El papel de la ecología de la conducta en la conservación

Alejandro Rodrigo

ARod

ANIMAL BEHAVIORIST

No obstante la *República*, de Platón, o la *Utopía*, de Tomás Moro, todos sabemos que el mundo ideal no existe y la relación entre ecólogos de la conducta y los encargados de la conservación de las especies dista mucho de serlo. Prueba de ello es la escasa asistencia de ecólogos conductuales en los congresos relacionados con la biología de la conservación y la prácticamente nula asistencia a los congresos de ecología de la conducta de los especialistas en conservación (Caro, 2007). ¿A qué se debe este distanciamiento? Los ecólogos conductuales critican severamente el poco interés que perciben por parte de los especialistas en conservación por desarrollar un marco teórico que evite el tener que solucionar cada problema de conservación como si fuera un caso único. Por su parte, los especialistas en conservación suelen ignorar las sugerencias de los ecólogos conductuales con el argumento de "falta de practicidad" y en muchos casos no les falta la razón. A veces los ecólogos conduc-

González-Zuarth, 2015

https://www.aljazeera.com/news/2021/7/2/mexico-water-supply-buckles-on-worsening-drought-crops-at-risk


https://earth.org/mexico-wildfires/

https://earthobservatory.nasa.gov/images/148270/widespread-drought-in-mexico

https://www.nytimes.com/2020/09/15/climate/biodiversity-united-nations-report.html?smid=url-share


https://www.cbsnews.com/news/climate-change-polar-bears-extinct-by-2100/

https://www.nationalgeographic.com/animals/article/vaquita-the-porpoise-familys-smallest-member-nears-extinction


https://www.worldwildlife.org/species/jaguar


http://todochiapas.mx/chiapas/el-pavon-ave-emblematica-de-chiapas/16627


http://www.edgeofexistence.org/species/bairds-tapir/


https://www.nationalgeographic.es/animales/ajolote

More than 40,000 species
are threatened with extinction

That is still 28% of all assessed species.

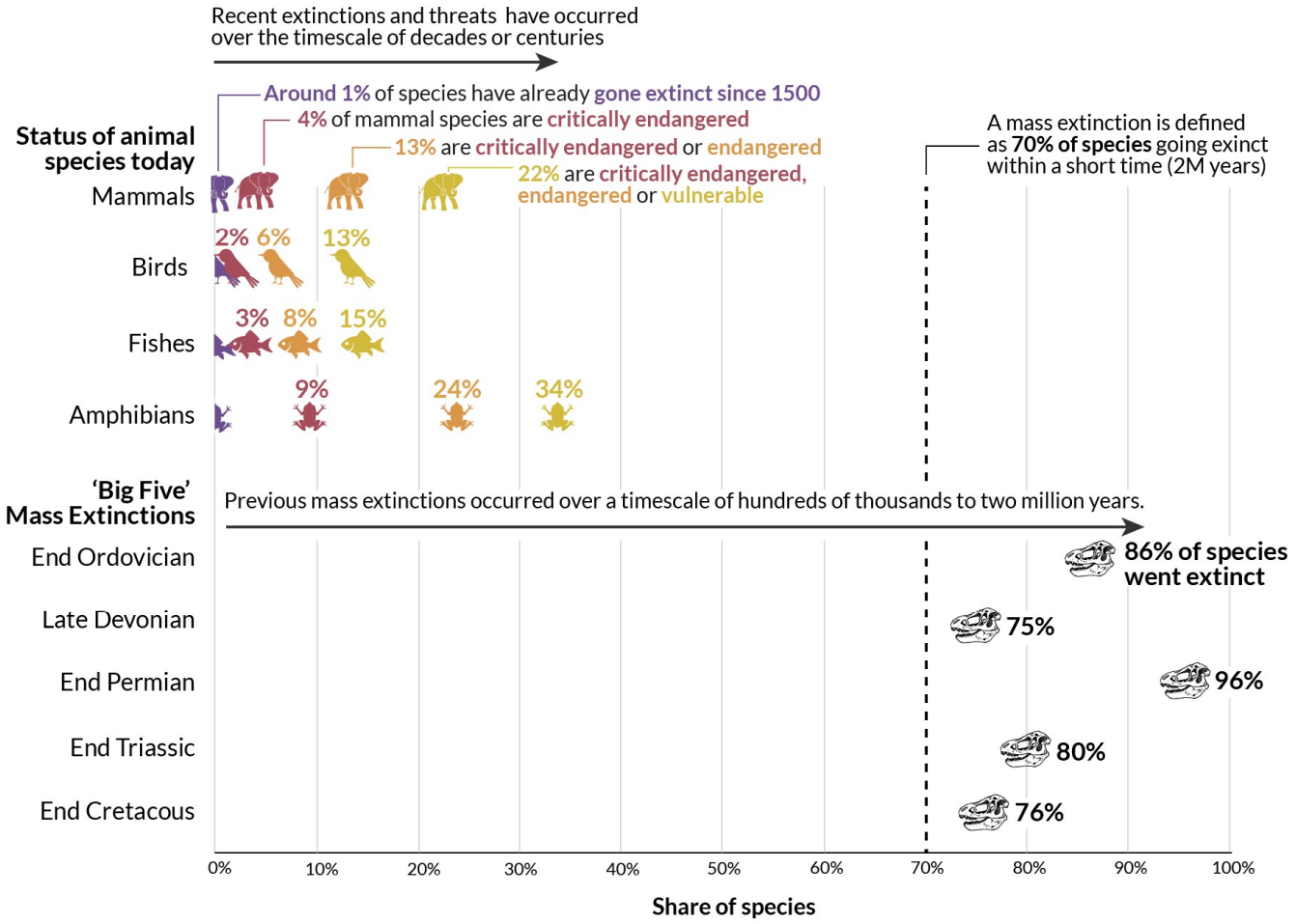
AMPHIBIANS	MAMMALS	CONIFERS	BIRDS	SHARKS & RAYS	REEF CORALS	SELECTED CRUSTACEANS
41%	26%	34%	13%	37%	33%	28%

REPTILES	CYCADS
21%	63%

How far are we from a sixth mass extinction?

Our World in Data

Shown is the share of assessed animal species that have gone extinct or are threatened with extinction today, relative to the share of species that went extinct in previous mass extinction events.
This is only shown for species in vertebrate groups where more than 80% of known species have been assessed for their extinction risk.



Data Sources: Barnosky et al. (2011). Has the Earth's sixth mass extinction already arrived? *Nature*. Threatened species from IUCN Red List (2021). Images sourced from Noun Project.

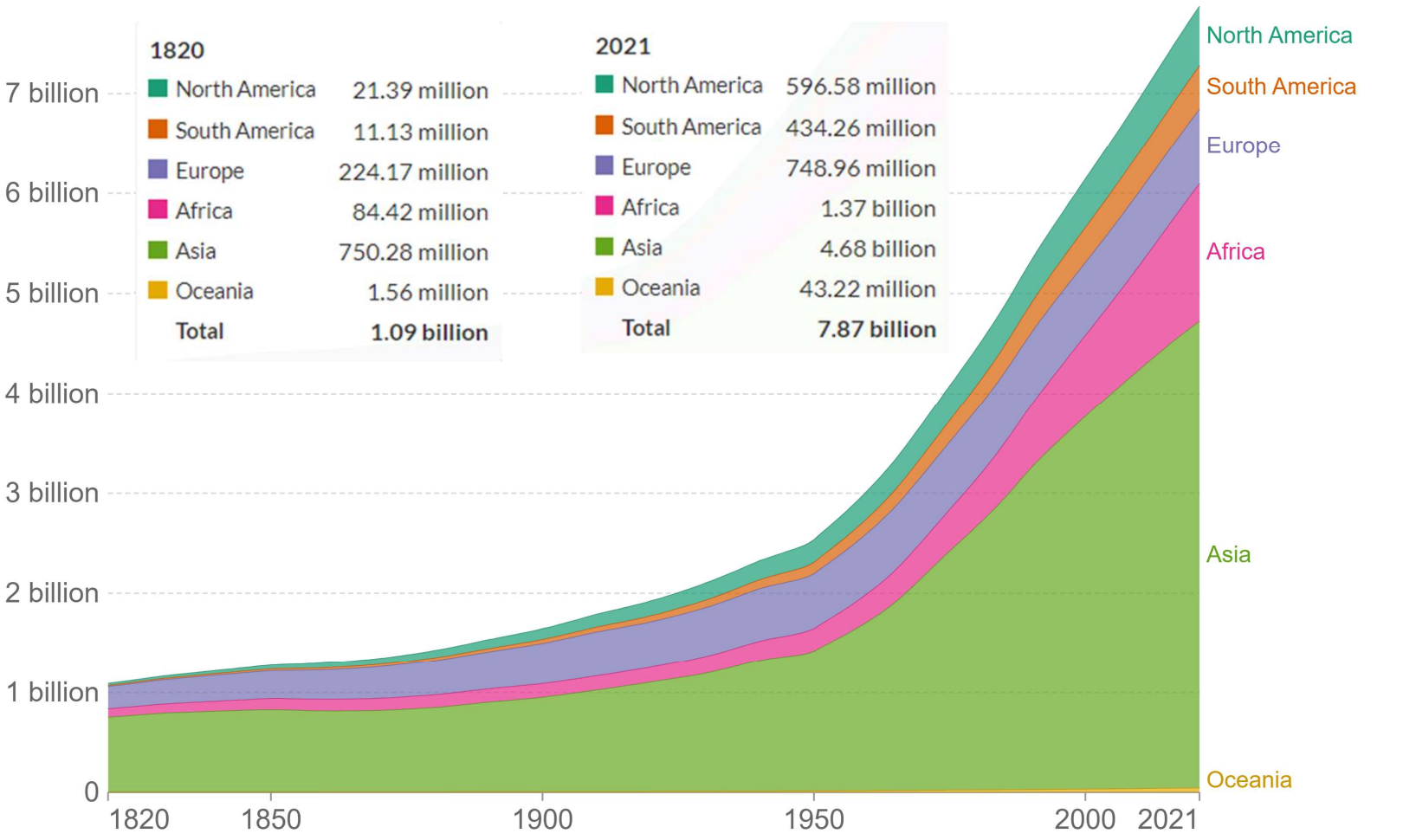

WE'RE ALL
GONNA DIE
memegenerator.net

Y como podemos ayudar?


NO SE ACERQUE
NO SE ACERQUE
NO SE ACERQUE

https://www.nationalgeographic.com/environment/article/carbon-capture-trees-atmosphere-climate-change

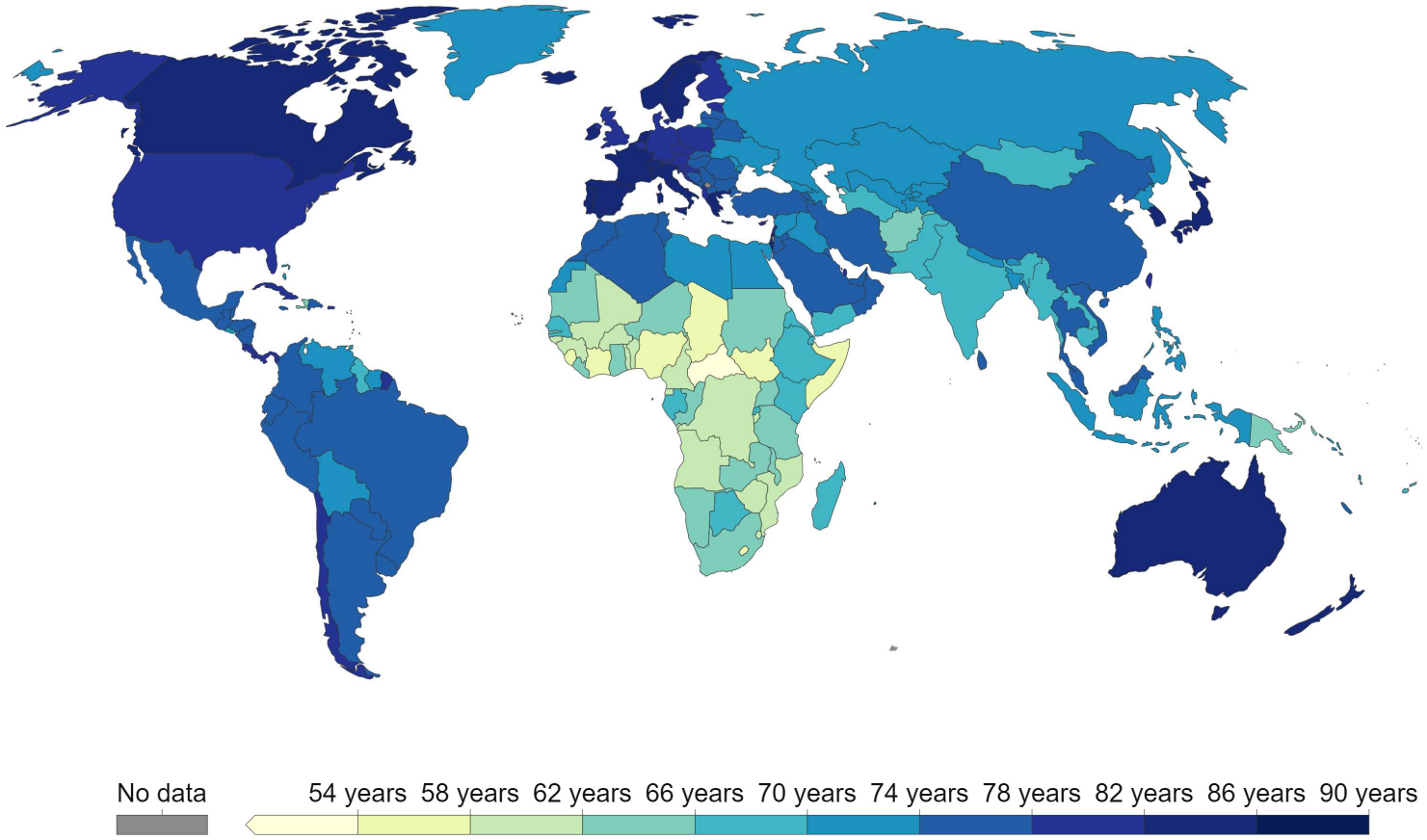
World population by region



Source: Gapminder (v6), HYDE (v3.2), UN (2019)

Life expectancy, 2019

Our World in Data



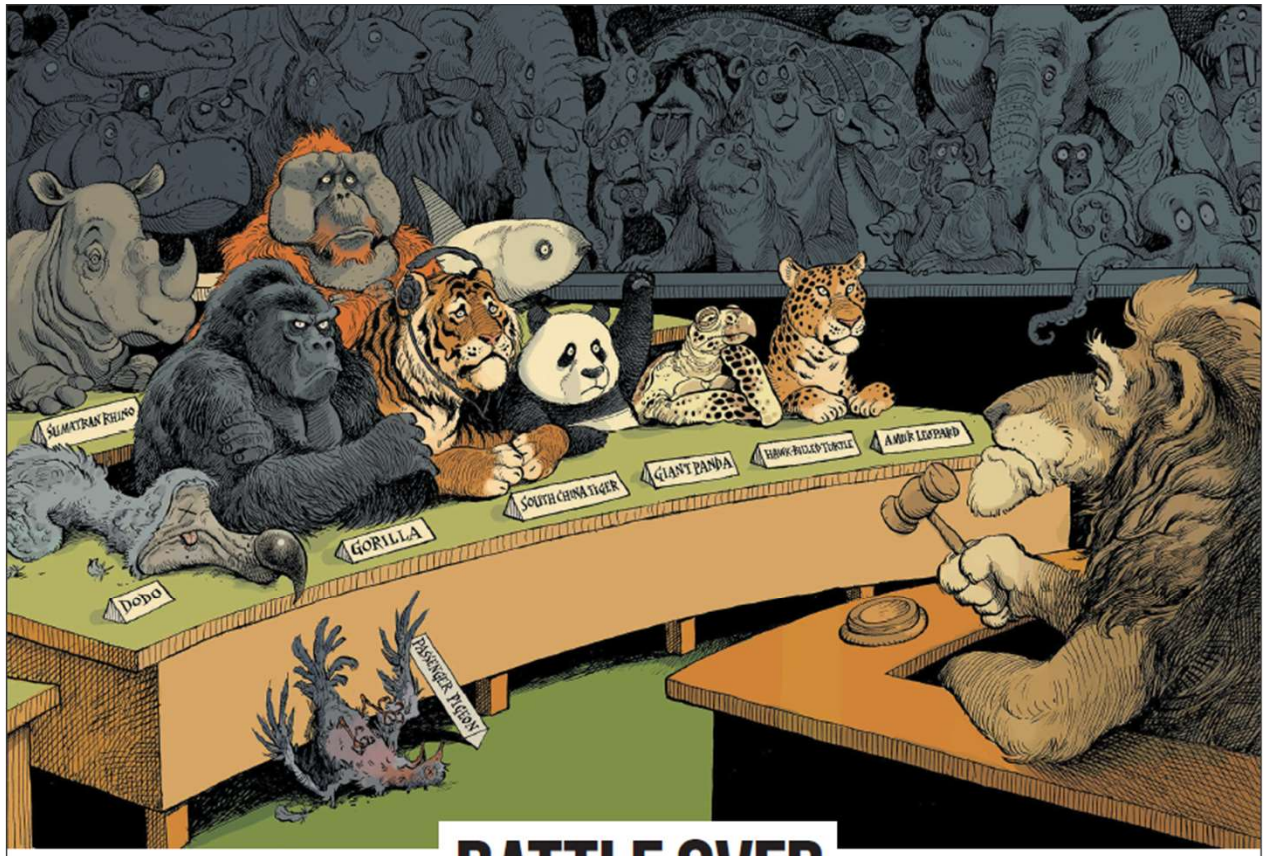
Source: Riley (2005), Clio Infra (2015), and UN Population Division (2019)
OurWorldInData.org/life-expectancy • CC BY
Note: Shown is period life expectancy at birth, the average number of years a newborn would live if the pattern of mortality in the given year were to stay the same throughout its life.


https://www.nbcnews.com/id/wbna28777897

IPBES-IPCC CO-SPONSORED WORKSHOP

BIODIVERSITY AND CLIMATE CHANGE

Scientific outcome



BATTLE OVER BIODIVERSITY

An ideological clash could undermine a crucial assessment of the world's disappearing plant and animal life.

Promover el bienestar animal a traves de su estudio

Reversal of environmental conditions in adult Wistar rats

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[1] Centro de Estudios e Investigaciones en Comportamiento, Universidad de Guadalajara

*rodrigo.gutierrezt@alumno.udg.mx

Question

- The present research aims to investigate how reversing between conditions can affect the exploratory behavior of male Wistar rats using the open field test.

Methods

GROUP (PND 25)	Test 1	Reversal	Test 2
SOC n=9	OFT1	SOC-SOC	OFT2
EE n=9	OFT1	EE-ISO	OFT2
ISO n=9	OFT1	ISO-EE	OFT2
Test day (PND)	94	121	190

Isolated group

Individually housed

Physical objects included:

Water Dispenser

Cage Dimensions:

33 cm long x 23 cm width x 15 cm height.

Volume: 11 385 cm^3

Area: 2 358 cm^2

Animal density:

Volume: 11 385 cm^3/subject

Area: 2 358 cm^2/subject

Social group

Socially housed: 9 conspecifics

Physical objects included:

8 fixed wall mounted feeders

4 water dispenser (one x corner)

Cage Dimensions:

80 cm long x 80 cm width x 50 cm height.

