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FEEDING BEHAVIOUR OF TWO BUTHID SCORPIONS OF THE GENUS *ANDROCTONUS* EHRENBERG, 1828 FROM THE CENTRAL SAHARA OF ALGERIA (SCORPIONES: BUTHIDAE)

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Abstract. Scorpions are predatory arthropods known for their hunting prowess and adaptability in various environments, but studies on the food preference of many species remain rare. The aim of this paper is to study the intra- and inter-guild feeding behaviour and food preference of two of the most abundant buthid scorpions of the genus *Androctonus* Ehrenberg, 1828: *A. amoreuxi* (Audouin, 1825) and *A. australis* (Linnaeus, 1758), in the Algerian Sahara. Food preference was experimentally assessed using several locally widely available species: the larvae of *Tenebrio molitor* Linnaeus, 1758 (laboratory breeding), *Pimelia angulata* Fabricius, 1775, *Gomphocerinae* sp., *Mantis religiosa* (Linnaeus, 1758) and *Periplaneta americana* (Linnaeus, 1758). For each prey species, we calculated the prey acceptance time (PAT), number of stings (NS), voracity time (VT), and the rate of consumption (RC). Our results show that *T. molitor* was the most preferred prey species, though the fixation and attack time for the prey *P. angulata* was significantly longer compared to other species. Additionally, *A. amoreuxi* exhibited higher voracity, while *A. australis* displayed a shorter feeding duration. The prey species *P. americana, Gomphocerinae* sp. and *M. religiosa* were moderately appreciated by the two scorpions. Moreover, the intra-guild predation and cannibalism results show that *A. amoreuxi* was more aggressive, while *A. australis* was faster.

INTRODUCTION

Scorpions are notable carnivorous and cannibalistic arthropods, occupying a pivotal position in the food chain due to their effectiveness as predators of diverse taxa (Vachon 1952; Gouge and Olson 2001; Chedad et al. 2023). Their predatory proficiency is attributed to their ability to detect prey via tactile and auditory senses (Pinkston and Wright 2001). Their diet predominantly consists of insects and arachnids, but larger scorpions extend their diet to include other invertebrates, small lizards, snakes, and even small mammals such as mice (Vachon 1952; McCormick and Polis 1995; Dupré 2015; Sadine and El Bouhissi 2021; Chedad et al. 2022; Kock 1969; Dupré 2015; Sadine 2018). Cannibalism and intra-guild predation are also commonly observed in several scorpion species (Lighton et al. 2001; Sánchez-Piñero, & Urbano-Tenorio 2016; Moreira et al. 2022).

The foraging behaviour of scorpions is intrinsically linked to the availability of food resources within their environment (Rombach et al. 2023). For many species, the availability of these resources is a primary factor influencing their survival and population growth rates (Sinclair and Krebs 2003; Ruf et al. 2006). According to Forbes and Kyriazakis (1995), food preferences in scorpions are influenced by multiple factors beyond mere nutritional needs. These include the flavour and smell of food, its visual appearance (Wilcoxon et al. 1970), and the size and age of the predatory scorpions themselves (Cisneros and Rosenheim 1997; Rudolf 2006). Seasonal changes also play a significant role in shaping these preferences (Vonshak et al. 2009; McReynolds 2020).

The ecology and feeding behaviour of scorpions in the arid regions of North Africa, including Algeria, remain scarce and poorly understood. Our work aims to evaluate the feeding preferences of two species of *Androctonus: A. amoreuxi and A. australis.* Specifically, we observed inter-guild predation between *Androctonus* species and their prey*,* as well as intra-guild predation and cannibalism between *A. australis* and *A. amoreuxi* under laboratory conditions.

MATERIALS AND METHODS

Scorpion material

Scorpion material was collected at random from Ghardaïa region (29°19′N-32°57′N, 02°03′E-04°54′E). Located in the central Algerian Sahara, this region is an arid desert (Mihoub et al. 2016). Scorpions were collected in various forms of biotopes between June 2022 and December 2023, using ultraviolet light during the night and using direct hunting with a 30 cm pincer during the day.

Androctonus amoreuxi **(**Audouin, 1826): Scorpion of large size, up to 12 cm in length (Vachon 1952; Lourenço 2005). It is regarded as a desert scorpion due to its primary association with sandy substrates (Touloun et al. 2014a, b) and is considered the biggest scorpion in Algeria (Sadine et al. 2020; Dupré et al. 2023). In the study area, it is the most abundant scorpion species (Sadine et al. 2023) which prefers sandy, gravelly, and stony grounds (Sadine et al. 2018).

