactylus notatus atactus	DIU	140	9
21.8333	Sphaeroheca breviceps	NOC	110	4
21.8333	Sphaerotheca dobsonii	NOC	110	4
21.8333	Sphaerotheca rolande	NOC	110	4
10.4306	Sphenomorphus cherrei	DIU	140	13
10.4306	Spilotes pullatus	DIU	140	13
5.6922	Staurois latopalmatus	CAT	14	3
5.6922	Staurois natator	NOC	32	3
5.6922	Staurois tuberilinguis	DIU	100	3
13.0923	Stegonotus cucullatus	NOC	47	17
14.4413	Stenopgis betsileanus	NOC	53	12
14.4413	Stenophis arctifasciatus	NOC	53	12
14.4413	Stenophis gaimardi	NOC	53	12
41.2808	Sternotherus odoratus	CRE	148	15
23.9884	Stigmochelys pardalis	DIU	71	11
5.6922	Stoliczkia borneensis	NOC	33	3
41.2808	Storeria dekayi	NOC	7	15
41.2808	Storeria occipitomaculata	CAT	7	15
12.0406	Strabomantis sulcatus	CAT	167	2
14.4413	Stumpffia grandis	NOC	4	12
14.4413	Stumpffia roseifemoralis	CRE	53	12
14.4413	Stumpffia tridactyla	CRE	53	12
13.0923	Suta punctatus	NOC	28	17

12.0406	Syncope antenori	CAT	167	2
32.59	Takydromus smaragdinus	DIU	57	6
32.59	Takydromus tachydromoides	DIU	57	7
21.7361	Tarentola americana	NOC	142	9
41.1274	Telescopus fallax	CRE	8	8
12.0406	Teratohyla midas	NOC	64	2
41.2808	Terrapene carolina	DIU	7	15
41.1274	Testudo graeca	CRE	8	8
35.3446	Thamnodynastes hypoconia	CAT	38	16
43.6225	Thamnophis radix	CAT	78	14
41.2808	Thamnophis sauritus	DIU	7	15
41.2808	Thamnophis sirtalis	DIU	7	15
10.4306	Thecadactylus rapicauda	CAT	140	13
12.0406	Thecadactylus solimoensis	NOC	85	2
23.9884	Thelotornis capensis capensis	DIU	153	11
13.0923	Tiliqua scincoides	DIU	28	17
23.9884	Tomopterna cryptotis	NOC	152	10
21.7361	Trachemys decussata	CAT	142	9
41.2808	Trachemys scripta	DIU	56	15
41.2808	Trachemys scripta elegans	DIU	56	15
12.0406	Trachycephalus coriaceus	NOC	168	2
12.0406	Trachycephalus resinifictrix	NOC	72	2
12.0406	Trachycephalus venulosus	NOC	94	2
23.9884	Trachylepis quinquetaeniata	DIU	92	11
23.9884	Trachylepsis striata	DIU	134	11
10.4306	Tretanorhinus nigroluteus	NOC	140	13
5.6922	Trimeresurus borneensis	NOC	33	3
21.8333	Trimerusurus gramineus	CAT	110	4
41.2808	Trionyx spiniferus	DIU	7	15
41.1274	Triturus karelinii	NOC	3	8
5.6922	Tropidolaemus wagleri	NOC	100	3
13.0923	Tropidonophus mairii	DIU	47	17
21.7361	Tropidophis pilsbryi	NOC	142	9
5.6922	Tropidophorus mocquardii	DIU	33	3
21.7361	Typhlops lumbricalis	NOC	142	9
10.4306	Ungaliophis panamensis	NOC	140	13
21.8333	Uperodon globulosus	NOC	110	4
21.8333	Uperodon systoma	NOC	110	4
14.4413	Uroplatus alluaudi	NOC	128	12
14.4413	Uroplatus ebenaui	NOC	128	12
14.4413	Uroplatus fimbriatus	NOC	128	12
14.4413	Uroplatus henkeli	NOC	52	12
14.4413	Uroplatus lineatus	NOC	128	12
14.4413	Uroplatus sikorae	NOC	128	12
10.4306	Urotheca decipiens	DIU	140	13
10.4306	Urotheca euryzonus	DIU	140	13
10.4306	Urotheca guentheri	DIU	140	13
13.0923	Varanus baritji	DIU	91	17
21.8333	Varanus bengalensis	DIU	62	4

21.8333	Varanus flavescens	DIU	62	4
13.0923	Varanus glauerti	DIU	90	17
13.0923	Varanus glebopalma	CRE	28	17
13.0923	Varanus gouldii	DIU	90	17
13.0923	Varanus indicus	DIU	28	17
13.0923	Varanus mertensi	DIU	90	17
13.0923	Varanus mitchelli	DIU	90	17
13.0923	Varanus panoptes	DIU	90	17
13.0923	Varanus primordius	DIU	90	17
13.0923	Varanus scalaris	DIU	90	17
13.0923	Varanus tristis	DIU	90	17
13.0923	Vermicella multifasciata	NOC	29	17
41.1274	Vipera ammodytes	CAT	8	8
21.8333	Xenochrophis piscator	CAT	110	4
10.4306	Xenodon rabdocephalus	DIU	140	13
12.0406	Xenopholis scalaris	NOC	44	2
23.9884	Xenopus muelleri	CAT	11	10
12.0406	Xenoxybelis boulengeri	DIU	44	2
14.4413	Zonosaurus rufipes	DIU	53	12
32.59	Zootoca vivipara	DIU	57	6

APPENDIX C: SOURCES OF DIEL ACTIVTY

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Appendix D: Sources of Species Lists

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