Volume: 320 000 cm^3

Area: 20 800 cm^2

Animal density:

Volume: 35 555 $\mathrm{cm}^3/\mathrm{subject}$

Area: 2 311 $\mathrm{cm}^2/\mathrm{subject}$

Enriched Group

Socially housed: 9 conspecifics

Physical objects included: (rotated)

- 2 Running wheels
- 6 platforms/bridges
- 12 wooden chews
- Swings, ropes and chains
- H-shape pipes
- E-shape pipes
- U-shape pipes
- 6 water dispensers

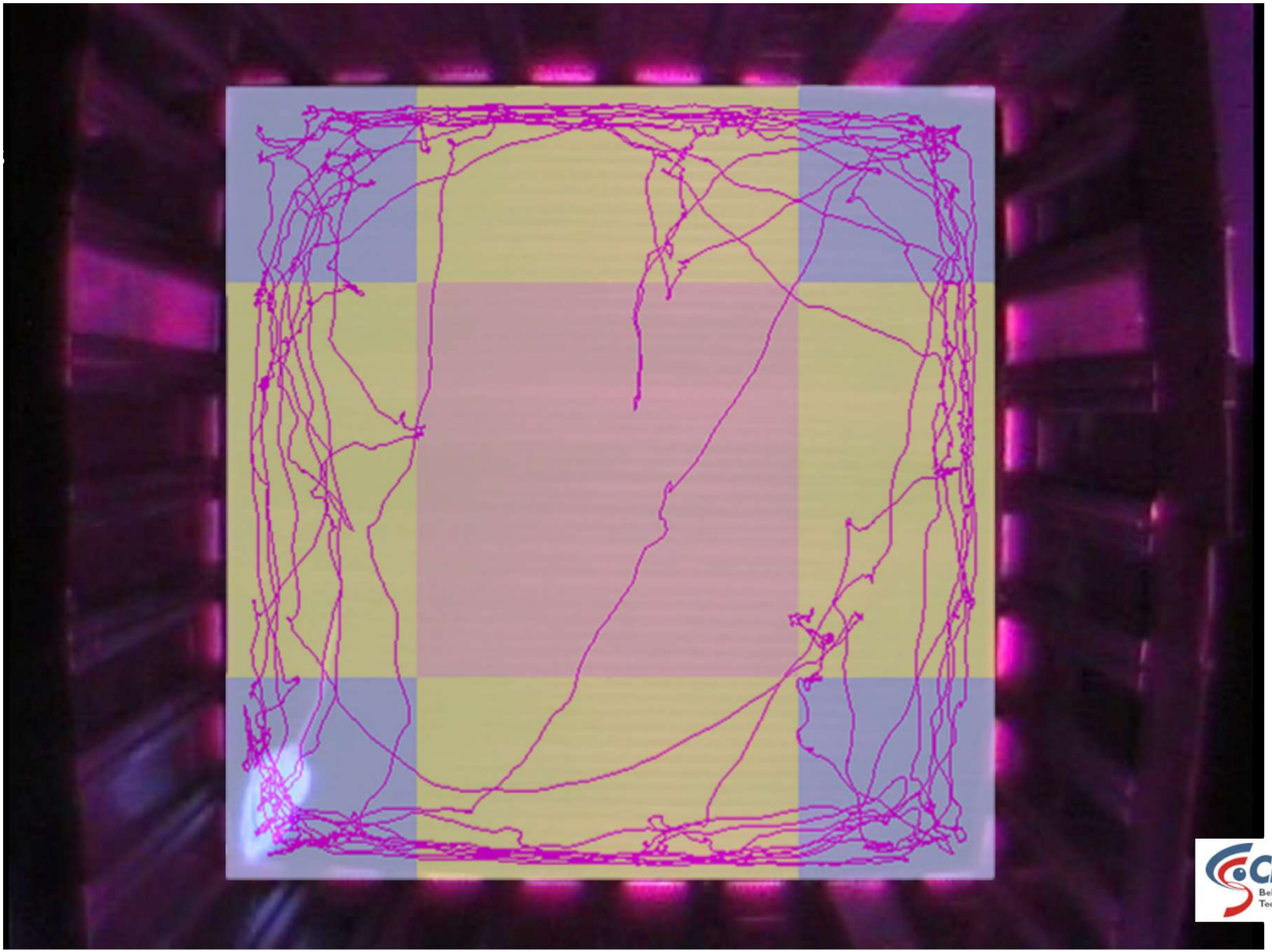
Cage Dimensions:

80 cm long x 80 cm width x 150 cm height.

- *Volume*: 960 000 cm^3
- *Area*: 36 800 cm^2

Animal density:

- *Volume*: 106 666 cm^3/subject
- *Area*: 4 088 cm^2/subject

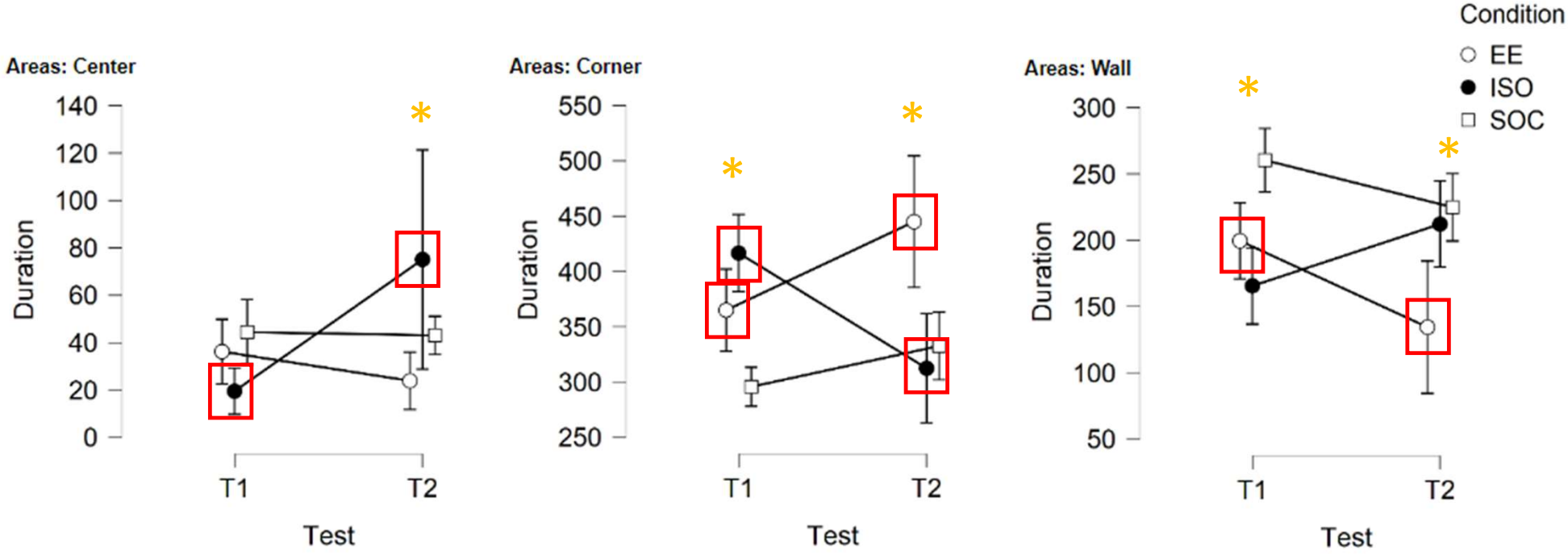

CleverSys
Behavior Recognition
Technology of Next Generation

TIME SPENT PER AREA

ANOVA - Duration

Cases	Sum of Squares	df	Mean Square	F	p	η^2	η^2_p
Condition	32.310	2	16.155	0.009	0.991	9.877e −6	1.253e −4
Test	1.001	1	1.001	5.551e −4	0.981	3.060e −7	3.882e −6
Areas	2.748e +6	2	1.374e +6	761.935	< .001	0.840	0.914
Condition ✻ Test	29.335	2	14.667	0.008	0.992	8.968e −6	1.137e −4
Condition ✻ Areas	131737.402	4	32934.350	18.260	< .001	0.040	0.338
Test ✻ Areas	7402.347	2	3701.173	2.052	0.132	0.002	0.028
Condition ✻ Test ✻ Areas	125617.362	4	31404.341	17.412	< .001	0.038	0.328
Residuals	257915.983	143	1803.608				

Note. Type II Sum of Squares

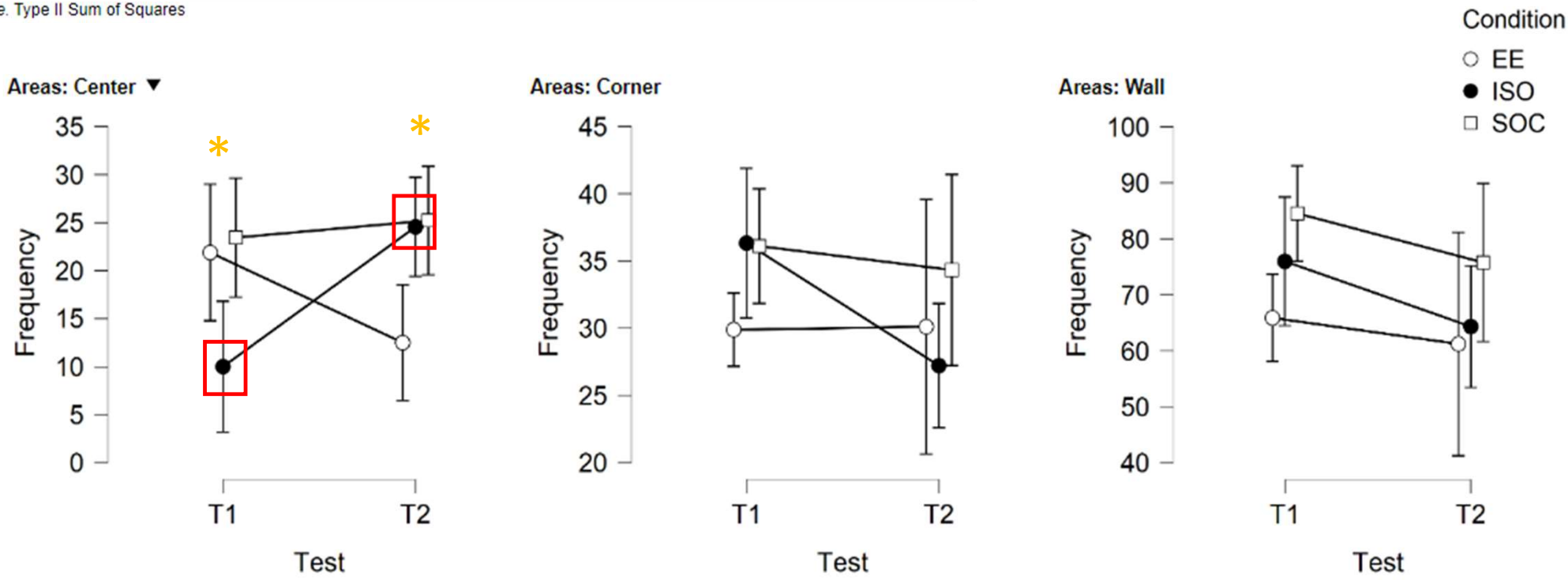


NUMBER OF CROSSINGS

ANOVA - Frequency

Cases	Sum of Squares	df	Mean Square	F	p	η^2	η_p^2
Condition	2609.670	2	1304.835	9.707	< .001	0.025	0.120
Test	402.540	1	402.540	2.994	0.086	0.004	0.021
Areas	77838.057	2	38919.028	289.514	< .001	0.754	0.802
Condition ✻ Test	37.036	2	18.518	0.138	0.871	3.589e −4	0.002
Condition ✻ Areas	729.991	4	182.498	1.358	0.252	0.007	0.037
Test ✻ Areas	796.023	2	398.012	2.961	0.055	0.008	0.040
Condition ✻ Test ✻ Areas	1546.638	4	386.659	2.876	0.025	0.015	0.074
Residuals	19223.333	143	134.429				

Note. Type II Sum of Squares

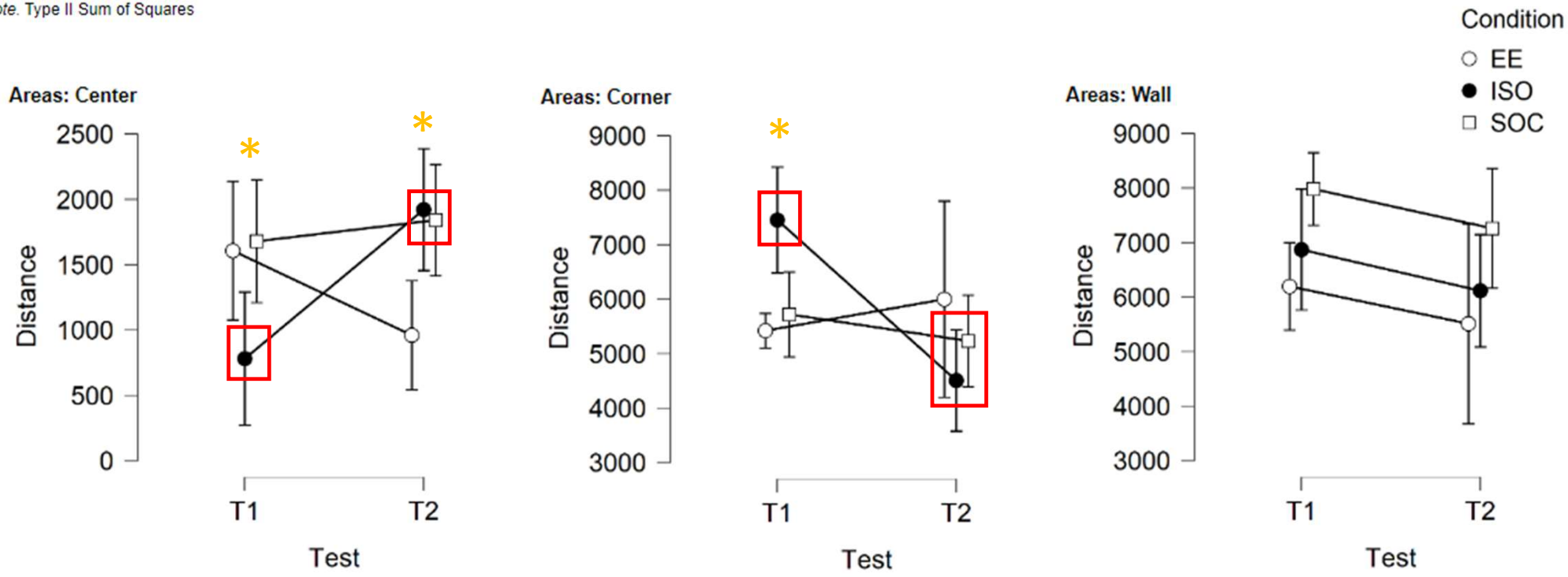


DISTANCE TRAVELED

ANOVA - Distance

Cases	Sum of Squares	df	Mean Square	F	p	η^2	η^2_p
Condition	1.182e +7	2	5.908e +6	3.977	0.021	0.011	0.053
Test	9.408e +6	1	9.408e +6	6.332	0.013	0.008	0.042
Areas	8.165e +8	2	4.083e +8	274.803	< .001	0.730	0.794
Condition ✻ Test	2.952e +6	2	1.476e +6	0.993	0.373	0.003	0.014
Condition ✻ Areas	2.154e +7	4	5.385e +6	3.625	0.008	0.019	0.092
Test ✻ Areas	1.066e +7	2	5.328e +6	3.586	0.030	0.010	0.048
Condition ✻ Test ✻ Areas	3.346e +7	4	8.365e +6	5.630	< .001	0.030	0.136
Residuals	2.125e +8	143	1.486e +6				

Note. Type II Sum of Squares



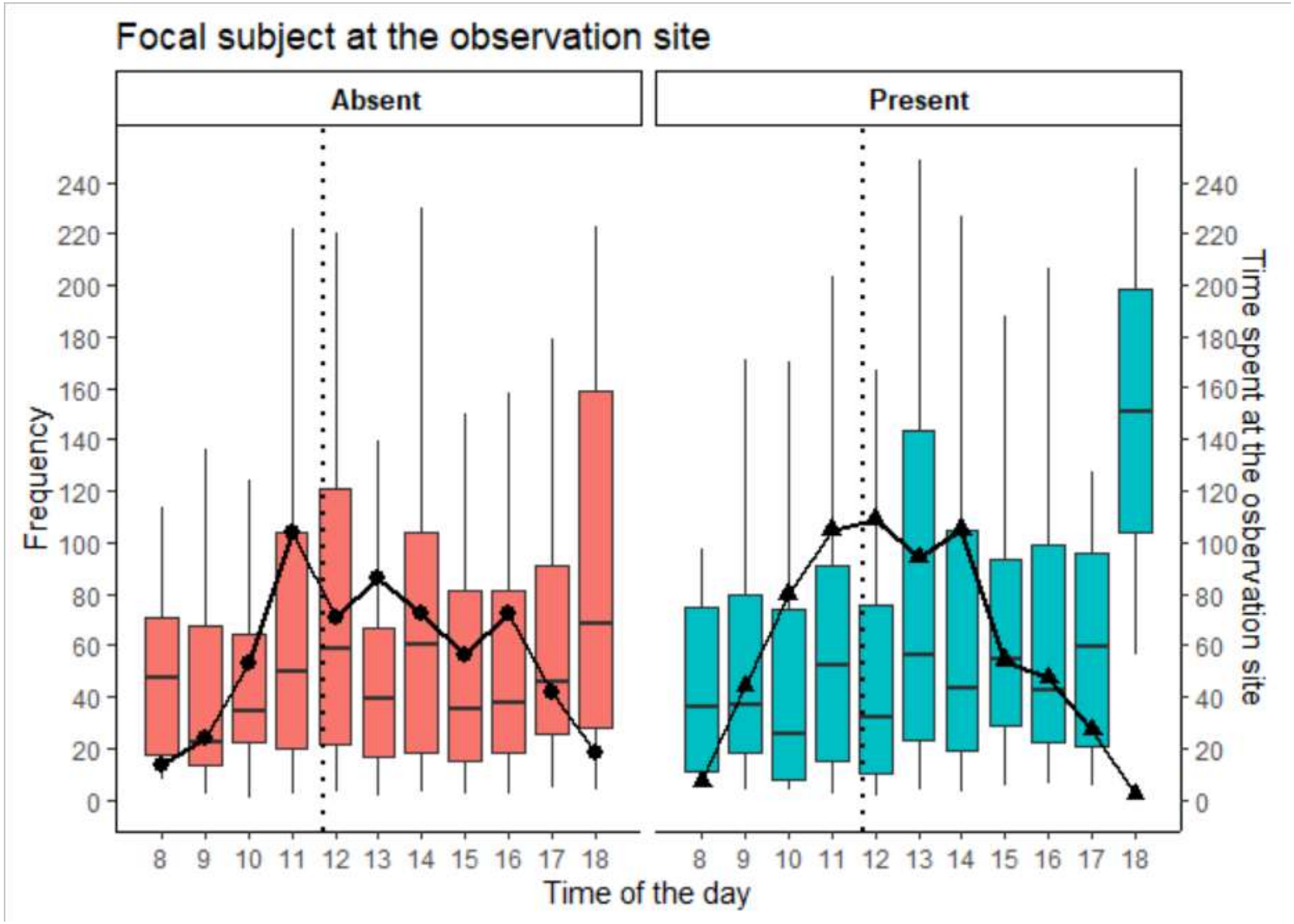
Estudiando la naturaleza urbana

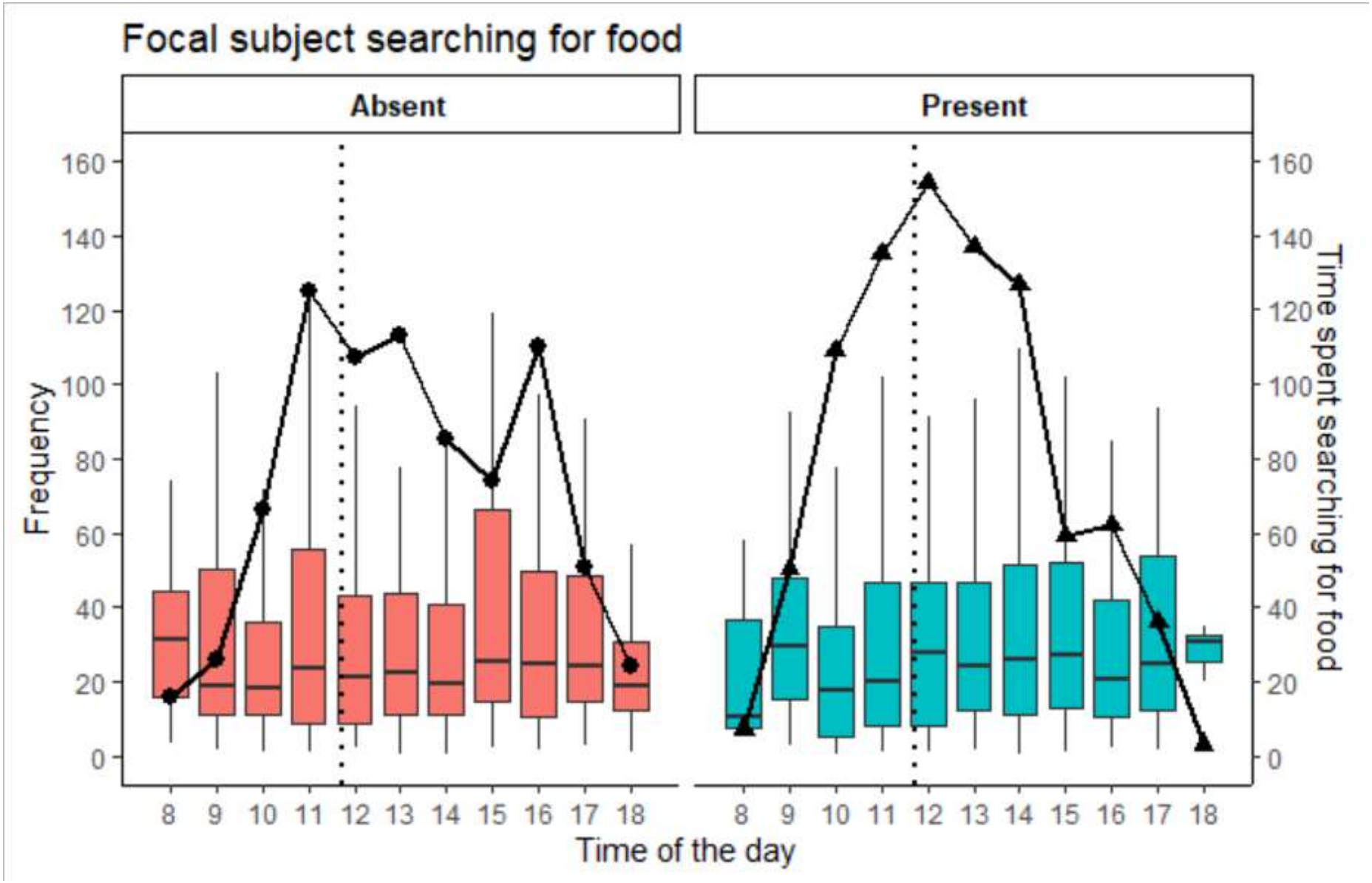
Daily Patterns of Foraging and Aggressive Behaviors in Great-tailed Grackle *(Quiscalus mexicanus)* at an Urban Patch with Availability or Absence of Resources

