

Predation of *Gecarcinus quadratus* (Decapoda: Gecarcinidae) by *Aramides cajaneus* (Gruiformes: Rallidae) in Costa Rica

Depredación de *Gecarcinus quadratus* (Decapoda: Gecarcinidae) por *Aramides cajaneus* (Gruiformes: Rallidae) en Costa Rica

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ABSTRACT

Gecarcinus quadratus is a land crab preyed upon by some species, but there is little information about the genera and species of these predators. This scientific note presents the first record of *Aramides cajaneus* preying upon *G. quadratus*. This observation occurred during daylight in May 2021 in Costa Rica, and contributes to the knowledge about the natural history, behavior and ecology of these species.

Keywords: behavior, diet, Gray-cowled Wood-Rail, Halloween Crab, natural history

RESUMEN

Gecarcinus quadratus es un cangrejo terrestre depredado por algunas especies, sin embargo, hay poca información en el nivel de género y especie de sus depredadores. Esta nota científica presenta el primer registro de *Aramides cajaneus* depredando a *G. quadratus*. La observación ocurrió durante el día, en mayo del 2021, en Costa Rica y contribuye al conocimiento sobre la historia natural, comportamiento y la ecología de estas especies.

Palabras clave: comportamiento, dieta, Cangrejo de Halloween, Rascón Cuelligrís, historia natural

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INTRODUCTION

Gecarcinus quadratus (de Saussure, 1853) is a terrestrial crab that inhabits neotropical coastal forests, and is distributed from Florida, through the Antilles and Central America to Guyana on the Atlantic Coast, and from Mexico to Peru on the Pacific Coast (Burggren & McMahon, 1988; Sherman, 2002). It is fossorial, its populations (of up to six crabs m⁻²) extend approximately 600 m inland from the shore in coastal forests, and its activity outside the burrow increases during the rainy season (Von Prahll & Manjarrés, 1984; Sherman, 2002; Sherman, 2003). It has been reported as being preyed upon by *Crocodylus acutus* (Cuvier, 1807), *Procyon lotor* (Linnaeus, 1758), some birds and perhaps other crabs (Carrillo *et al.* 2001; Perger *et al.* 2013; Cupul-Magaña *et al.* 2015; Villagrán-Colón *et al.* 2016). *G. quadratus* may have developed adaptations to high levels of predation (Perger, 2013), but there is little information about the genera and species of these predators.

On the other hand, *Aramides cajaneus* (Stadius Muller, 1776) is a bird distributed from southwestern Costa Rica southwards to northern Argentina, from lowlands up to 2,300 m.a.s.l. (Stiles & Skutch, 1989; Taylor, 2020). It inhabits wet ground along the sides of streams, as well as swamps,

secondary growth and deciduous woodlands, mangroves, marshes and marshy thickets, rice and cane fields, seasonal pools and scrubby pastures, as long as they include wet and shaded areas (Stiles & Skutch, 1989; Taylor, 2020). Its diet is diverse and includes mostly invertebrates (including crabs), but also small vertebrates such as frogs, as well as seeds and fruits (Stiles & Skutch, 1989; Taylor, 2020). It also feeds on the feces of giant otters in latrines (Leuchtenberger *et al.* 2012).

Among the crab species reported as prey of *A. cajaneus* are: *Uca rapax* (Smith, 1870), *U. mordax* (Smith, 1870), *U. leptodactyla* (Rathbun in Rankin, 1898), *U. uruguayensis* (Nobili, 1901), and *Callinectes danae* (Smith, 1869; Silva & Olmos 2015). It has also been observed consuming droppings of horses and *P. lotor*; in the latter, perhaps looking for remains of crab exoskeletons, possibly of the genera *Gecarcinus* and *Cardiosma* (Skutch, 1994; Solano-Ugalde, 2005). Nevertheless, there are no reports of *A. cajaneus* preying on *G. quadratus*. The following report represents the first record of an event of this kind.

MATERIALS AND METHODS

The event occurred on the El Pezoso Trail, at Manuel Antonio National Park, Quepos, Puntarenas, Costa Rica (9° 23' N, 84° 8' W; 23 m.a.s.l.).

On 24 May 2021, at 08 00 h, the second author observed an individual of *A. cajaneus* preying on an individual of *G. quadratus* during a guided tour. The crab was coming out of the forest and the wood-rail followed, pecking at it. When they reached the trail, the crab tried to cross it and escape, but the wood-rail took advantage to get close to

it, catching one of its walking legs with its bill and flipping it on its back. It began to hammer at the crab with its bill to break its shell, while the crab tried to defend itself by raising its chelipeds (Fig. 1). Finally, the bird killed the crab and carried it into the forest as a large group of people approached the site. The whole event lasted at least 2 minutes.



Fig. 1. *Aramides cajaneus* preying on *Gecarcinus quadratus*, Manuel Antonio National Park, Costa Rica, 2021 (Photos from a video recorded by Jorge Picado; the pictures should be viewed from left to right in each row and the rows should be viewed from top to bottom)

Fig. 1. *Aramides cajaneus* depredando a *Gecarcinus quadratus*, Parque Nacional Manuel Antonio, Costa Rica, 2021 (Secuencia de fotos del video grabado por Jorge Picado, ver de izquierda a derecha y de arriba hacia abajo)

RESULTS AND DISCUSSION

Land crabs are preyed upon by a wide range of vertebrates (Burggren & McMahon, 1988). Many of them are birds, which have been identified at the species level (Burggren & McMahon, 1988; Wolcott & Wolcott, 1982; Silva & Olmos 2015). In the case *G. quadratus*, we only found two predators identified to this level (Carrillo *et al.* 2001; Cupul-Magaña *et al.* 2015). Birds have also been reported as predators of *G. quadratus*, but there is no specific data on their taxonomy; this is the first study in which an avian predator is identified at the species level.

Some crab species are also an important part of the diet of *A. cajaneus* (Silva & Olmos 2015; Taylor, 2020). In mangroves, for example, this bird preys heavily on crabs (Taylor, 2020). In this sense, it could be that this crab is a regular part of the diet of *A. cajaneus*, along with other crab species (Silva & Olmos 2015), but it is necessary to carry out further studies to determine its diet in more detail. It is possible that the wood-rail took advantage of the crab crossing the trail to hunt it.

The wood-rail hammered its prey with its bill to destroy its shell, a behavior which has been reported when this species preys on snails (Taylor, 2020). While the crab tried to defend itself by raising its chelipeds, it was unable to use them successfully or

use autonomy in response to the attack, which is a defensive system used by *G. quadratus* to defend itself effectively while wandering far from a burrow or retreat (Robinson *et al.* 1970). Likewise, the Halloween Crab is nocturnal (Sherman, 2002; Sherman, 2003), and *A. cajaneus* apparently often feeds at night (Taylor, 2020), but this observation occurred at 08:00 h. However, both species can also engage in diurnal activity (Von Prael & Manjarrés, 1984; Solano-Ugalde, 2005), so it is possible that this was an opportunistic event.

Knowledge about predation is one of the initial steps to understand the ecology and ethology of animals (Curio, 2012). Identifying species of predators provides basic information to study its impact on the life histories of prey and their defense mechanisms, as well as the hunting behavior and diet of predators (Robinson *et al.* 1970; Curio, 2012; Perger *et al.* 2013). The evidence presented here contributes to the knowledge about the natural history, behavior, and ecology of both *G. quadratus* and *A. cajaneus*.

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