NOTAS

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Beware of the stripes: Encounter between *Lycalopex griseus* and *Conepatus chinga* in their natural environment in central Chile

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Resumen

Documentamos un encuentro ocasional entre las especies de carnívoros *Lycalopex griseus* y *Conepatus chinga*, usando cámaras trampa en el bosque mediterráneo nativo de la Cordillera de la Costa en Chile central. Se proporciona evidencia fotográfica del comportamiento agonístico exhibido por *C. chinga*, y de la reacción de *L. griseus* a esta interacción. En vista de la segregación incompleta de nichos y el solapamiento espacio-temporal en el uso del hábitat por ambas especies, nuestras observaciones contribuyen a una mejor comprensión de las interacciones y dinámicas ecológicas de la comunidad de carnívoros de este ecosistema.

Palabras clave: comportamiento agonístico, interacciones intragremio, evitación de competencia, segregación de nichos.

Abstract

We document an occasional encounter between carnivore species *Lycalopex griseus* and *Conepatus chinga*, using camera traps in native Mediterranean forest of the Coast Range in central Chile. Photographic evidence is provided as to the agonistic behavior exhibited by *C. chinga* and the reaction of *L. griseus* to this interaction. In view of incomplete niche segregation and the spatiotemporal overlap in the habitat use for both species, our observations contribute to a better understanding of the interactions and ecological dynamics of the carnivore community of this ecosystem.

Key words: agonistic behavior, intraguild interactions, competition avoidance, niche segregation.

Carnivores play an essential role in maintaining the structure and stability of natural ecosystems (Prevosti & Pereira 2014). Sympatric species of carnivores have often coexisted over an evolutionary time scale, where niche differentiation has occurred and competition is more difficult to observe (Glen & Dickman 2005). Consequently, carnivores interact with each other in a variety of ways, and conservation efforts require a greater understanding of the complex relationships between species at the landscape level (Glen & Dickman 2005).

Seven native carnivore species have been described in central Chile: *Lycalopex griseus* and *Lycalopex culpaeus* (Canidae), *Leopardus guigna*, *Leopardus colocola*, and *Puma concolor* (Felidae), *Conepatus chinga* (Mephitidae) and *Galictis cuja* (Mustelidae) (Ramírez-Álvarez 2018).

The Chilla fox (*L. griseus*) weighs around 4 kg and is the most abundant fox species in central Chile (Ramírez-Álvarez et al. 2023). The distribution range of the species extends from Atacama to Tierra del Fuego and includes a large variety of habitats. In central and southern Chile, there is an overlap with areas occupied by Molina's hog-nosed skunk (*C. chinga*), a smaller and lighter species weighing just around 3 kg. Both species are active at dawn and throughout the night (Zúñiga et al. 2017; Ramírez-Álvarez 2018), suggesting a high potential for encounters.

The present note describes the first evidenced opportunistic encounter and direct interaction between *L. griseus* and *C. chinga*, as observed in camera trap records, and provides a discussion of our observations.

During a field study carried out in La Estrella, O'Higgins Region, central Chile, we distributed ten camera traps in the native Mediterranean coastal thorn forest. Camera traps were separated by 1,000 m each, so as to form a regular monitoring grid (Trolliet et al. 2014). No bait or lure was used. We used Bushnell 24MP Trophy Cams, model 119719CW, with the following settings: Mode: Camera, Image size: HD pixel, Capture number: 2 photos, Interval: 3 sec, Sensor level: Auto, Camera mode: 24 hrs. The cameras were active between March 1, 2021, and March 31, 2022, with a total photo-trapping effort of 3,098 camera days. Photos obtained were inspected visually, and those displaying native carnivores were selected for further analysis.

On September 24th, 2021, a camera trap positioned at -34.2789, -71.6650 (WGS84) captured the occasional encounter between *L. griseus* and *C. chinga* in their natural environment (Figure 1). The sequence was recorded at 9:47 p.m. and may be described as follows: An adult individual of *L. griseus* passed through an area of open vegetation and approached to a solitary adult of *C. chinga*. There are no evident visual signs of *L. griseus* realizing the skunk's presence (Figure 1A). Seconds later, the fox turned its head towards the skunk, now undoubtedly aware of its presence (Figure 1B). The fox abruptly changed its path and thus reduced the risk of direct contact with the skunk. At the same time, the skunk turned towards the fox and adopted a defensive position, arching its back and rising its tail (Figure 1C). The fox augmented the distance between them and walked in a wide arc around the skunk, eventually leaving the scene. *C. chinga* maintained its defensive position during the remainder of the sequence (Figure 1D-1F).