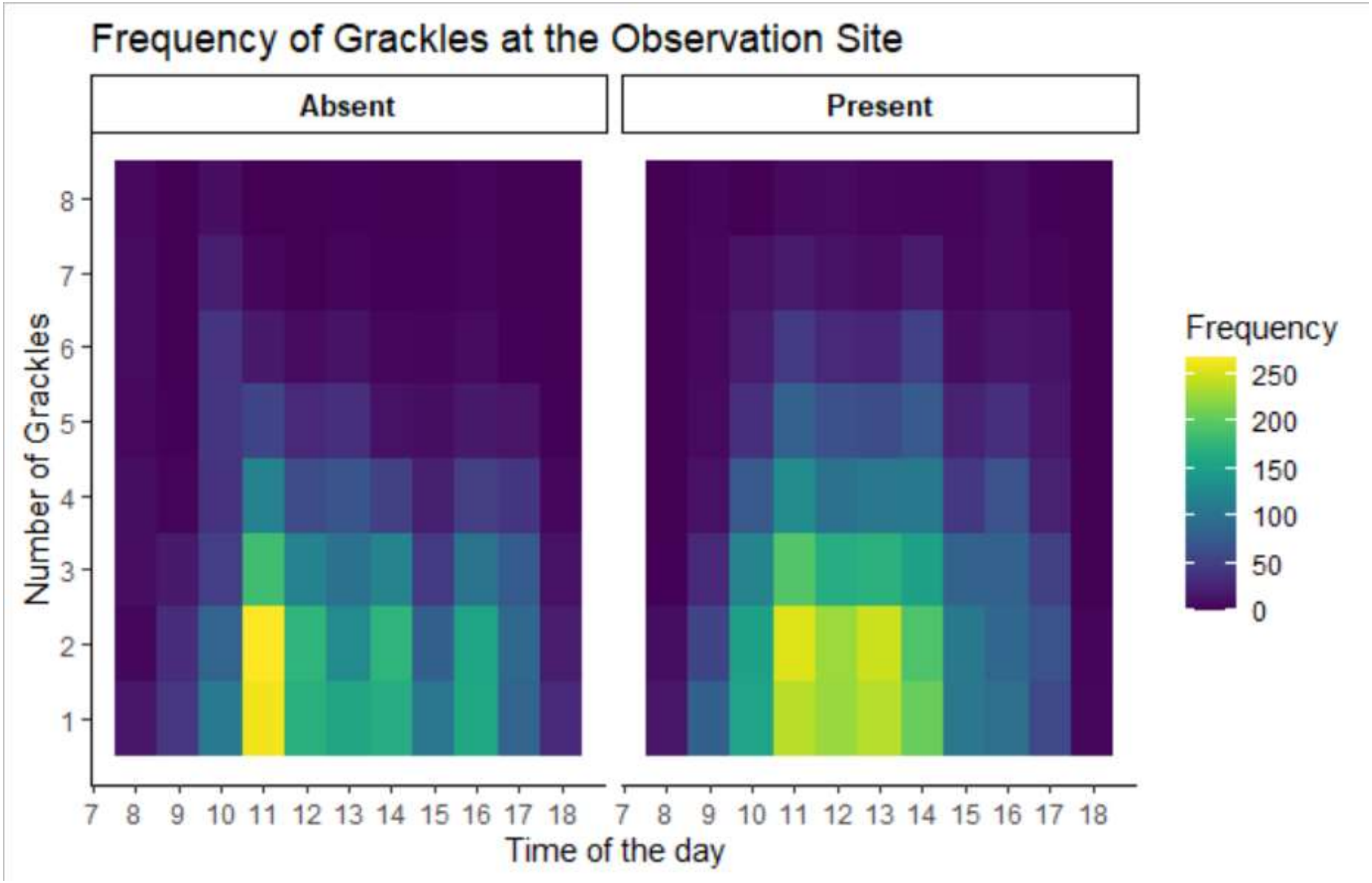
Alejandro Rodrigo[1], Laurent Ávila-Chauvet[1], & Jonathan Buriticá[1]

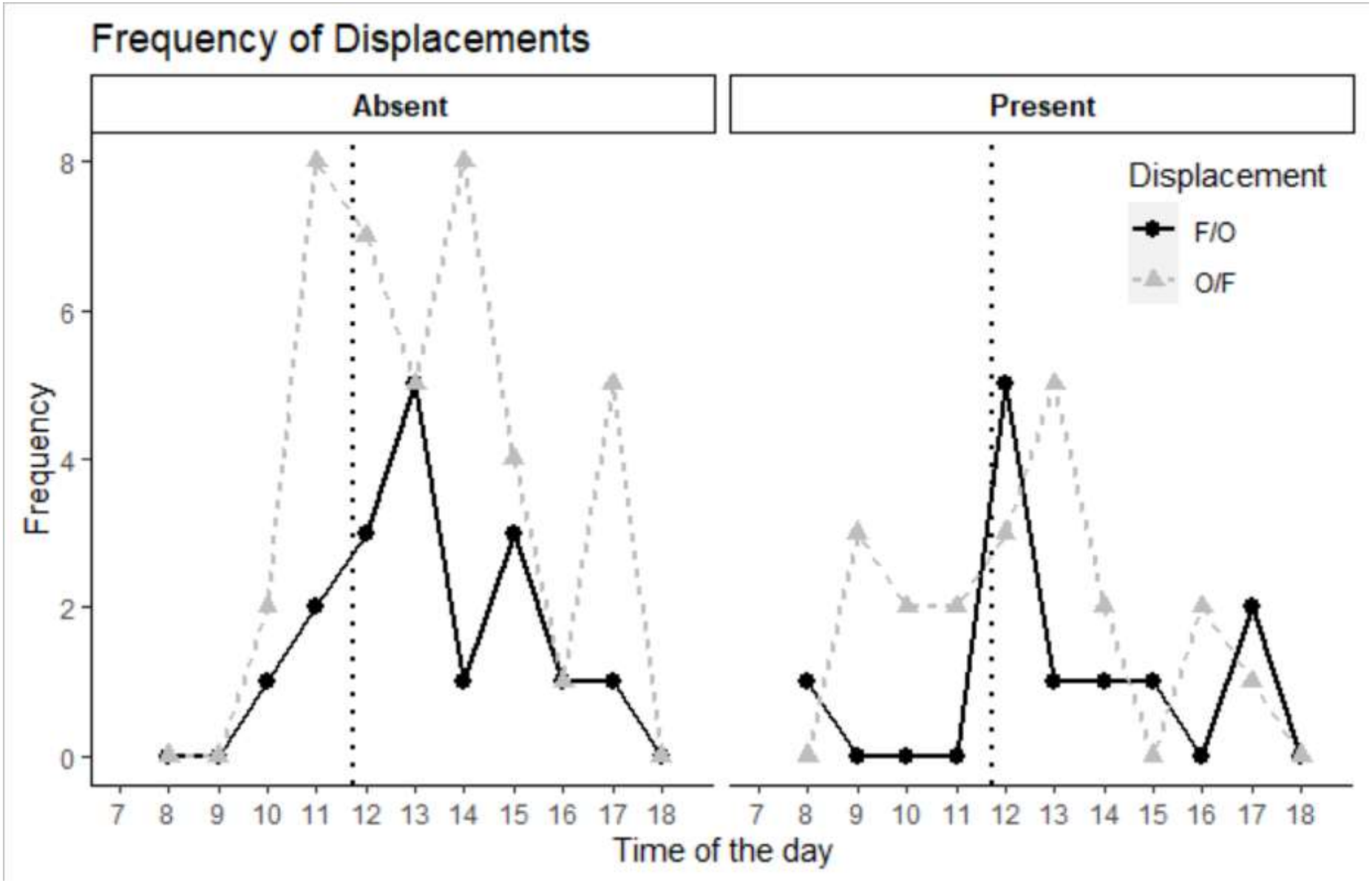
Centro de Estudios e Investigaciones en Comportamiento


Breeding
Year-round


Focal subject at the observation site
Absent
Present
Frequency
Time spent at the osbervation site
Time of the day
0
20
40
60
80
100
120
140
160
180
200
220
240
8
9
10
11
12
13
14
15
16
17
18


Focal subject searching for food
Absent
Present
Frequency
Time spent searching for food
Time of the day
0
20
40
60
80
100
120
140
160
8
9
10
11
12
13
14
15
16
17
18


Frequency of Grackles at the Observation Site
Absent
Present
Number of Grackles
8
7
6
5
4
3
2
1
7 8 9 10 11 12 13 14 15 16 17 18
7 8 9 10 11 12 13 14 15 16 17 18
Time of the day
Frequency
250
200
150
100
50
0


Frequency of Displacements
Absent
Present
Displacement
F/O
O/F
Frequency
0
2
4
6
8
7 8 9 10 11 12 13 14 15 16 17 18
Time of the day

Time Patterns of Foraging Behaviors in Great-tailed grackle (*Quiscallus mexicanus*) at an Urban Patch

Alejandro Rodrigo[1], Marielena Eudave-Patiño[1], Najla Serna[1], Eusebio Lara[1], Laurent Avila-Chauvet[2], Jonathan Buriticá[1]
[1]Laboratory of Comparative Cognition and Learning, CEIC [2]Laboratory of Perception and Decision Making, CEIC / Guadalajara University

Introduction

Unlike most animals[1] the Great-tailed grackle (*Quiscalus mexicanus*) seems to take advantage of inhospitable environments such as cities[2]. However, we don't fully understand how this birds exploit the urban environment to its advantage[3]. Casual observation seems to suggest that these species obtain resources such as food or nesting material from trash[4]. As a first approach to the problem we located a patch outside a residential building, in a high density urban area, where the residents left their trash for pickup and a group of great-tailed grackles were identified as regular visitors. The objective was establish the foraging patterns of this bird species, in order to know the most active times of the day, it´s relation with garbage collection, and to try to observe the interactions between the individuals of the group during the episodes of searching and obtaining food.

Method

Subjects and study site
The foraging behavior of wild Great-tailed grackles (*Quiscallus mexicanus*) was observed in a high-density urban area on the city of Guadalajara, México. This area was selected for the vast amount of garbage that is continually generated by local residents and the abundant arrival of Great-tailed grackles at the observation site.

Data Collection
For this preliminary study, a total of 194 hours divided in 25 days were recorded. The recordings were carried out between 0630 and 2200 hours during the months of November (2017) to January (2018). The recordings were made with a Sony Handycam DCR-SR85 placed inside one of the apartments in the residential area, approximately 15 meters above street level.

Data Analysis
The analysis of the videos was carried out with the BORIS[5] registration software (v.6.0.6) installed on a computer with a Windows operating system. For the analysis of the videos, three observers were necessary. The registration of events was carried out independently by each of the three observers. To evaluate the level of precision among observers, a Cohen's Kappa (K = 0.776) was calculated. Once the event registration was completed, a data matrix was created and analyzed with MATLAB (v. R2017a).

Results

Figure 1A. Frequency of "searching for food" in relation to the frequency of events when the "garbage" collection occurred. The graph shows in the left axis the frequency of "searching for food" and in the right axis the distribution of garbage. The top colormap shows the average number of subjects present at the observation site. The color of the line is the same of the axis.

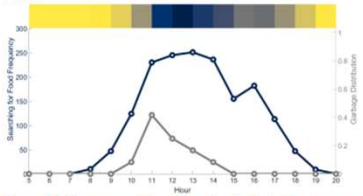


Figure 1B. Frequency of "searching for food" in the absence of "garbage" collection. The graph shows in the left axis the frequency of "searching for food". The right axis shows the distribution of garbage (zero). The top colormap shows the average number of subjects present at the observation site.

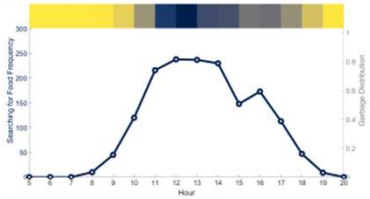


Table 1. Grackle ethogram use to quantify foraging and social behaviors

Behavior	Behavior type	Description
At the observation site	State event	This event indicates the moment when the animal lands in the ground and leaves the observational site. To start the registration, at least 50% of the animal's body should be appearing in the shot, including head and chest. Before closing the observation, if part of animal's body still on the screen the observer needs to wait 3 seconds.
Fly	Point event	The focal animal flies away from the feeding site.
Searching for food	State event	The focal animal picks the ground, walks searching for food or holds food in the peak.
Jump	Point event	The focal animal jumps or make a quick fly from/or to a different location within the observation site.
Displacement	Point event	The focal animal bumb another bird from searching food nearby luring part of the body towards another bird.
Out of the site	State event	The focal animal is out of the site.
One subject	Point event	Indicates that only one animal is at the observational site.
Two subjects Three subjects Four subjects Five subjects Six subjects Seven subjects Eight subjects More subjects	Point events	Indicates that more than one animal is at the observational site.
Garbage	Point event	This event indicates the ending of the garbage collection.

Figure 2. Number of grackles present at the observation site during the day. The graph shows the average number of subjects registered at the observation site during the day. The colormap represents the total number of point events recorded for each bird during the entire observations.

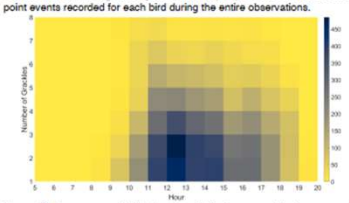


Figure 3. Frequency of "displacement" that occurred between grackles at the observation site during the day. The continuous line represents the average number of times the "displacement" was made by the focal subject to another subject. The dashed line shows the average number of times the "displacement" occurred from another subject to the focal subject.

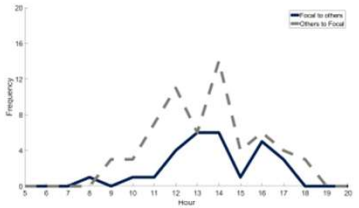
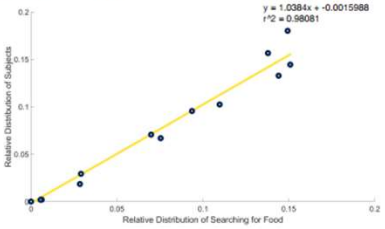


Figure 4. Relation between the relative frequency of subjects and the relative frequency of "Searching for food". Comparison of relative frequency per hour of subjects at the observation site, on the ordinate, and the frequency per hour of "searching for food", on the abscissa. The points are the number of events per hour divided by the total of events in the day. The line shows the relation between the two variables as a linear function with a narrow dispersion of the data.



Discussion

The results show that the highest peak of bird activity occurs between 1100 and 1400 hours. Additionally, garbage collection does not alter the birds' food-seeking patterns and therefore we can conclude that the food-seeking activity of these birds follows a regular pattern, relatively independent of garbage collection.

On the other hand, it seems that there is a close relation between the time of day, the number of subjects present at the observation site and the food search behaviors (Fig. 1A, 1B, and 2). This result suggests that this species of bird is highly social and possibly the mechanisms used to obtain resources and exploitation of the environment is regulated by the interaction between the individuals of the group, which could explain one of the reasons why this species is so successful even in hostile environments such as cities.

Finally, Figure 3 indicates that, as described in the producer-scrounger game literature, when dominance is the reason for agonist behaviors[6], the individuals of a group could be establishing hierarchies through physical competition as a result the dominant subjects gain access to almost any patch of food just for being present leading to an increase in scrounging strategy. The higher ranking subject will parasitize more the less dominant subjects. The results of the present study show that focal subjects tend to exhibit less displacement behaviors compared to "others". According to the above, if we assume that the focal subjects pointed to the source of food and that the "others" came to parasitize, then, we can suppose that agonist behaviors are a mean to obtain a greater number of resources in this species of bird and that the establishment of dominance or hierarchy could be similar to that reported in other animal species such as primates[7], birds[8] and fishes[9].

It is important to emphasize that it is fundamental to carry out a more complete study, even so manipulations in the environment and/or identification of the subjects, that allows us to know if the foraging patterns in this species are met in different kind of environments and with this we can carry out studies that allow us to know more about the cognitive abilities of this species and its relation with the success of this species in the colonization of cities.

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Acknowledgements

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CONACYT

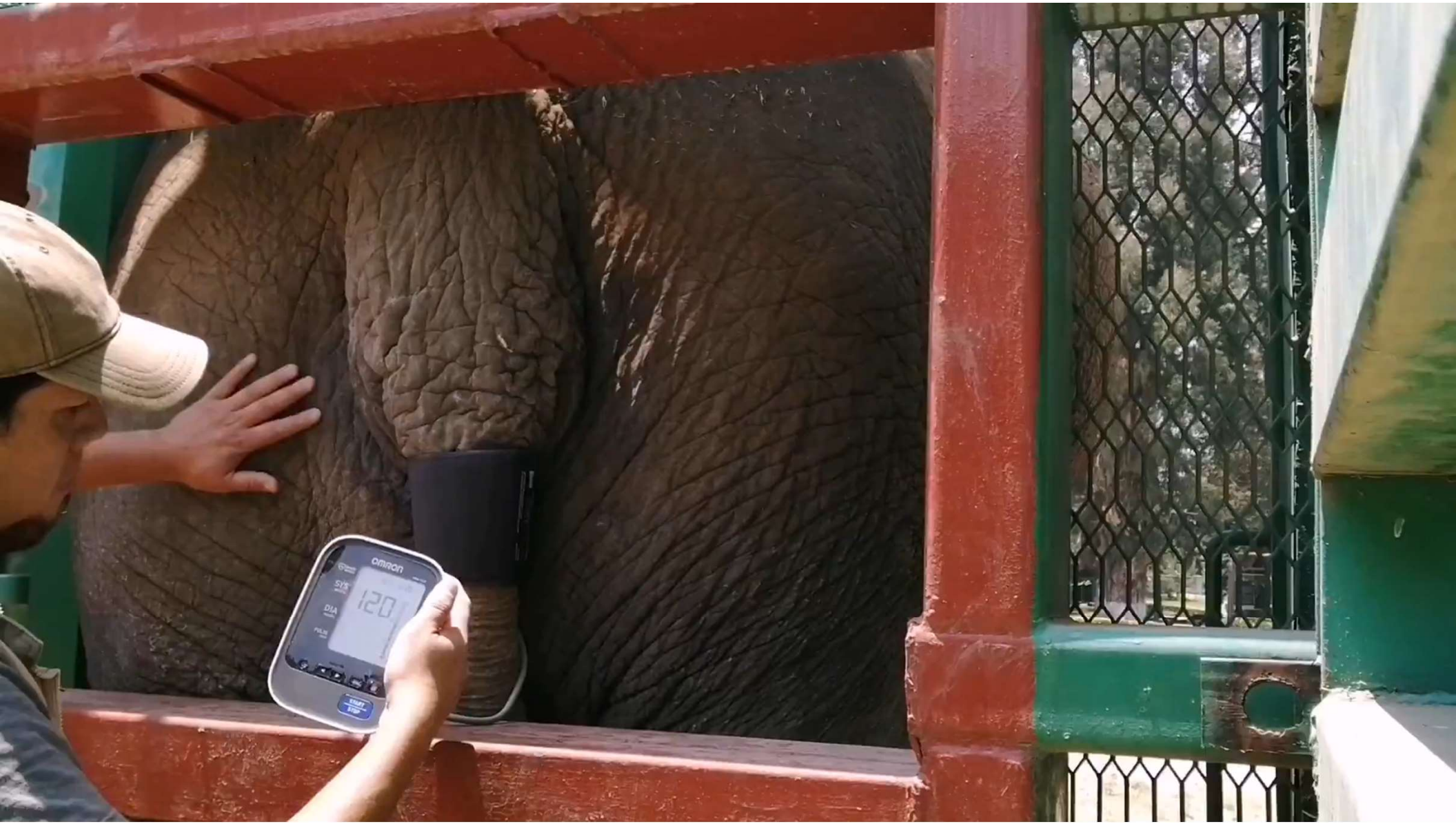
Apoyando los programas de conservación

Evaluation of zoo animal training programs

Aida Longán[1], Carlos Gómez-Medina[2] & Alejandro Rodrigo[1]