Androctonus australis **(Linnaeus, 1758):** Scorpion of large size up to 10 cm in length, a thick metasoma, straw-yellow in colour, and darkened body parts (Vachon 1952; Lourenço 2005). It is an opportunistic species (Sadine et al. 2012) and is widespread in various eco-geographical regions in Egypt (Saleh et al. 2017), particularly in rocky habitats with relatively rich desert vegetation cover (Badry et al. 2018). It is the most abundant species in the Algerian septentrional Sahara (Sadine 2018). In the study area (Ghardaïa region), its relative abundance reaches 33.82% (Sadine et al. 2023).

Prey species

The prey species we have chosen in this study are either available at the study site or reared under laboratory conditions. Table 1 summarizes the prey species used.

Experimental protocol

In order to study the feeding and to observe the predatory behaviours in both inter-guild and intra-guild aspects of *Androctonus* Ehrenberg, 1828, we set up the following experimental protocol.

Figure 1. Adult *Androctonus amoreuxi* (alive) in laboratory.

Figure 2. Adult *Androctonus australis* (alive) in laboratory.

Table 1. Prey species used to test the food preference of *Androctonus* species.

Prey species	Class/Order	Familly	Stages	Activities	Availability
Tenebrio molitor Linnaeus, 1758	Insecta/ Coleoptera	Tenebrionidae	Larvae	Diurnal, nocturnal	***(#)
Pimelia angulata Fabricius, 1775	Insecta/ Coleoptera	Tenebrionidae	Adult	Diurnal, nocturnal	***
Gomphocerinae sp.	Insecta/ Orthoptera	Acrididae	Adult	Diurnal	**
Mantis religiosa (Linnaeus, 1758)	Insecta/ Mantodea	Mantidae	Adult	Diurnal, nocturnal	*
Periplaneta americana (Linnaeus, 1758)	Insecta/ Blattodea	Blattidae	Adult	Nocturnal	***
Androctonus amoreuxi (Audouin, 1825)	Arachnida/Scorpiones	Buthidae	Adult	Nocturnal	***(#)
Androctonus australis (Linnaeus, 1758)	Arachnida/Scorpiones	Buthidae	Adult	Nocturnal	***(#)

*** very abundant, ** moderately abundant, * rare, (#) laboratory breeding.

Scorpions were kept individually in terrariums (40 cm × 20 cm × 15 cm) covered with dark fabric to create a medium level of darkness and with at least 2 cm of sand on the bottom. The tested scorpions were deprived of food for one week. Each experimental group (batch) of scorpion species contained five individuals.

One group of scorpions was used to observe inter-guild predation and was fed with various insect prey (Table 1). A second group was used to observe intra-guild predation and cannibalism and was thus tested with conspecific or heterospecific scorpion prey. For each prey individual, we measured the initial weight (IW) with a 0.01g precision scale and the size with a 0.01 mm precision caliper.

The parameters of interest in our work were:

- Prey acceptance time (PAT) = Δ time between the placing of the prey species into the terrarium and its fixation by the scorpion.
- Number of stings (NS) = the number of stings performed by the scorpion in order to kill or to subdue its prey.
- Voracity time (VT) = consumption time = the time required for the scorpion to consume its prey, which is Δ time between the subjection of the prey until the scorpion discards it permanently.
- Rate of consumption (RC) = the percentage of prey consumed; it is calculated by subtracting the weight of the remaining prey from its initial weight.

Statistical analysis

Statistical analyses of the data were performed using R 3.3.2 (R Core Team 2009) software with a significance level of α = 0.05. Prior to analysis, the normality of the data sets was assessed by the Shapiro-Wilk test. For the rate of consumption (RC), we collected the remaining prey, weighed them and calculated the ratio to the initial prey weight. For the study of feeding preference behaviour, we carried out descriptive analyses of each parameter measured: prey acceptance time (PAT), number of stings (NS), voracity time (VT), and rate of consumption (RC).

We performed statistical analyses using R software, focusing on the relationships between dependent variables (PAT, VT, RC, and NS) and independent variables (prey species and scorpion species). The generalized linear mixed models (GLMMs) were employed with appropriate link functions tailored to the nature of each variable. Specifically, a Gaussian link function was applied to the dependent variables PAT and VT, a Poisson link function was utilized for the variable NS, and a binomial link function was used for the variable RC. These analyses were conducted using the “lme4” package in R. Furthermore, to assess the differences and significance of scorpion and prey species on the dependent variables PAT, VT, NS, and RC, an ANOVA was performed using the “stats” package in R.