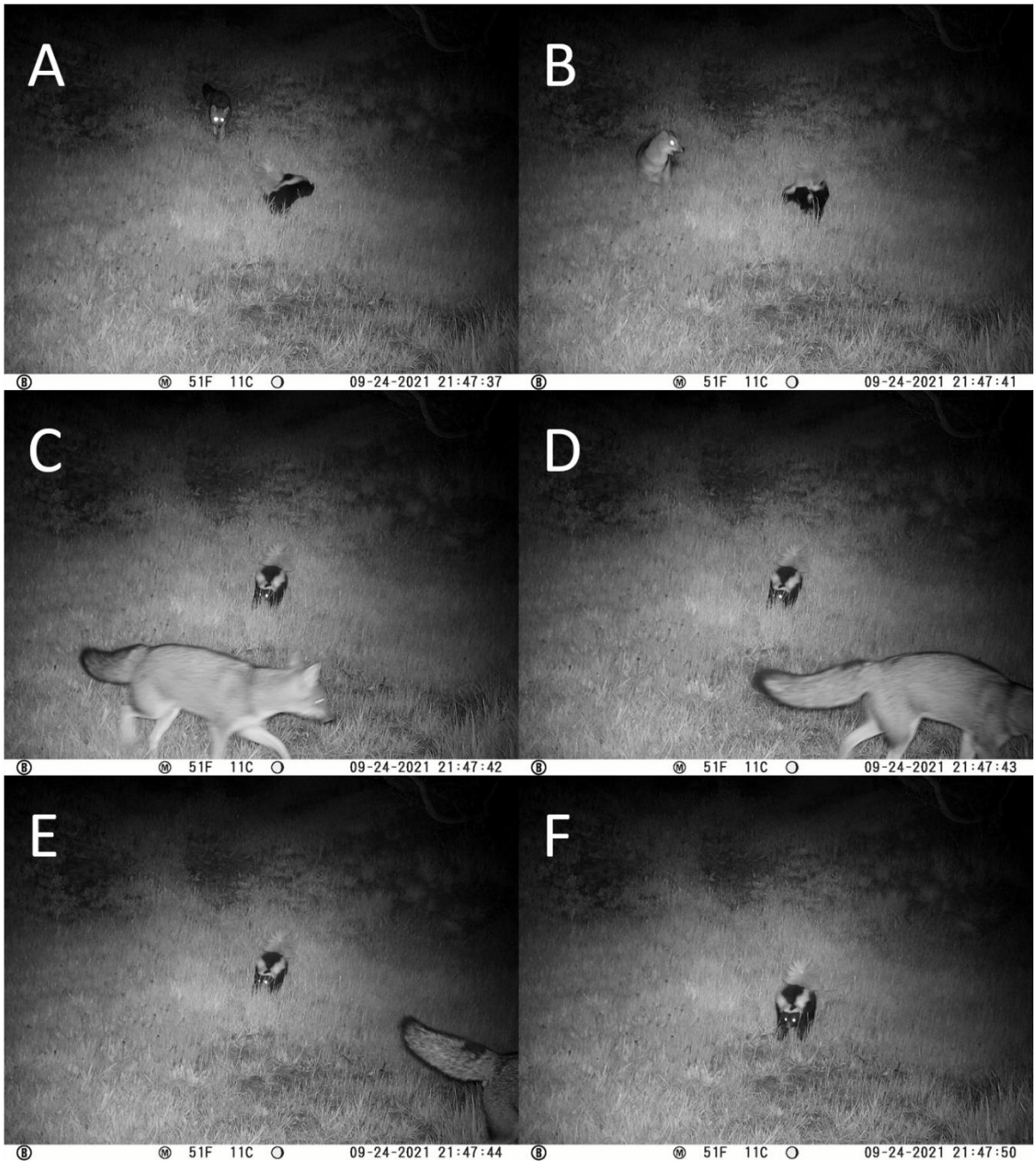

FIGURE 1. Photographic sequence of a chance encounter between *L. griseus* and *C. chinga* in the native Mediterranean coastal thorn forest of central Chile.

Owing to significant overlap between both species in terms of their spatial use of the environment and activity patterns, encounters like this may not be extraordinary. While the differential use of space and time is one of the most frequent segregation strategies, coexistence may also be facilitated by the differentiation in other ecological traits (Gil-Sánchez et al. 2021; Arias-Alzate *et al.* 2022). For instance, resource partitioning and competition avoidance may be based on diet, and indeed, *L. griseus* and *C. chinga* differ in their foraging behavior and diet composition.

C. chinga has been described as an omnivorous species with a preference for insects it finds by "digging with fore legs and muzzle" and "searching under bushes and clumps of grass" (Donadio et al. 2001). While vertebrate prey – especially mammals – has been shown to account for more than half of the biomass ingested by this skunk, this may largely be attributed to the consumption of carrion (Novaro et al. 2000). By contrast, *L. griseus* actively explore their home range while relying on smell and audition to identify potential food sources. As generalist and opportunistic predators, *L. griseus* feed on live prey and carrion as well as fruits and seeds (Zúñiga et al. 2008; Zúñiga et al. 2018). In this context, previous studies conducted in the Mediterranean ecosystems of central Chile have shown rodents and lagomorphs to account for about 90% of prey biomass ingested by the species (Muñoz-Pedreros *et al.* 2018).

In view of the former, niche segregation between *L. griseus* and *C. chinga* is not complete, and avoidance behavior may be expected for the subordinate species in order to minimize the risk of active interference competition (Tannerfeldt *et al.* 2002; Leo et al. 2015). Dominance over other species also depends on the respective animals' body mass, which, in this situation, puts the skunk at a disadvantage (Donadio & Buskirk 2006; de Oliveira & Pereira 2014). The skunk would also not be able to outrun the Chilla fox, and still, we can observe avoidance behavior in the larger carnivore. Due to their smaller mean body size and plantigrade foot posture, skunks are under high potential predation pressure, but evolution has equipped them with a powerful defense mechanism (Hunter & Caro 2008).

Members of the Mephitidae family are well known for their ability to spray an oily, foul-smelling liquid from their anal glands in order to repel potential predators, which is also accompanied with aposematic coloration (Hunter & Caro 2008). In the face of threat, skunks will adopt a warning stance with their back arched and tail raised. They may also stomp their front feet, scratch, or hiss to advertise their noxiousness, especially in conditions that give poor visibility to their aposematic coloration (Lartviere & Messier 1996). This type of defense behavior is what we can observe in our photographic sequence, and it may allow *C. chinga* to survive while using similarly ecological niches as larger carnivores like *L. griseus* without incurring the costs of a direct dispute.

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