Centro de Estudios e Investigaciones en Comportamiento

ZACANGO PARQUE ECOLÓGICO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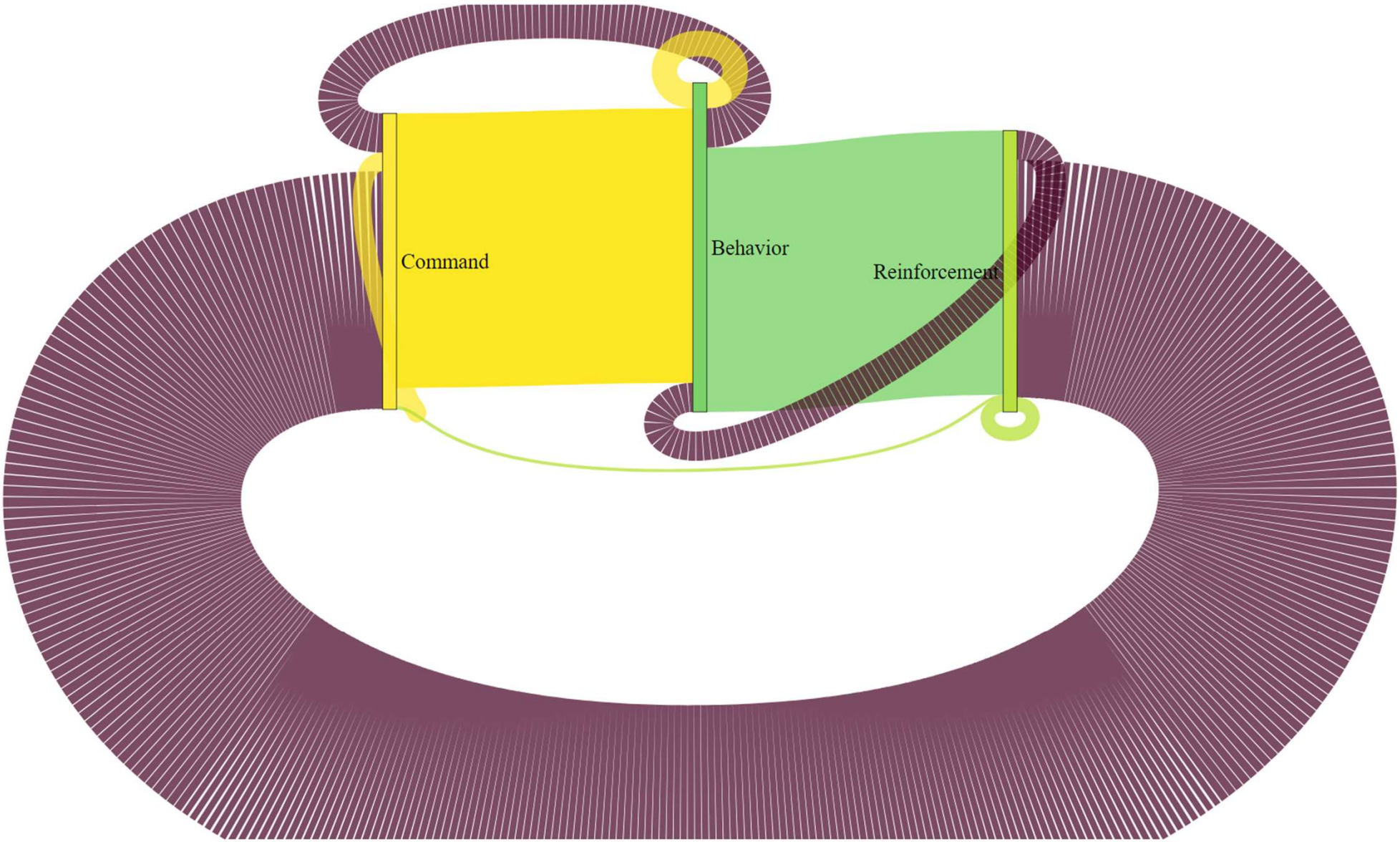
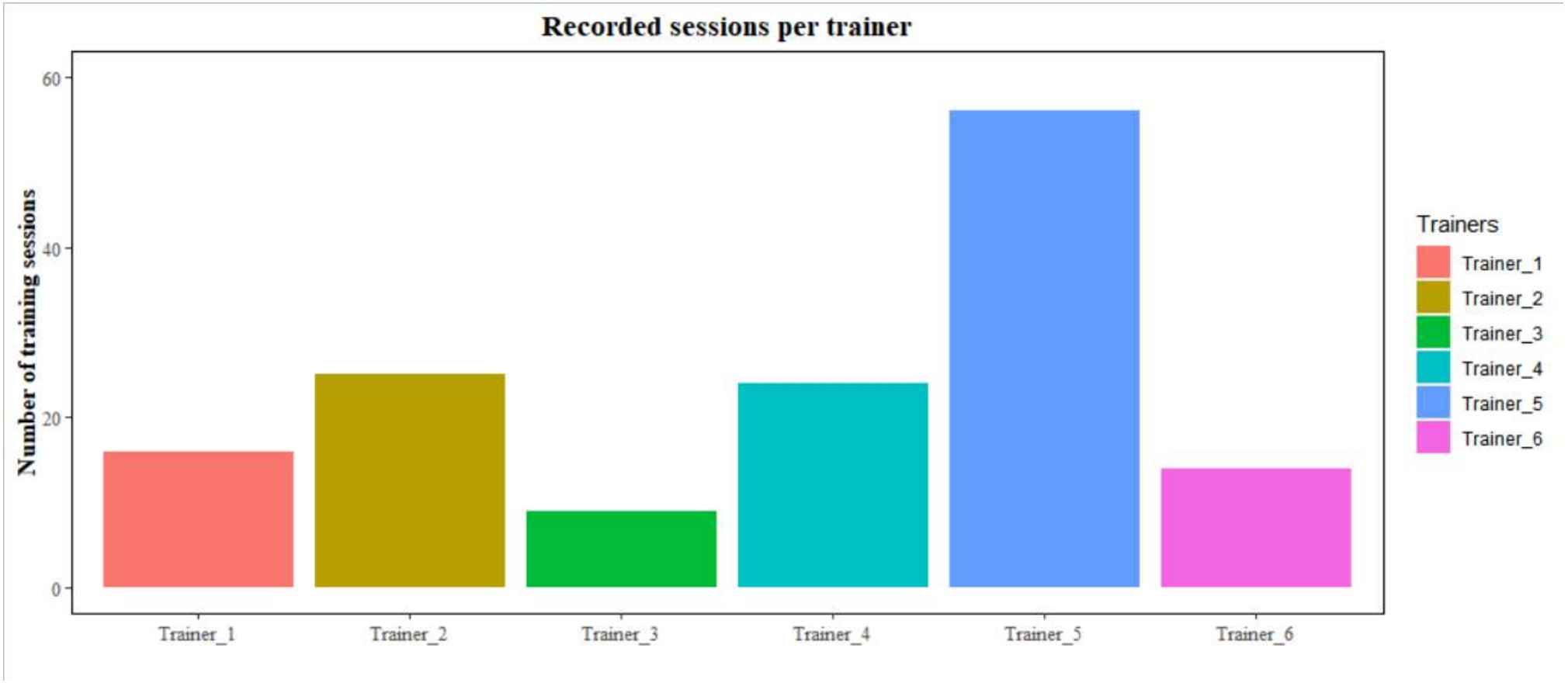
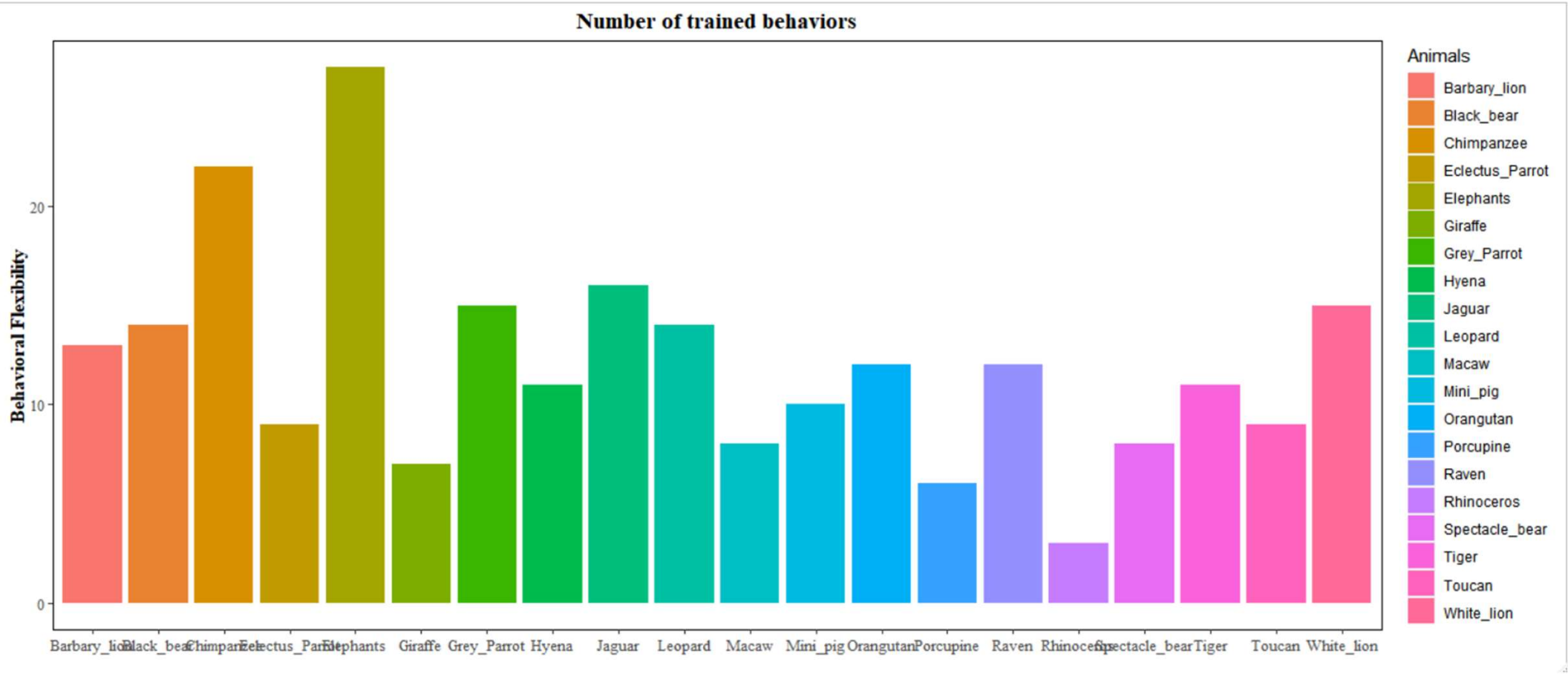
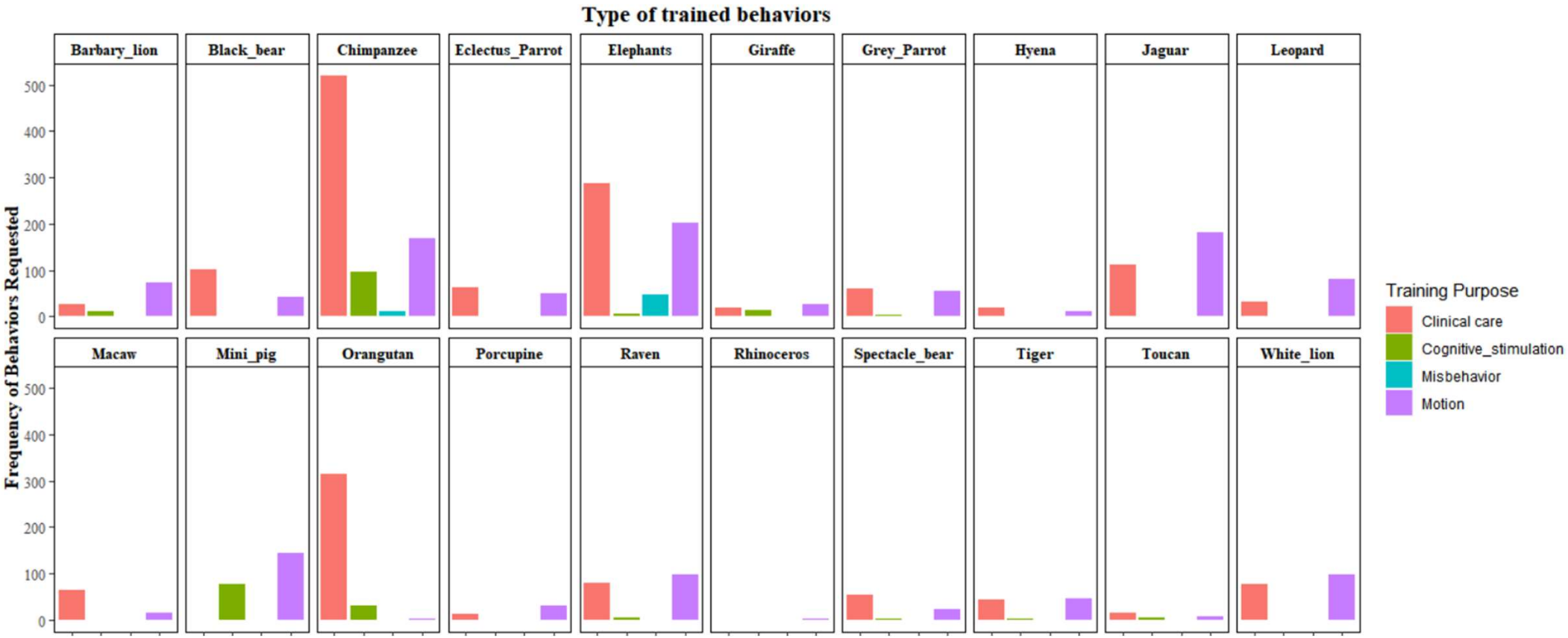
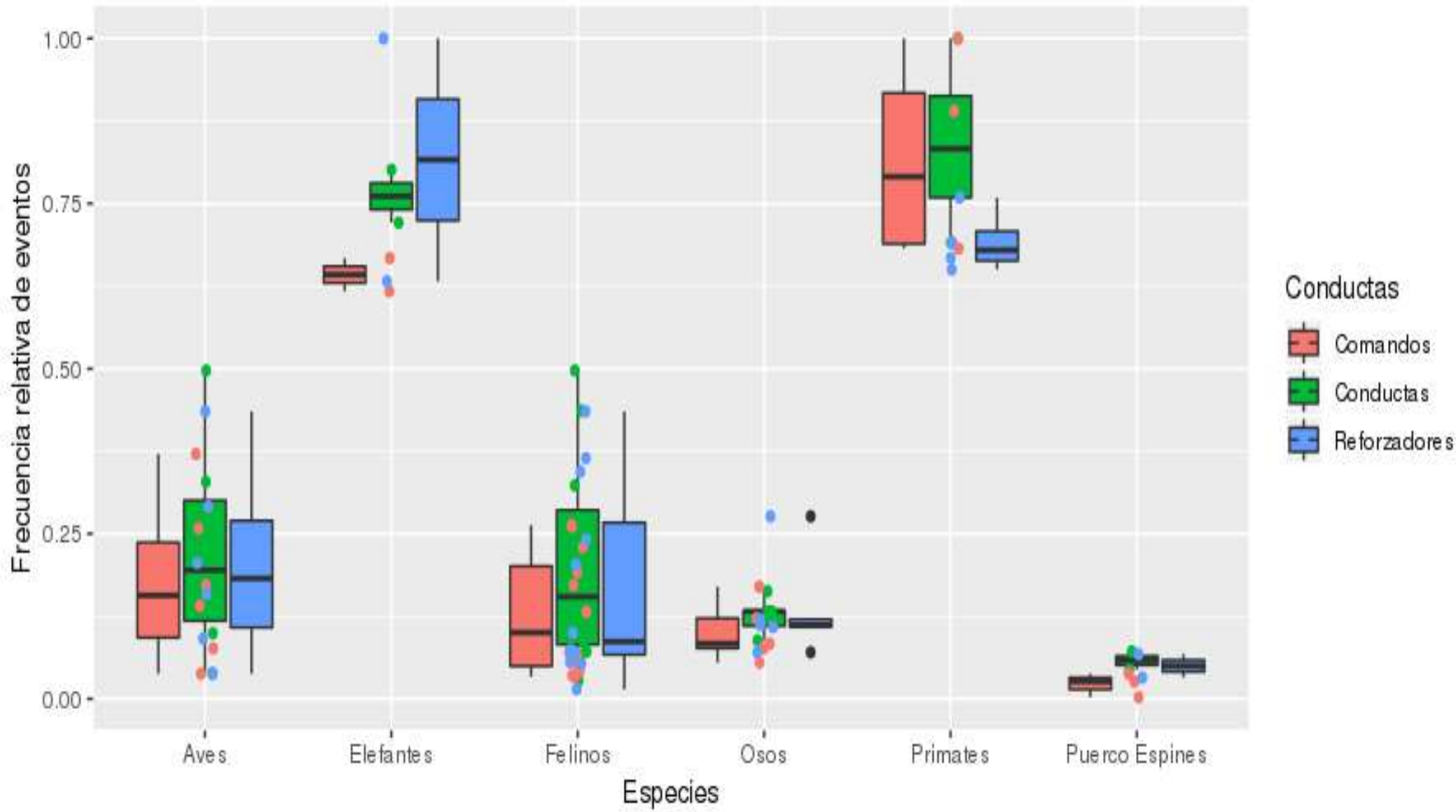
SYS
DIA
120


Command
Behavior
Reinforcement

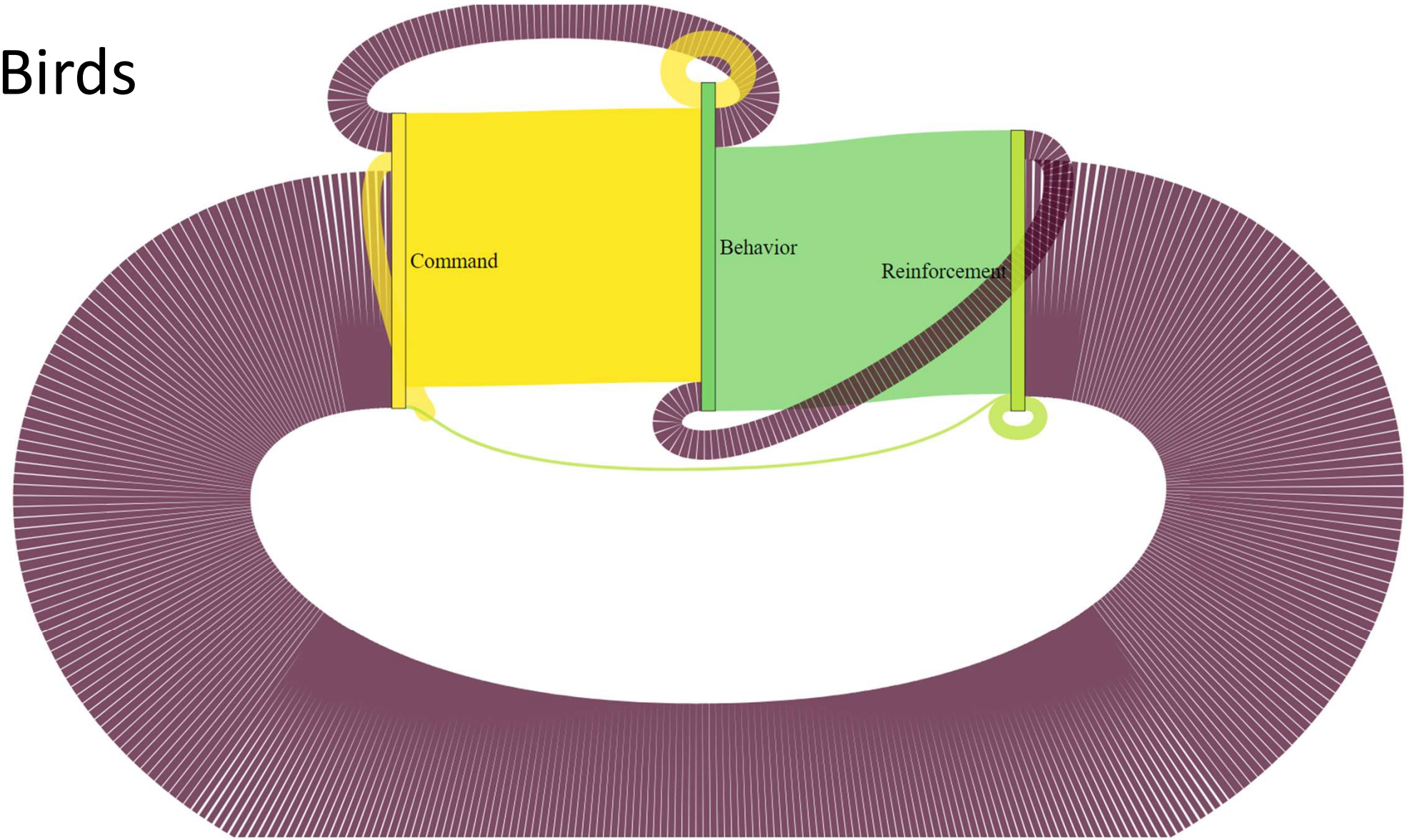

Recorded sessions per trainer
Number of training sessions
60
40
20
0
Trainer_1
Trainer_2
Trainer_3
Trainer_4
Trainer_5
Trainer_6
Trainers
Trainer_1
Trainer_2
Trainer_3
Trainer_4
Trainer_5
Trainer_6


Number of trained behaviors
Behavioral Flexibility
0
10
20
Barbary_lion
Black_bear
Chimpanzee
Eclectus_Parrot
Elephants
Giraffe
Grey_Parrot
Hyena
Jaguar
Leopard
Macaw
Mini_pig
Orangutan
Porcupine
Raven
Rhinoceros
Spectacle_bear
Tiger
Toucan
White_lion
Animals
Barbary_lion
Black_bear
Chimpanzee
Eclectus_Parrot
Elephants
Giraffe
Grey_Parrot
Hyena
Jaguar
Leopard
Macaw
Mini_pig
Orangutan
Porcupine
Raven
Rhinoceros
Spectacle_bear
Tiger
Toucan
White_lion

