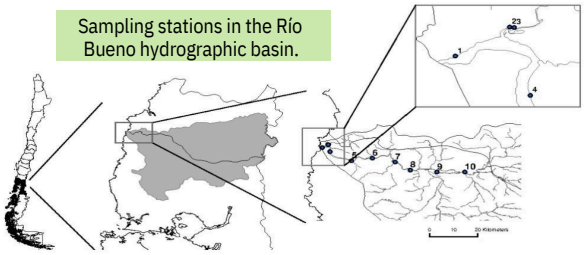
Sanitary implications of the interspecific co-occurrence of a domestic and wild mammal assemblage from central-southern Chile

Alexis Santibañez[1], Erwin M. Barría [2,3], Sandro Huenchuguala,[4]Macarena Barros-Lama [3], Carlos Calvo-Mac [7], Cristina Coccia2,5 and Gonzalo Medina-Vogel7
*Corresponding author: alexissantibanez@santotomas.cl
[1] Programa de Doctorado en Conservación y Gestión de la Biodiversidad, Facultad de Ciencias, Universidad Santo Tomás, Chile.
[2] Departamento de Ciencias Básicas, Facultad de Ciencias, Universidad Santo Tomás, Osorno 5290000, Chile.
[3] Centro de Investigación e Innovación en Cambio Climático, Facultad de Ciencias, Universidad Santo Tomás, Santiago 8370003, Chile.
[4] Escuela de Tecnología Médica, Facultad de Salud, Universidad Santo Tomás, Santiago 8370003, Chile.
[5] Department of Sciences, University of Rome, 00185 Rome, Italy
[6] NBFC, National Biodiversity Future Center, Palermo, Italy
[7] Centro de Investigación para la Sustentabilidad, Facultad de Ciencias de la Vida, Universidad Andres Bello, Santiago, Chile.

In natural environments, invasive species import diseases for native species. In temperate rainforests from central-southern Chile, the latrines of the endemic mustelid *Lontra provocax* are frequently visited by different species of native and invasive mammals, which suggests that such sites may constitute potential sources of contagion of long-lasting airborne pathogens. We quantify the interspecific co-occurrence of native and invasive mammals from *L. provocax* latrine visits and estimate the associated pathogenic risks.

Methodology: During spring 2022 - summer 2023 we characterized and quantified the interspecific co-occurrence between native and invasive mammals with camera traps installed on latrines of *L. provocax* in a riparian forest from north Patagonian hydrographic basin from Chile (Figure 1), and based in the number of paired co-ocurrences and the first and second species to arrive at the latrines, the probabilities of contagion of four disease: canine distemper, canine parvovirus, leptospirosis, and yersiniasis were estimated.

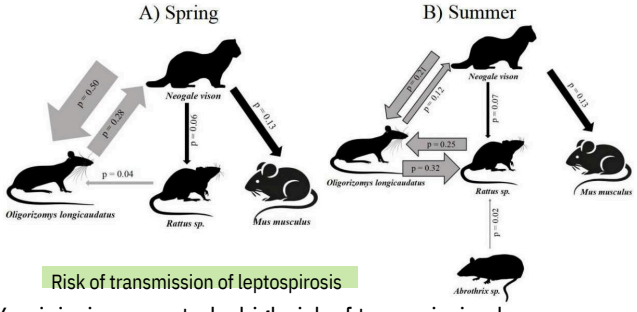
Sampling stations in the Río Bueno hydrographic basin.



Results: 14 mammal species (9 native and 5 invasive) were identified.

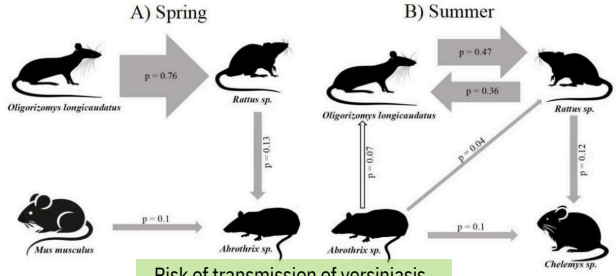
Taxon	Origin (Threatened Status)	Spring 2022 N° records	Spring 2022 N° Indiv.	Summer 2023 N° records	Summer 2023 N° Indiv.
ORDER CARNIVORA					
Family Mustelidae *Lontra provocax (Lpr) Neogale vison (Nvi)*	Native (EN)	7	4	82	8
Family Mephitidae *Conepatus chinga (Cch)* Family Canidae *Canis lupus familiaris (Clf) Lycalopex culpaeus (Lcu)*	Invasive	35	1	36	7
	Native (LC)	2	1	-	-
Family Felidae	Invasive	-	-	22	8
	Native (LC)	-	-	14	3
Leopardus guigna (Lgu)	Native (VU)	z37	3	1	1
ORDER RODENTIA					
Family Cricetidae	Native (LC)	20	3	17	4
Oligoryzomys longicaudatus (Olo)	Native (LC)	1	1	-	-
Chelemys macronyx	Native (LC)	1	1	1	1
Abrothrix sp.					
Family Muridae *Rattus norvegicus*	Invasive	3	1	24	4
Mus musculus	Invasive	1	1	-	-
Family Miocastoridae					
Myocastor coipus	Native (LC)	1	1	15	2
ORDER LAGOMORPHA Family Leporidae					
Lepus europeus	Invasive	-	-	4	2
ORDER DIDELPHIMORPHA					
Family Didelphidae					
Dromiciops gliroides	Native (NT)	1	1	-	-

N.vison also actively co-occurred with rodents, contributing to much of the leptospirosis transmission within the mammal assemblage analysed, especially by co-occurrence with *O. longicaudatus* in spring and the co-occurrence of this species with Rattus sp in summer.



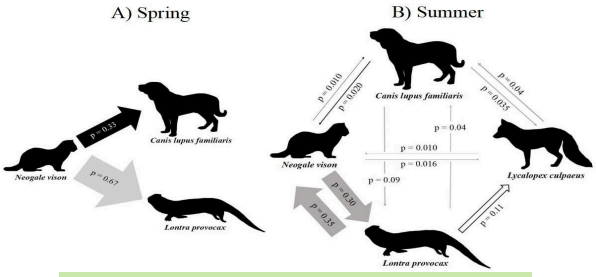
Risk of transmission of leptospirosis

Yersiniasis presented a high risk of transmission by co-occurrence among rodents, especially between O. longicaudatus and Rattus sp in both study periods.



Risk of transmission of yersiniasis

In both sampling periods, a high risk of transmission of canine parvovirus and distemper to *L. provocax* was observed due to co-occurrence with N. vison and to a lesser extent with *C. lupus familiaris*, while in summer L. culpaeus was incorporated into the complex of species with risk of transmission of both diseases.



Risk of transmission of canine parvovirus and distemper

Conclusions:

- *L. provocax* latrines constitute common areas of transit, activity and disease transmission for the assemblage of native and invasive mammals in the forest ecosystems of central- southern Chile. - *N. vison* and *O. longicaudatus* are important bridges for disease transmission to native mammals. - Our results reflect the need to manage and restrict the home range of dogs and their co-occurrence with *N. vison* and this with rodents.

Acknowledgments: Regarding financial aspects, this work would not have been possible without the support of the Fondecyt project 1171417, FIPA 2018-28 and the doctoral program of the Universidad Santo Tomás, which partially financed the fee. Also to the Internal Contest for Doctoral Thesis Research Projects, which allowed the acquisition of essential laboratory supplies for this research. Finally, to the Environmental Education and Citizen Participation program of Wenuleufu Lodge.