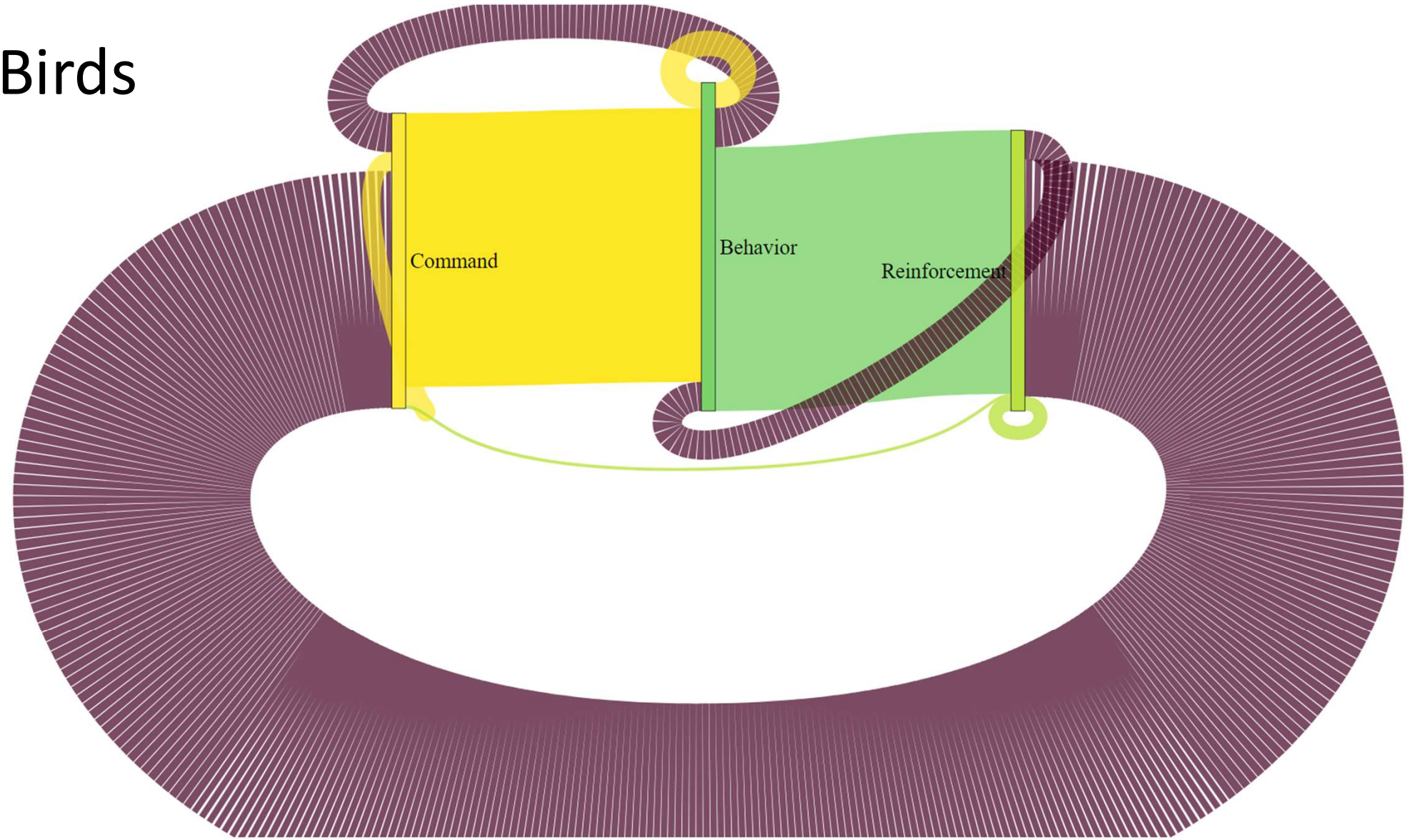

Type of trained behaviors
Barbary_lion
Black_bear
Chimpanzee
Eclectus_Parrot
Elephants
Giraffe
Grey_Parrot
Hyena
Jaguar
Leopard
Macaw
Mini_pig
Orangutan
Porcupine
Raven
Rhinoceros
Spectacle_bear
Tiger
Toucan
White_lion
Frequency of Behaviors Requested
0
100
200
300
400
500
Training Purpose
Clinical care
Cognitive_stimulation
Misbehavior
Motion


1.00
0.75
0.50
0.25
0.00
Frecuencia relativa de eventos
Aves
Elefantes
Felinos
Osos
Primates
Puerco Espines
Especies
Conductas
Comandos
Conductas
Reforzadores

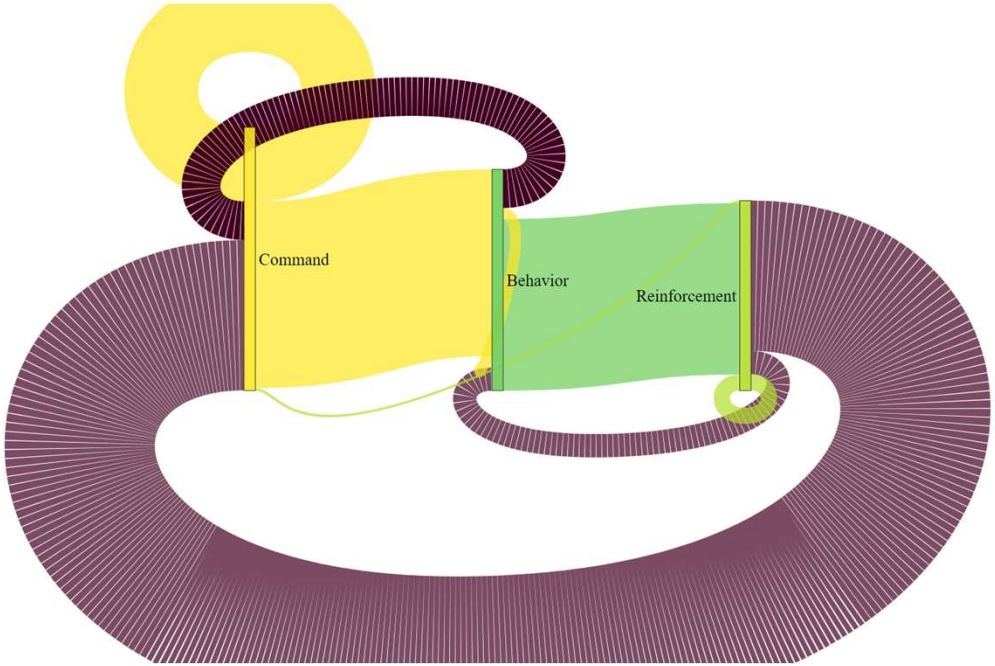
Birds



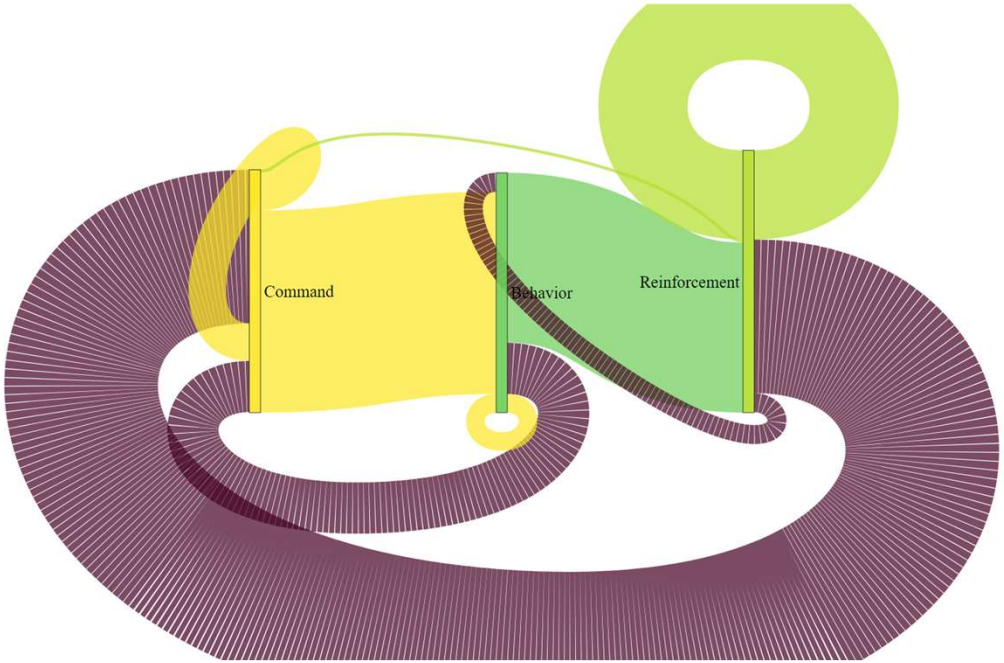
Birds



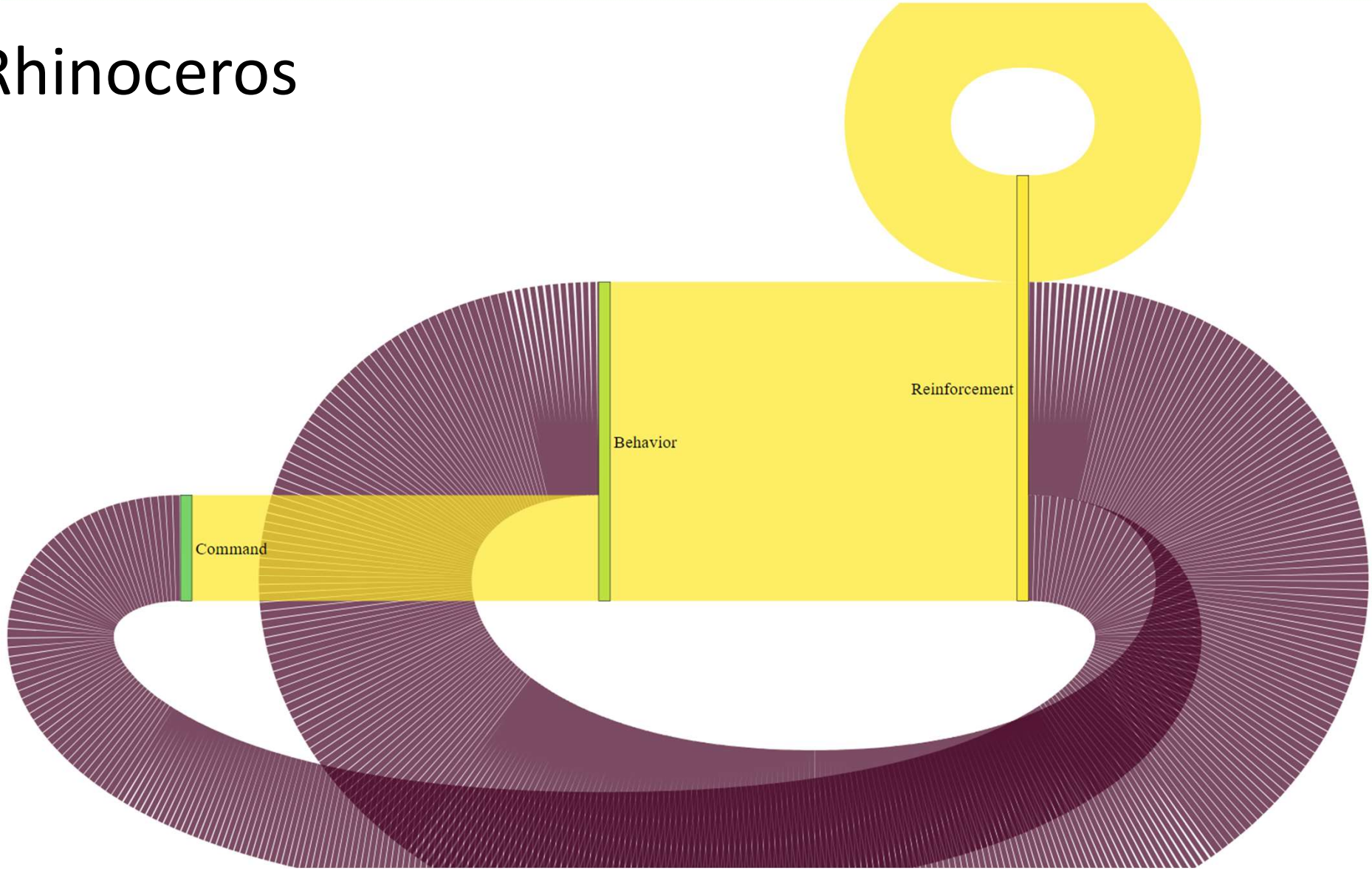
Chimpancés



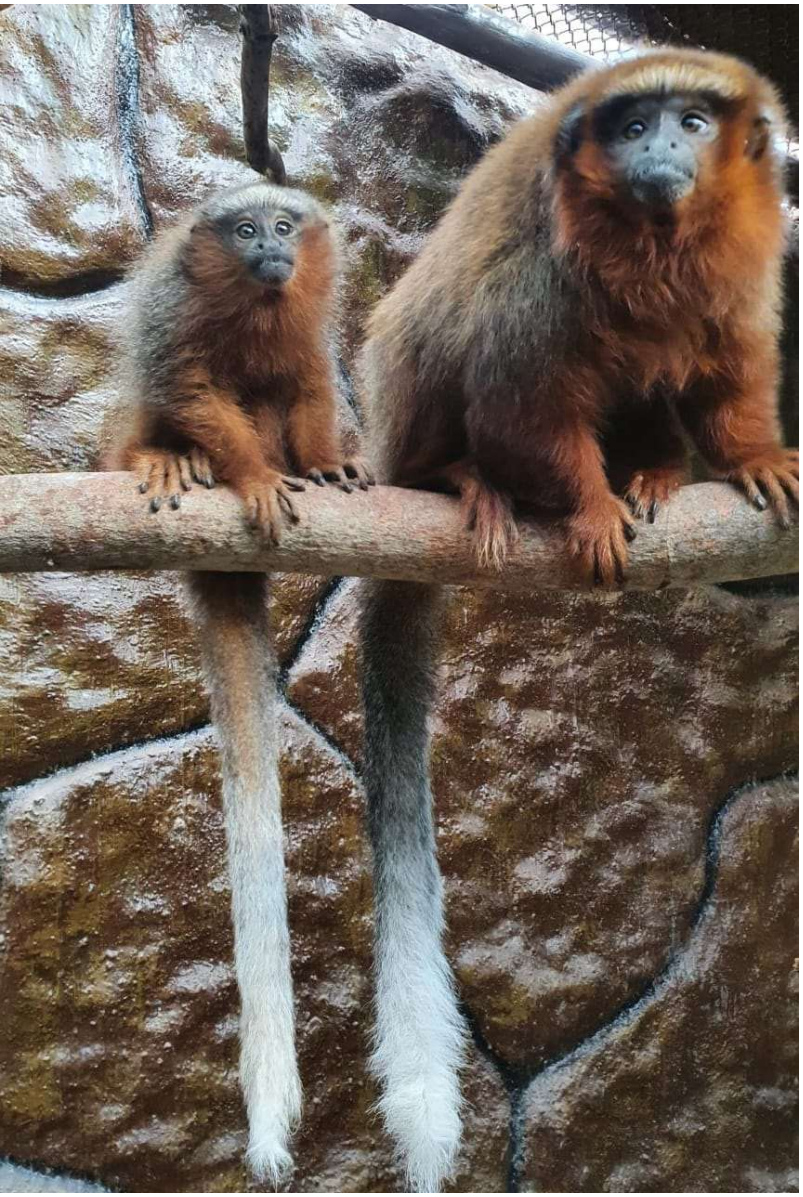
Elefantes



Rhinoceros

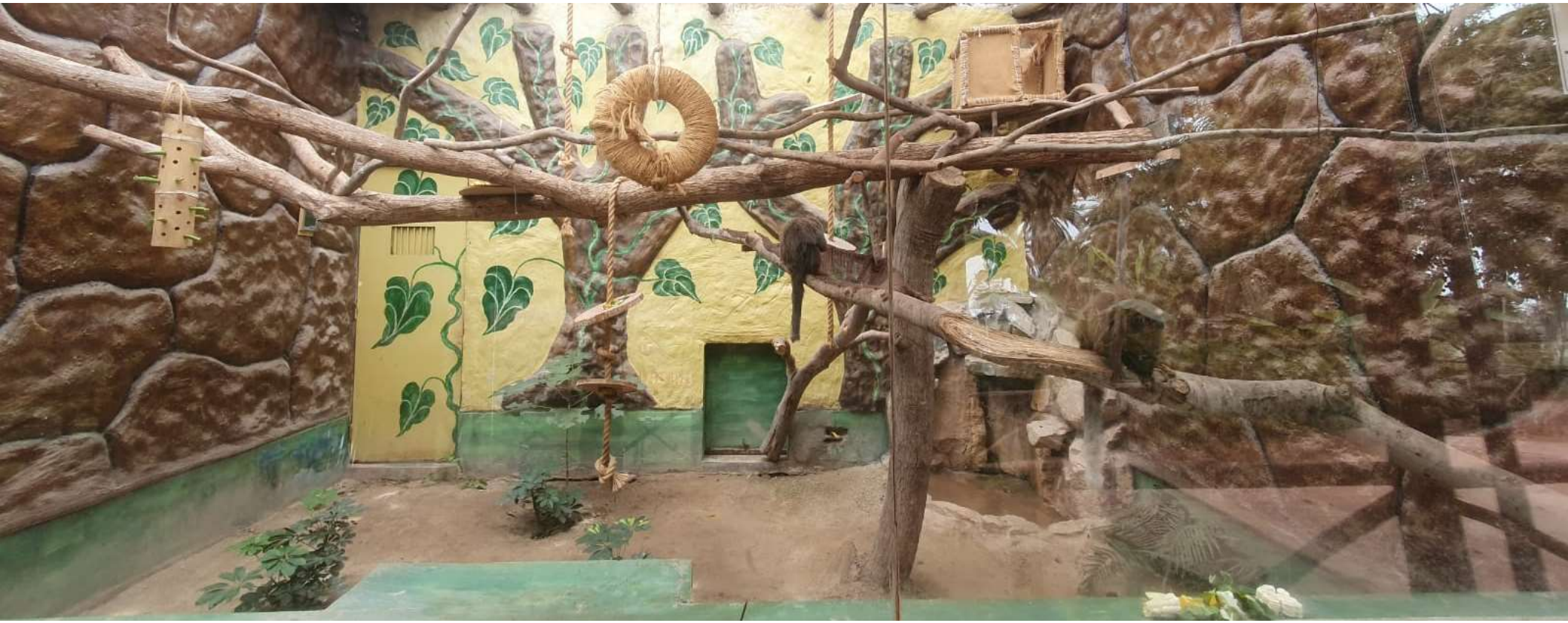


Crear vinculos con otras insituciones en pro de la conservación

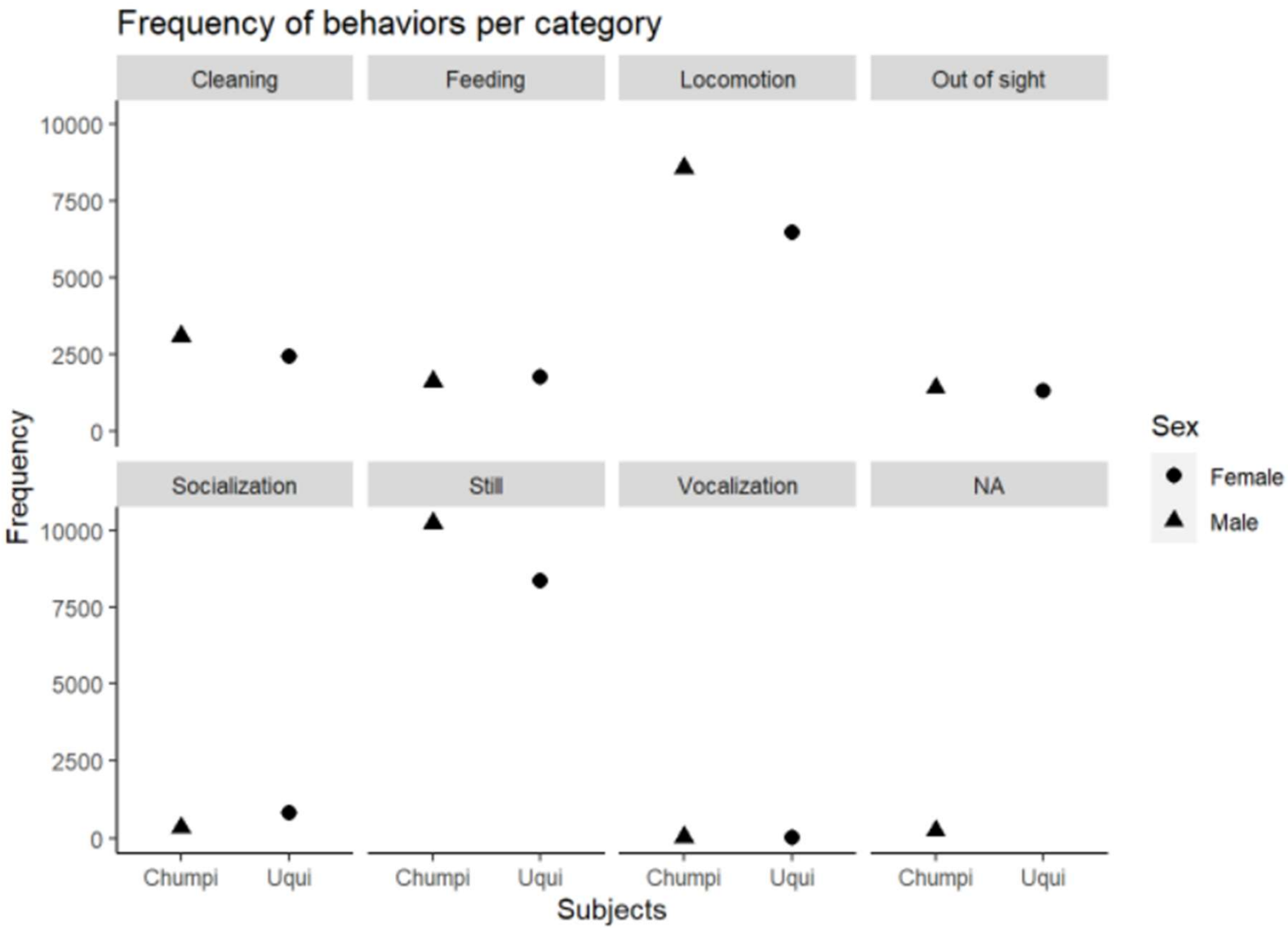


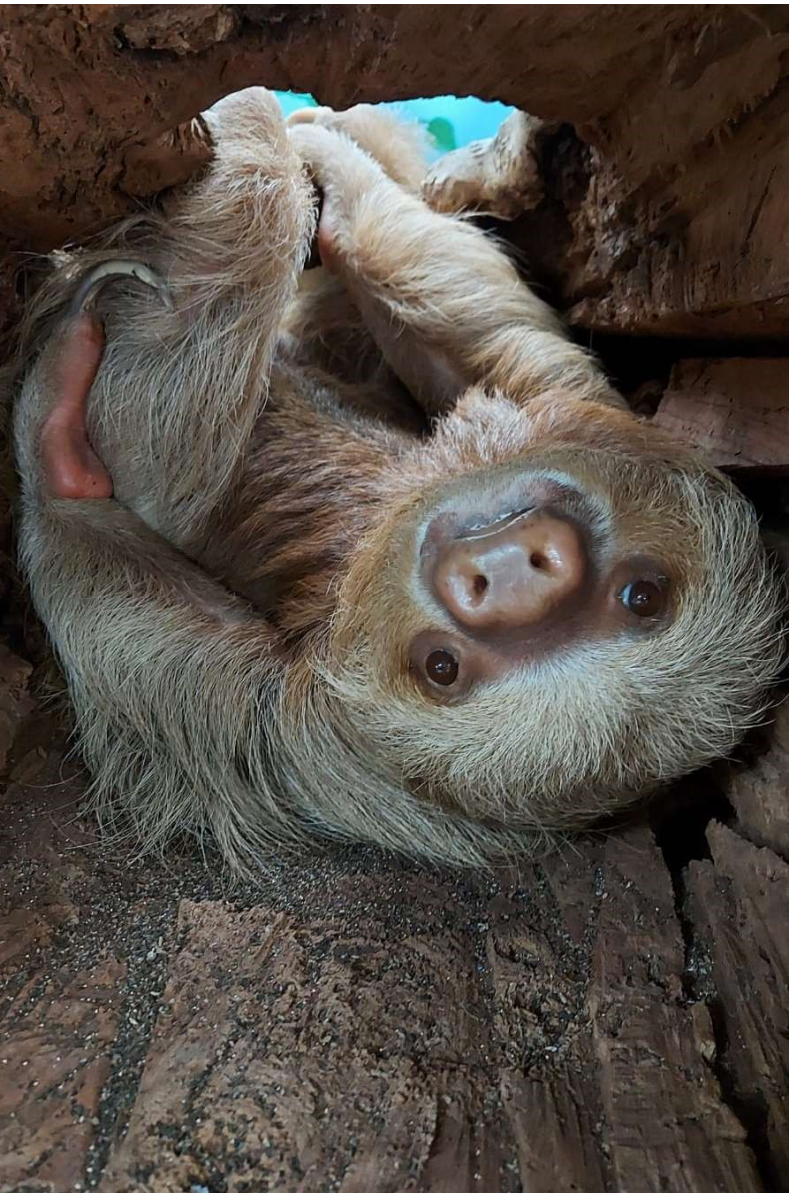
Patrones conductuales de una pareja de Monos Tocón (*Plecturocebus discolor*) del Zoológico Parque de las Leyendas (Lima, Perú)

Andrea Zeballos Mora[1], Roberto Alfredo Huanaco Pujaico[1], Aurora Samantha Rojas Arriaga[2], Karla Maryana Gattas Camacho[2], Alejandro Rodrigo[3]



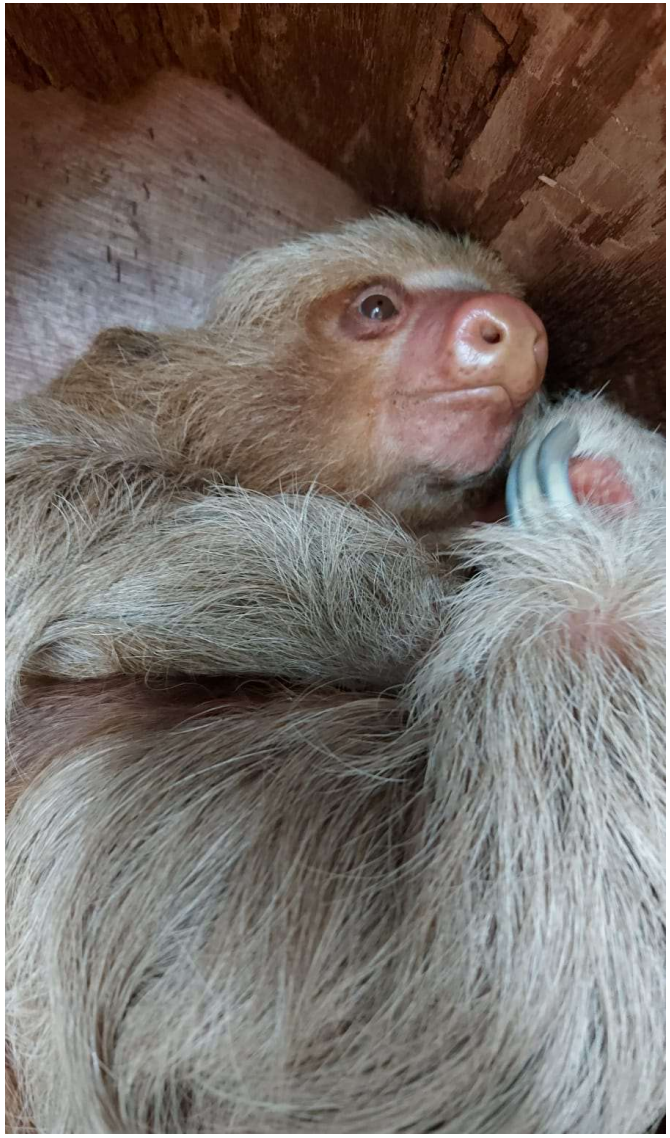
Conducta	Tipo de conducta	Descripción
Acicalar	State event	Uno de los individuos revisa minuciosamente el pelaje del otro
Beber	State event	Ingerir liquido por la boca
Comer	State event	El mono sujeta el alimento con ambas manos y lo lleva a la boca. En caso de alimentos semiliquidos, el mono utiliza su lengua.
Copula	State event	El macho monta a la hembra
Desplazamiento	State event	El mono se mueve de un sitio a otro en dirección vertical u horizontal
Echado	State event	El mono permanece con el cuerpo en posicion horizontal sobre una superficie
Fuera de vista	State event	La parte superior del cuerpo del mono (50%) se encuentra en fuera del campo de visión
Guarida	State event	El mono se encuentra dentro del refugio/guarida
Levantarse	State event	El mono adopta una posicion bipedal
Limpiarse	State event	El mono revisa minuciosamente su pelaje
Persecucion	State event	Uno de los monos sigue al otro individuo con la finalidad de alcanzarlo
Rascarse	State event	Refregar una parte del cuerpo con las uñas para aliviar la picazón
Sentado/Estático	State event	El mono permanece sentado, moviendo unicamente su cabeza a un lado o al otro
Trepar	State event	El mono utiliza las extremidades para sujetarse de alguna superficie en posición vertical
Visitante	Point event	Personas del publico se acercan a observar el recinto de los monos
Vocalizacion grave	State event	El individuo emite sonidos graves y extendidos en el tiempo
Zarandear/Sacudirse	Point event	El mono comienza a moverse bruscamente de un lado a otro con la finalidad de quitarse algo que lleva encima
Saltar	Point event	El mono se eleva del suelo u otra superficie con impulso para caer en el mismo lugar o en otro
Incitar	Point event	El mono llama la atención del otro individuo para que haga cierta cosa
Ruido extraño	Point event	Ruidos extraños, como aviones, o visitantes gritando o alguna maquina para podar pasto, etc. Los ruidos de animales no se incluyen
Colgarse	Point event	El mono se sujeta de algun objeto con alguna de las extremidades, mientras que el resto de su cuerpo queda suspendida en el aire
Estereotipia	State event	Movimiento repetitivo sin función aparente

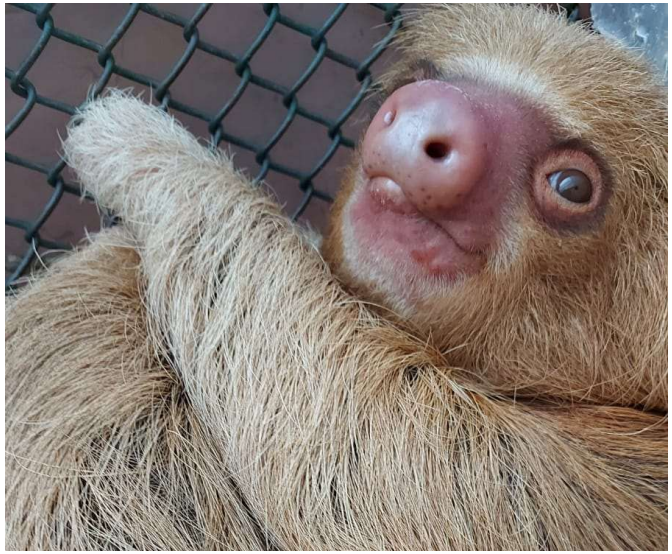

Frequency of behaviors per category
Cleaning
Feeding
Locomotion
Out of sight
Socialization
Still
Vocalization
NA
Frequency
10000
7500
5000
2500
0
Chumpi
Uqui
Subjects
Sex
Female
Male

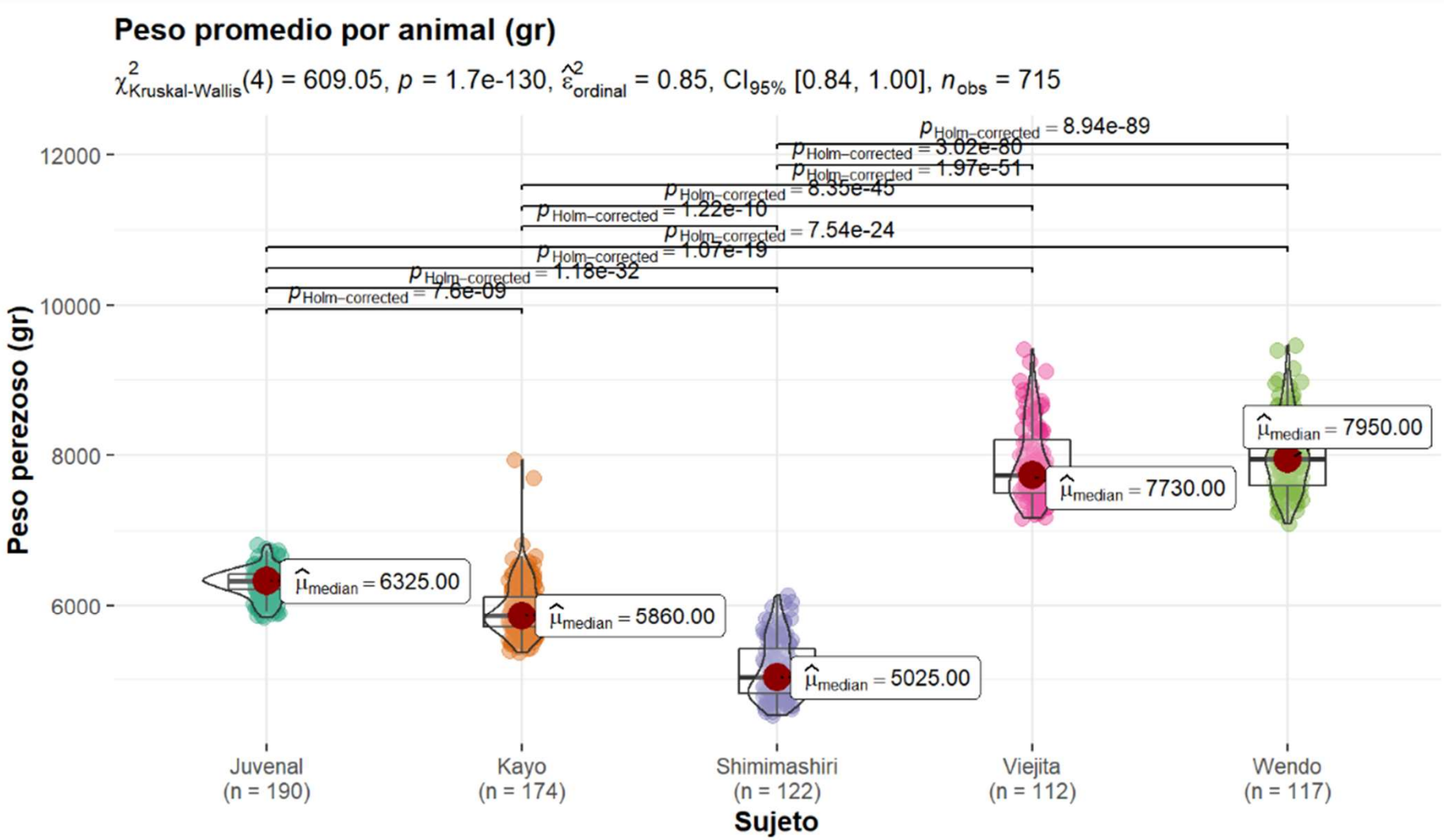


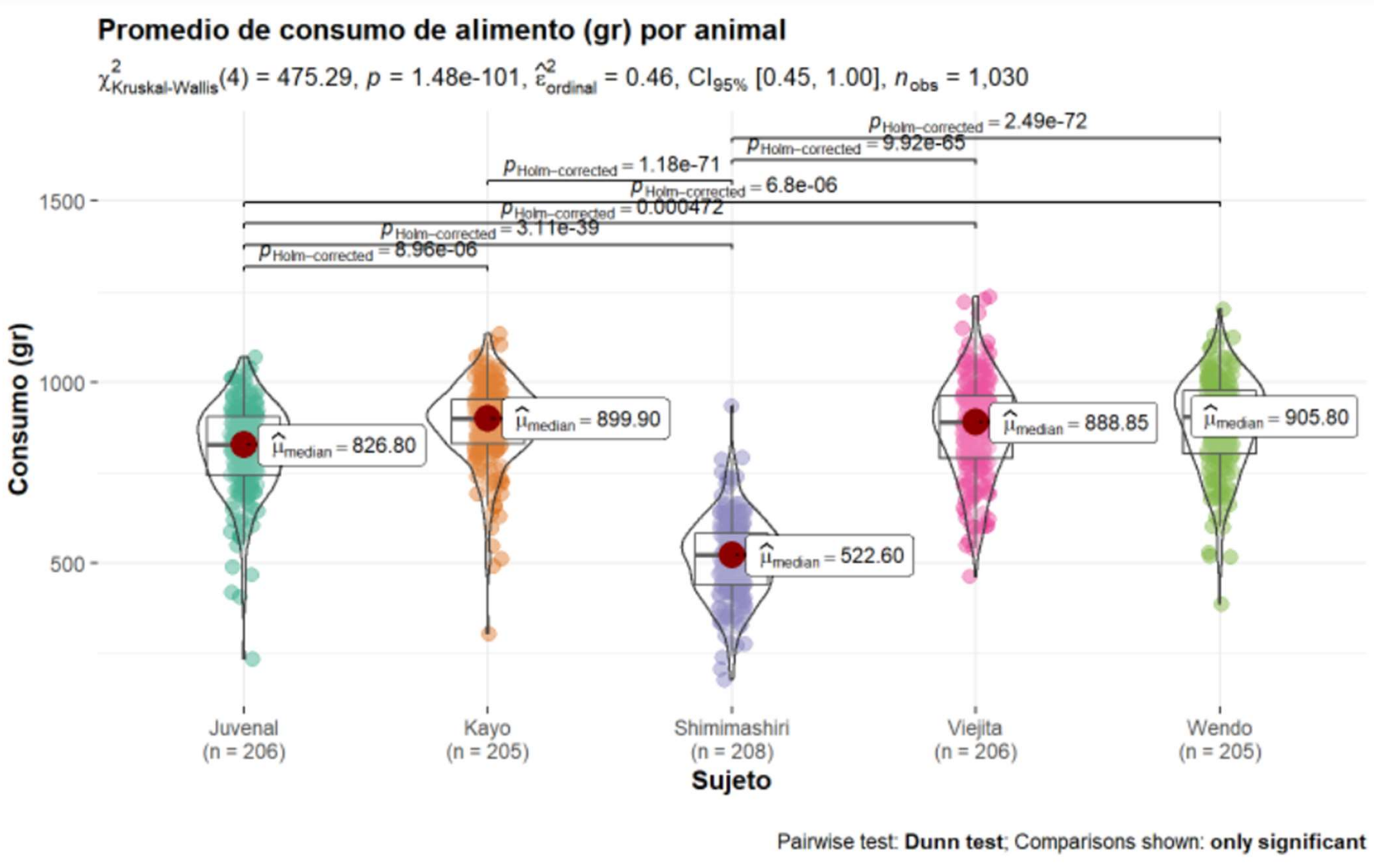
El efecto de la variación de la temperatura y humedad en el peso y consumo de alimento de cinco Perezosos de dos dedos *(Choloepus didactylus)* en cautiverio.

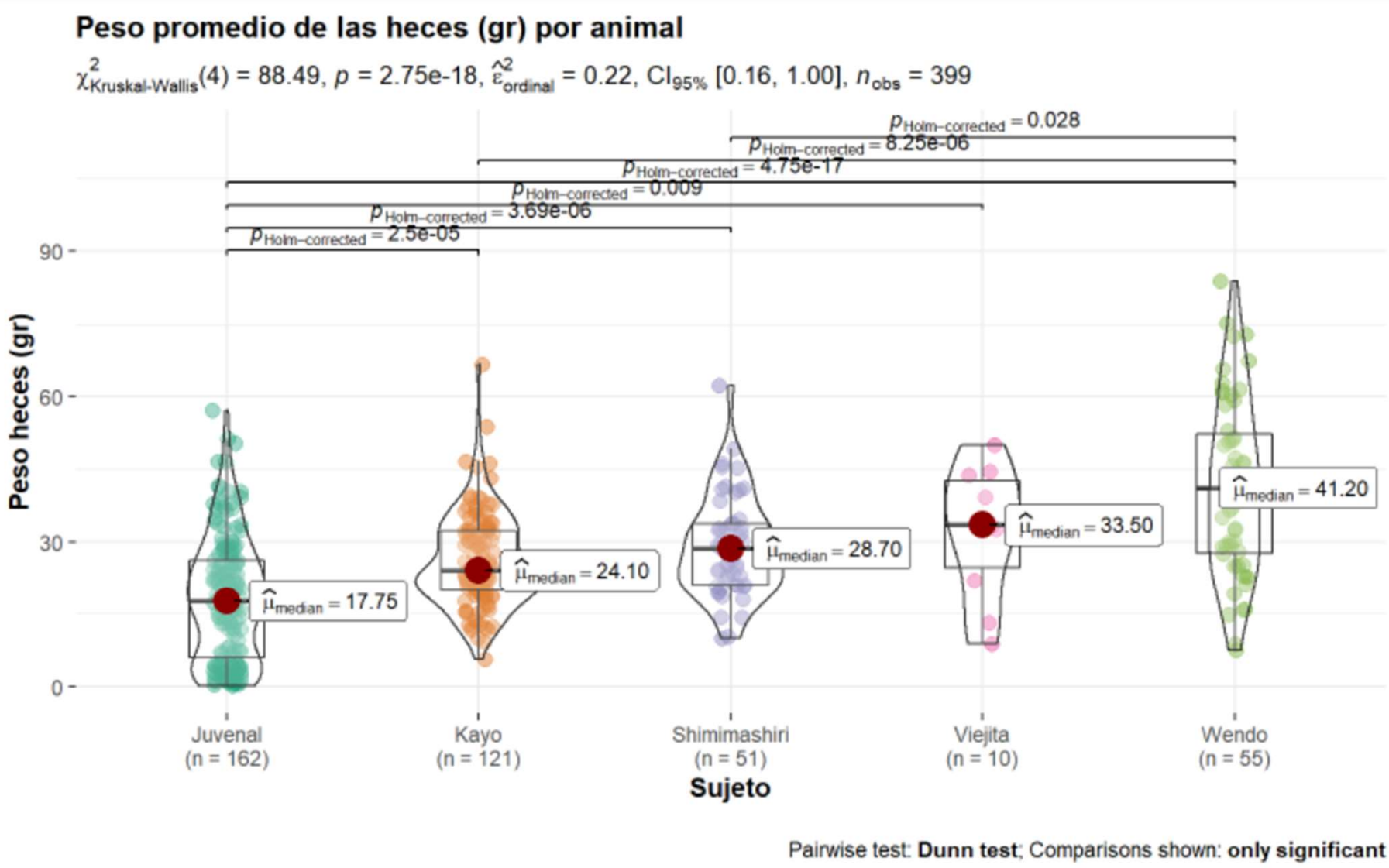
Roberto Alfredo Huanaco Pujaico[1], & Alejandro Rodrigo[3]






Peso promedio por animal (gr)
$\chi^2_{\text{Kruskal-Wallis}}(4) = 609.05$, $p = 1.7e\text{-}130$, $\hat{\varepsilon}^2_{\text{ordinal}} = 0.85$, $CI_{95\%}$ [0.84, 1.00], $n_{\text{obs}} = 715$
$p_{\text{Holm-corrected}} = 8.94e\text{-}89$
$p_{\text{Holm-corrected}} = 3.02e\text{-}80$
$p_{\text{Holm-corrected}} = 1.97e\text{-}51$
$p_{\text{Holm-corrected}} = 8.35e\text{-}45$
$p_{\text{Holm-corrected}} = 1.22e\text{-}10$
$p_{\text{Holm-corrected}} = 7.54e\text{-}24$
$p_{\text{Holm-corrected}} = 1.07e\text{-}19$
$p_{\text{Holm-corrected}} = 1.18e\text{-}32$
$p_{\text{Holm-corrected}} = 7.6e\text{-}09$
12000
10000
8000
6000
Peso perezoso (gr)
$\hat{\mu}_{\text{median}} = 6325.00$
$\hat{\mu}_{\text{median}} = 5860.00$
$\hat{\mu}_{\text{median}} = 5025.00$
$\hat{\mu}_{\text{median}} = 7730.00$
$\hat{\mu}_{\text{median}} = 7950.00$
Juvenal
(n = 190)
Kayo
(n = 174)
Shimimashiri
(n = 122)
Viejita
(n = 112)
Wendo
(n = 117)
Sujeto
Pairwise test: **Dunn test**; Comparisons shown: **only significant**


Promedio de consumo de alimento (gr) por animal
$\chi^2_{\text{Kruskal-Wallis}}(4) = 475.29$, $p = 1.48\text{e-}101$, $\hat{\varepsilon}^2_{\text{ordinal}} = 0.46$, $\text{CI}_{95\%}$ [0.45, 1.00], $n_{\text{obs}} = 1{,}030$
$p_{\text{Holm-corrected}} = 2.49\text{e-}72$
$p_{\text{Holm-corrected}} = 9.92\text{e-}65$
$p_{\text{Holm-corrected}} = 1.18\text{e-}71$
$p_{\text{Holm-corrected}} = 6.8\text{e-}06$
$p_{\text{Holm-corrected}} = 0.000472$
$p_{\text{Holm-corrected}} = 3.11\text{e-}39$
$p_{\text{Holm-corrected}} = 8.96\text{e-}06$
Consumo (gr)
1500
1000
500
$\hat{\mu}_{\text{median}} = 826.80$
$\hat{\mu}_{\text{median}} = 899.90$
$\hat{\mu}_{\text{median}} = 522.60$
$\hat{\mu}_{\text{median}} = 888.85$
$\hat{\mu}_{\text{median}} = 905.80$
Juvenal (n = 206)
Kayo (n = 205)
Shimimashiri (n = 208)
Viejita (n = 206)
Wendo (n = 205)
Sujeto
Pairwise test: **Dunn test**; Comparisons shown: **only significant**


Peso promedio de las heces (gr) por animal
$\chi^2_{\text{Kruskal-Wallis}}(4) = 88.49$, $p = 2.75\text{e-}18$, $\hat{\varepsilon}^2_{\text{ordinal}} = 0.22$, $\text{CI}_{95\%}$ [0.16, 1.00], $n_{\text{obs}} = 399$
$p_{\text{Holm-corrected}} = 0.028$
$p_{\text{Holm-corrected}} = 8.25\text{e-}06$
$p_{\text{Holm-corrected}} = 4.75\text{e-}17$
$p_{\text{Holm-corrected}} = 0.009$
$p_{\text{Holm-corrected}} = 3.69\text{e-}06$
$p_{\text{Holm-corrected}} = 2.5\text{e-}05$
Peso heces (gr)
90
60
30
0
$\hat{\mu}_{\text{median}} = 17.75$
$\hat{\mu}_{\text{median}} = 24.10$
$\hat{\mu}_{\text{median}} = 28.70$
$\hat{\mu}_{\text{median}} = 33.50$
$\hat{\mu}_{\text{median}} = 41.20$
Juvenal (n = 162)
Kayo (n = 121)
Shimimashiri (n = 51)
Viejita (n = 10)
Wendo (n = 55)
Sujeto
Pairwise test: **Dunn test**; Comparisons shown: **only significant**

ARod

ANIMAL BEHAVIORIST

Walden®

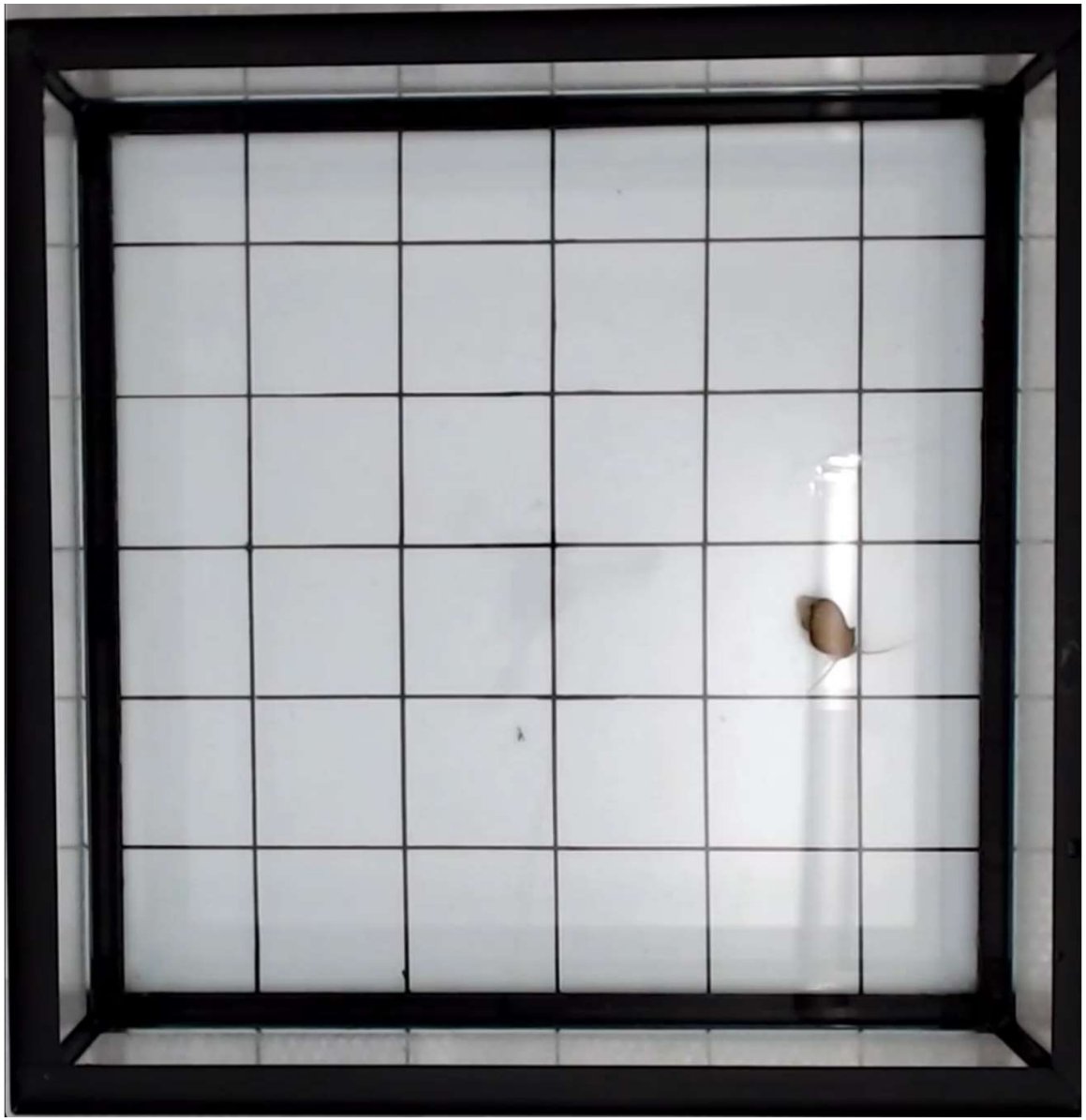
MODULAR EQUIPMENT

Conociendo el posible efecto que pueden tener especies no-nativas en el ambiente

How population density affects the locomotion patterns of Channeled Apple Snails (*Pomacea canaliculata*)

ARod1

ANIMAL BEHAVIORIST



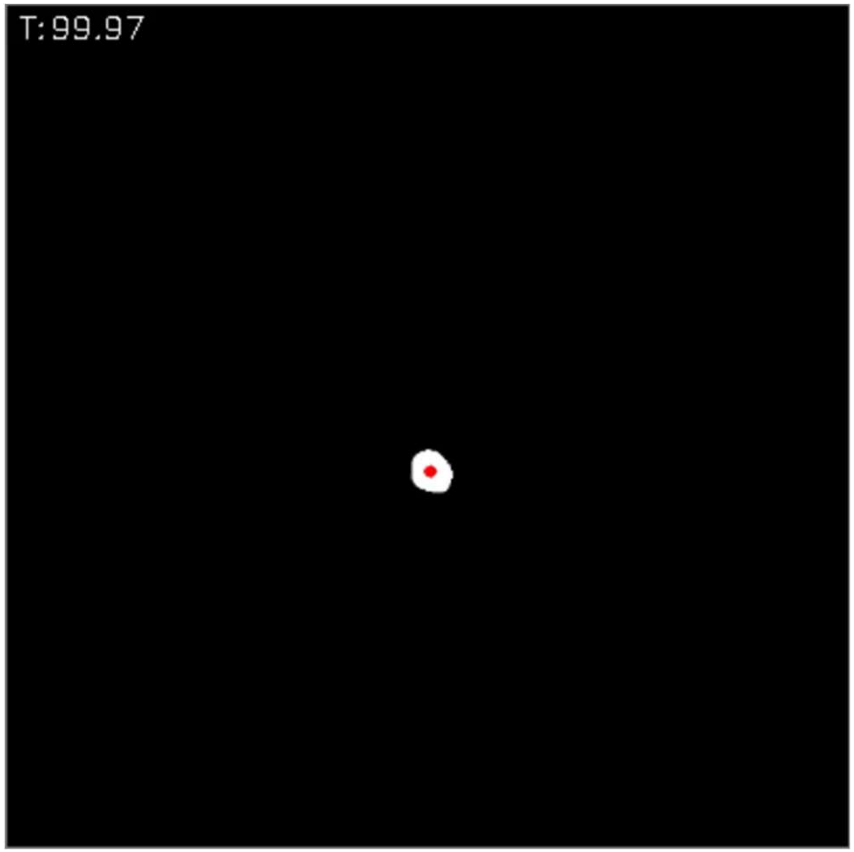

T:99.97

Table 2.1: Housing conditions

Group	n	Aerate	Housing	Dimensions	Capacity	ID
16L+A	16	Air Pumps[c]	Plastic box[a]	Large: 60.3cm x 40.6cm x 17.5cm	30 L	1:16
8L+A	8	Air Pumps[c]	Plastic box[a]	Large: 60.3cm x 40.6cm x 17.5cm	30 L	17:24
18L+W	16	Waterfall filter[d]	Plastic box[a]	Large: 60.3cm x 40.6cm x 17.5cm	30 L	25:42
8S+A1	8	Air Pumps[c]	Plastic box[b]	Small: 35.9 cm x 19.4cm x 12.4cm	5.7 L	43:50
8S+A2	8	Air Pumps[c]	Plastic box[b]	Small:35.9 cm x 19.4cm x 12.4cm	5.7 L	51:58
4T+W	4[f]	Waterfall filter[e]	Fish Tank	Tall: 50 cm x 35.5cm x 16.5cm	30 L	59:62

[a] Brand: Sterilite, Model: 32 Quart Latching Box

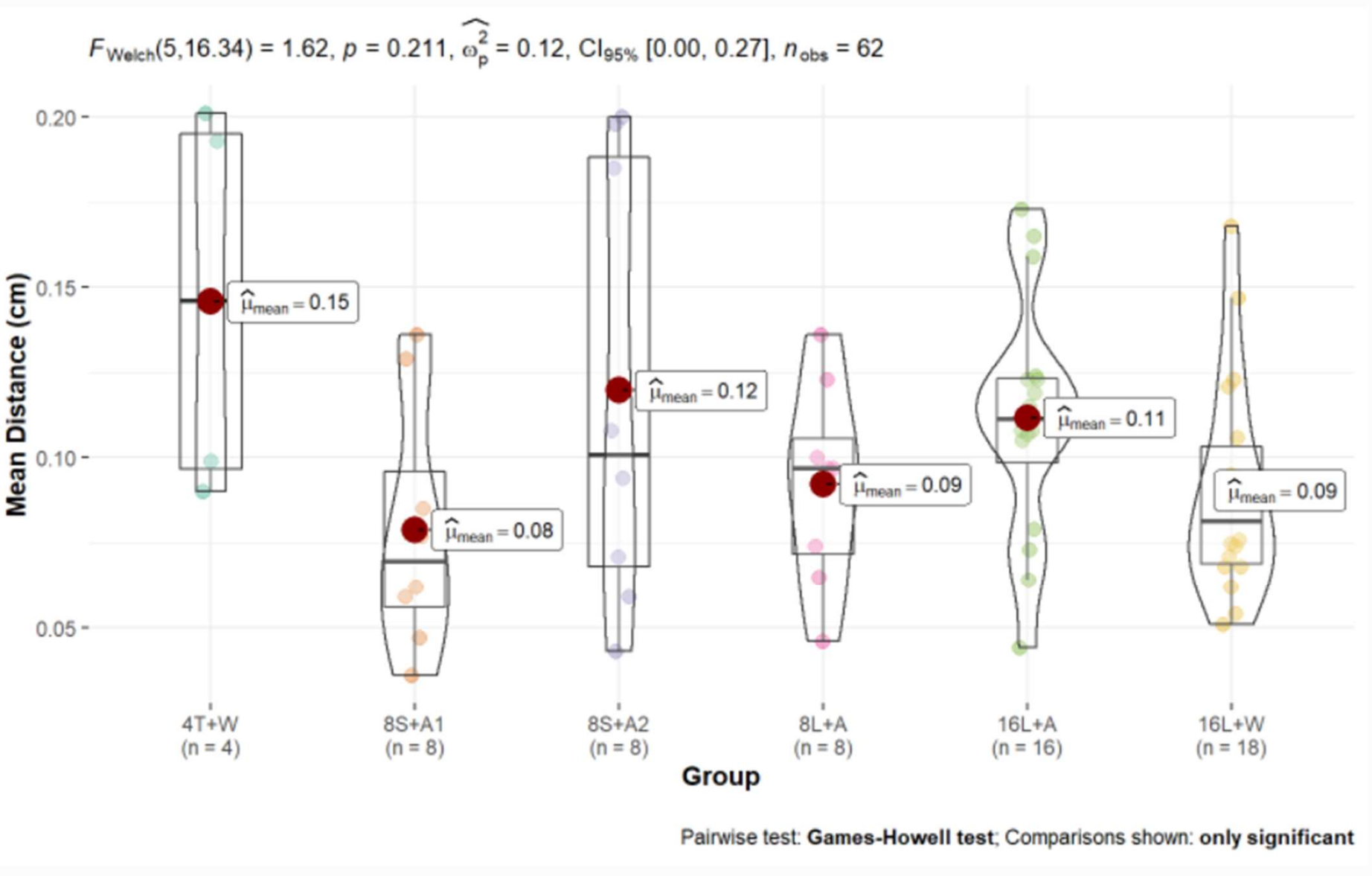
[b] Brand: Sterilite, Model: 6 Quart Latching Box

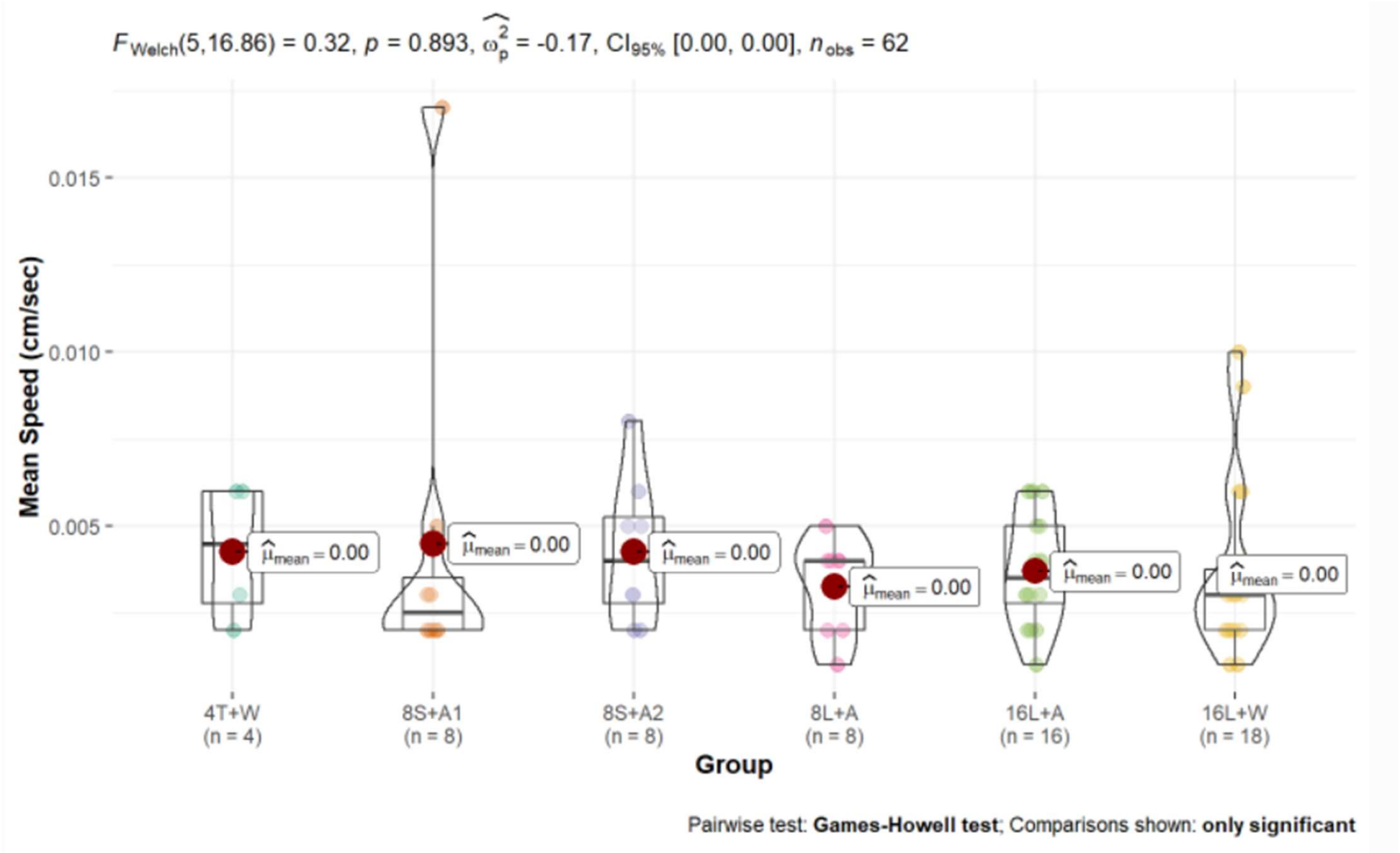
[c] Brand: Hagen, Model: HA802 Elite 802 20 Gal

[d] Brand: Lomas, Model: AquaJet Slim Pro 40 L

[e] Brand: Tetra, Model: Whisper Power Filter #25772 10-20 Gal

[f] This group shared the housing with 8 guppies

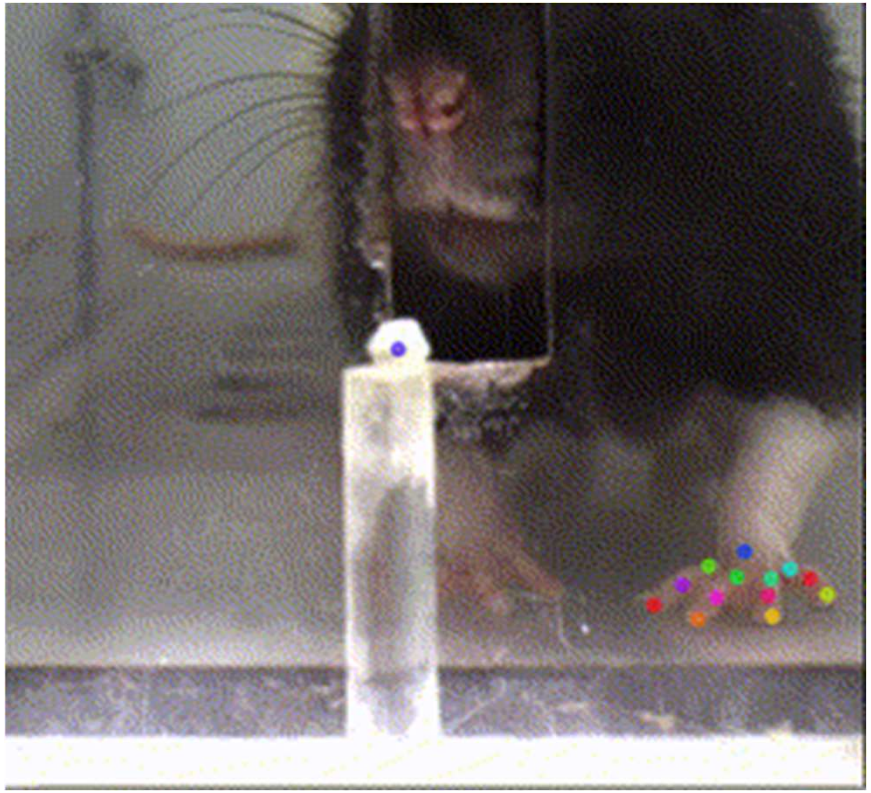

$F_{Welch}(5,16.34) = 1.62$, $p = 0.211$, $\widehat{\omega_p^2} = 0.12$, $CI_{95\%}$ [0.00, 0.27], $n_{obs} = 62$
Mean Distance (cm)
0.20
0.15
0.10
0.05
$\hat{\mu}_{mean} = 0.15$
$\hat{\mu}_{mean} = 0.08$
$\hat{\mu}_{mean} = 0.12$
$\hat{\mu}_{mean} = 0.09$
$\hat{\mu}_{mean} = 0.11$
$\hat{\mu}_{mean} = 0.09$
4T+W (n = 4)
8S+A1 (n = 8)
8S+A2 (n = 8)
8L+A (n = 8)
16L+A (n = 16)
16L+W (n = 18)
Group
Pairwise test: **Games-Howell test**; Comparisons shown: **only significant**


$F_{Welch}(5,16.86) = 0.32$, $p = 0.893$, $\widehat{\omega_p^2} = -0.17$, $CI_{95\%}$ [0.00, 0.00], $n_{obs} = 62$
Mean Speed (cm/sec)
0.015
0.010
0.005
$\hat{\mu}_{mean} = 0.00$
4T+W (n = 4)
8S+A1 (n = 8)
8S+A2 (n = 8)
8L+A (n = 8)
16L+A (n = 16)
16L+W (n = 18)
Group
Pairwise test: **Games-Howell test**; Comparisons shown: **only significant**

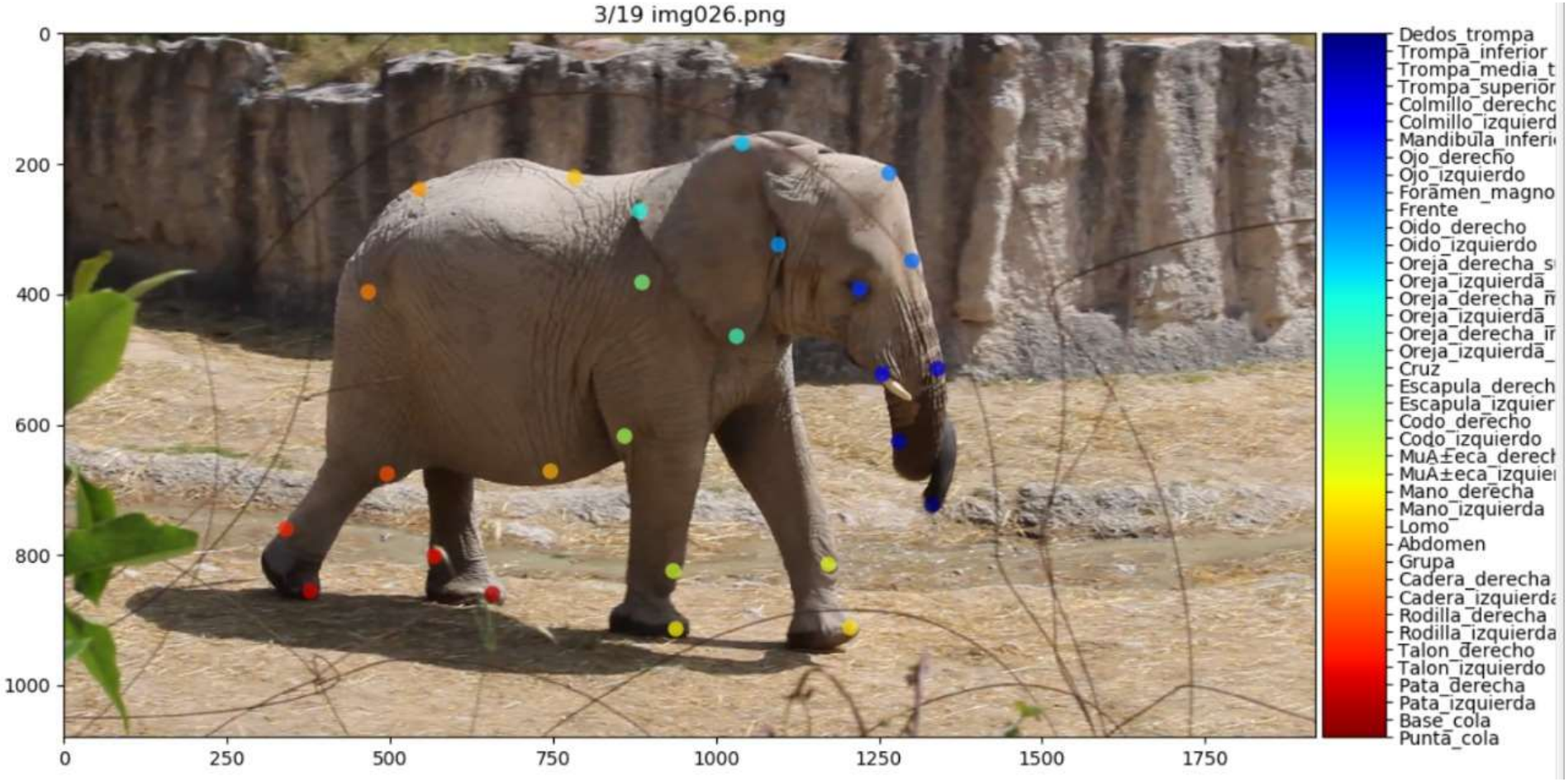
Utilizar técnicas novedosas para ayudar y promover la conservación de especies en peligro

DeepLabCut:

a software package for animal pose estimation

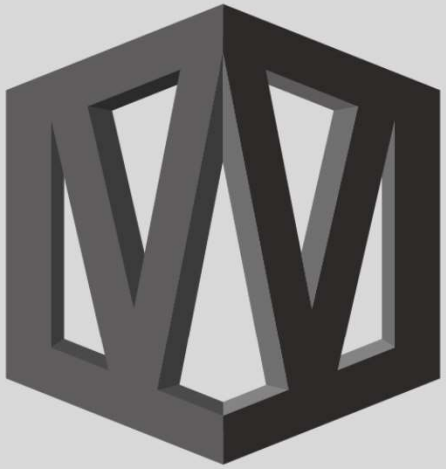


Mathis et al., 2018; Bova et al., 2019; Nath et al., 2019,. Mathis & Mathis, 2020



Using artificial intelligence to determine and prevent foot problems in African elephants (*Loxodonta africana*)

Rodrigo & Martinez (En preparación)



Walden®

MODULAR EQUIPMENT

Creando dispositivos tecnológicos de bajo costo

The welfare of fishes has been long forgotten...

...the Walden Operant Fish Tank is the solution!

Rodrigo, A., Avila-Chauvet, L., Esparza, C., Moreno Zazueta, J.N., Ojeda, Y. (Mexico)

Walden
MODULAR EQUIPMENT

Simple, easy adjustment nuts & bolts system adaptable to any fish tank.

No computer? No problem!*

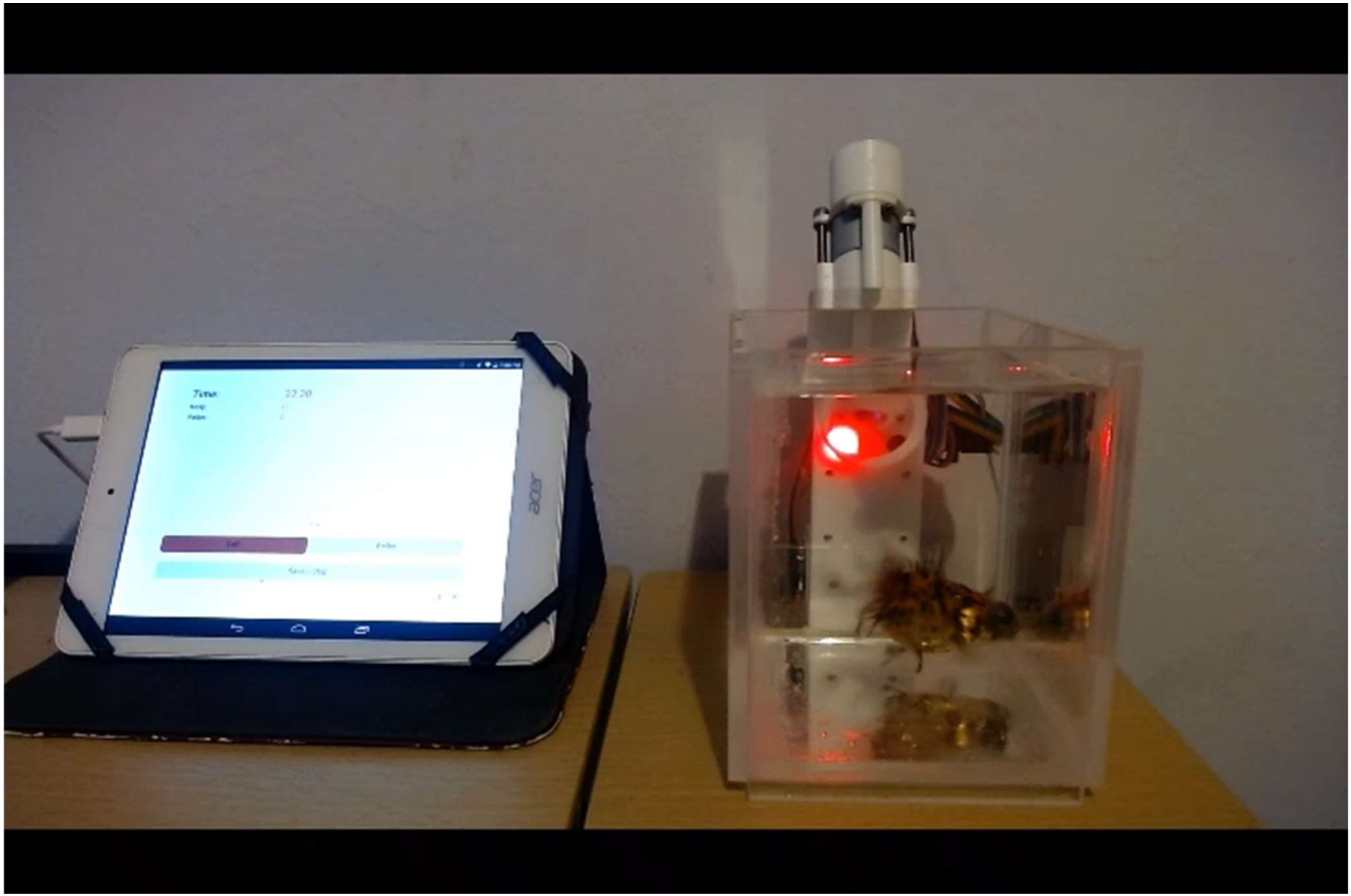
- Arduino-based software operated with joystick and integrated LCD display.
- Pre-programmed schedules of reinforcement (FI, VI, FR, VR) with session length control.
- Set the value of the programs and the frequency of food delivery.
- Illumination intensity, and response ring calibration.
- Record the fish move across the response hoop through the submersible ultrasonic sensor.
- with a bi-color LED
- Results summary (responses and food delivery).

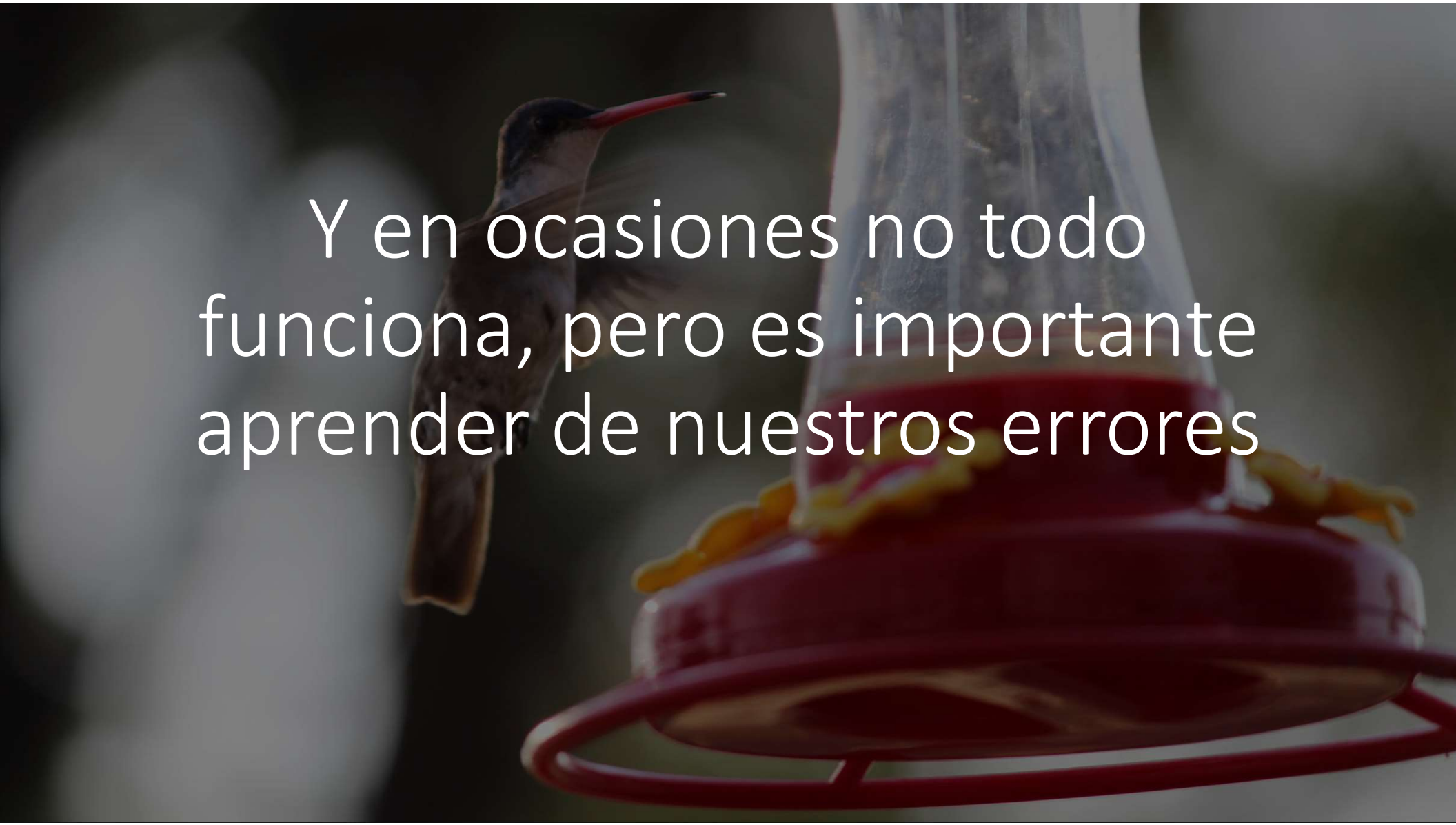
*WaldenPy

Operate the device with Python and the Waldenpy library available at Walden-me.com/Resources. Customize your programs.

*ScratchIt

Have you ever programmed? We are developing libraries so that you can use the equipment with the scratch graphical programming environment.


acer


Y en ocasiones no todo
funciona, pero es importante
aprender de nuestros errores

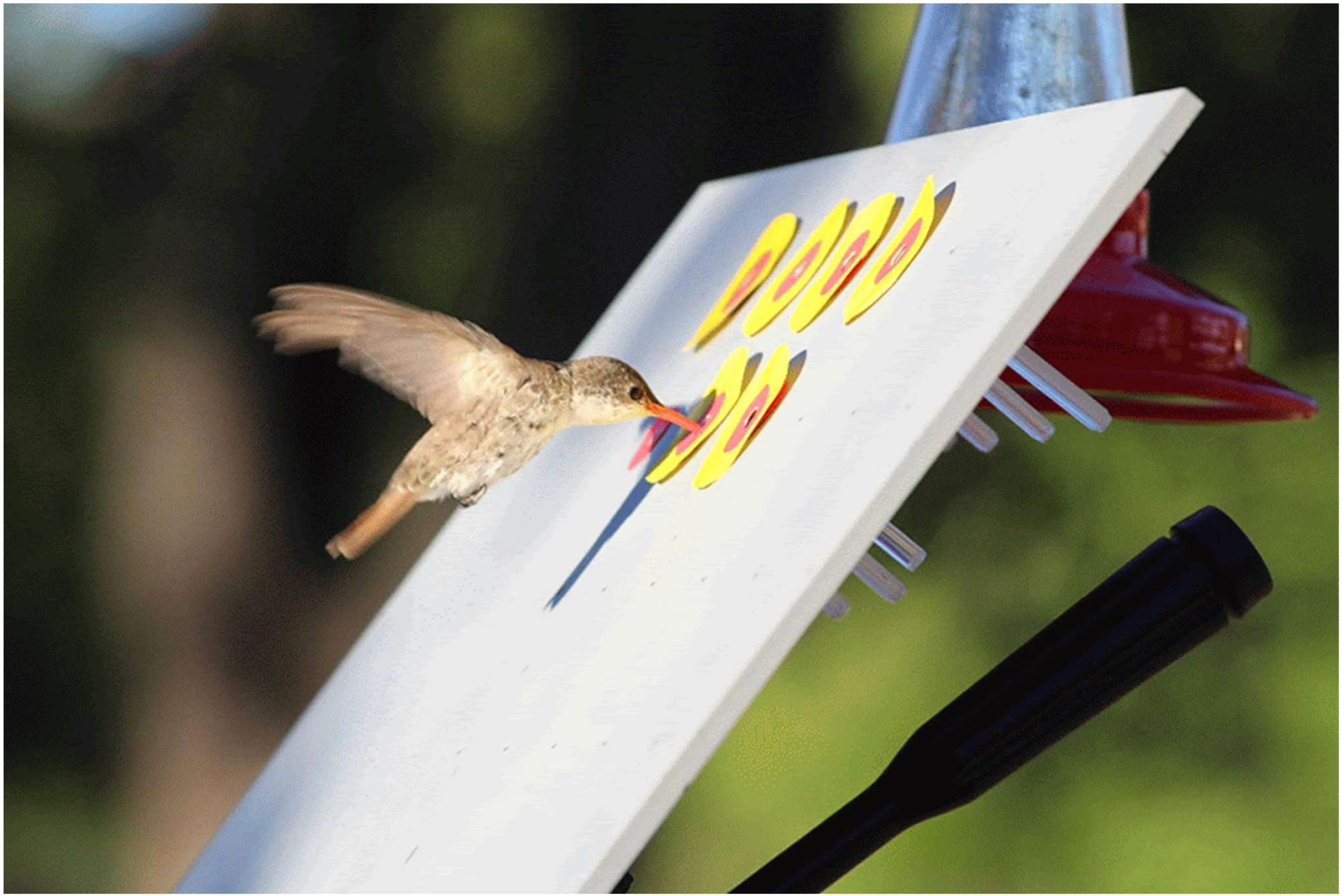



Photo by Scopio from Noun Project


Photo by Scopio from Noun Project


Photo by Scopio from Noun Project


Photo by Scopio from Noun Project


Photo by Scopio from Noun Project


Photo by Scopio from Noun Project


Photo by Scopio from Noun Project


Photo by Scopio from Noun Project

HACER LAS PACES CON LA NATURALEZA:

LA TAREA DEL SIGLO

Centro de Estudios e Investigaciones en Comportamiento

Walden®
MODULAR EQUIPMENT

PARQUE DE LAS LEYENDAS

UNIVERSIDAD DE GUADALAJARA
PIENSA Y TRABAJA

CONACYT

ARod

ANIMAL BEHAVIORIST

¡Gracias por su atención!

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