RESULTS

Inter-guild interaction

Acceptance and fixation times results for both scorpion species vary significantly depending on the prey species. *Tenebrio molitor* and *Periplaneta americana* were quickly attacked by both species within a time period ranging from 5 to 46 minutes. Conversely, the attack and fixation time for *Mantis religiosa* and *Gomphocerinae* sp. ranged between 55 and 160 minutes for both scorpion species. On the other hand, scorpions took a longer time to accept and fixate *Pimelia angulate,* ranging from 120 to 405 minutes.

The results (Figure 3) show that the voracity time (VT) of the different prey species is highly variable for the two species of scorpions. *T. molitor* larvae are quickly consumed by scorpions with consumption times ranging between 8 and 15 minutes. *P. americana* is consumed within 40 to 15 minutes. *Gomphocerinae* sp. and *M. religiosa* have consumption times ranging from 30 to 90 minutes. While *P. angulata* has a longer consumption time compared to other prey species, ranging between 35 and 82 minutes for *A. australis* and between 35 and 120 minutes for *A. amoreuxi.*

The results of counting the number of stings to fix the prey species (Figure 4) showed that it varied from one sting to six stings. *A. amoreuxi* remains very aggressive compared to *A. australis*, often stinging more than 3 times. The prey species *P. angulata* is the most attacked, with a high number of stings varying between 2 and 6 for both scorpion species. Other prey species, including *Gomphocerinae* sp., *M. religiosa* and *P. americana* are also strongly attacked by *A. amoreuxi*. But *T. molitor* is the least attacked prey species by the two scorpion species (1 to 2 stings).

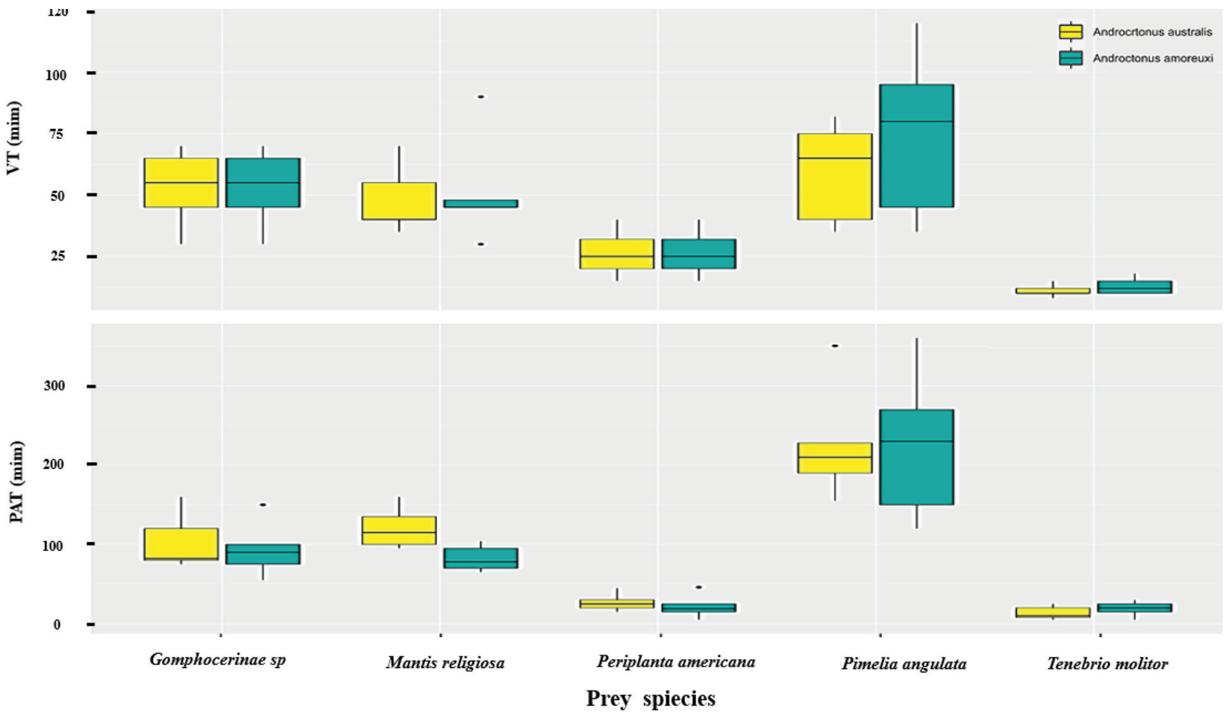

Figure 3. Variation of prey acceptance time (PAT) and voracity time (VT) in inter-guild interaction for *A. amoreuxi* and *A. australis.*

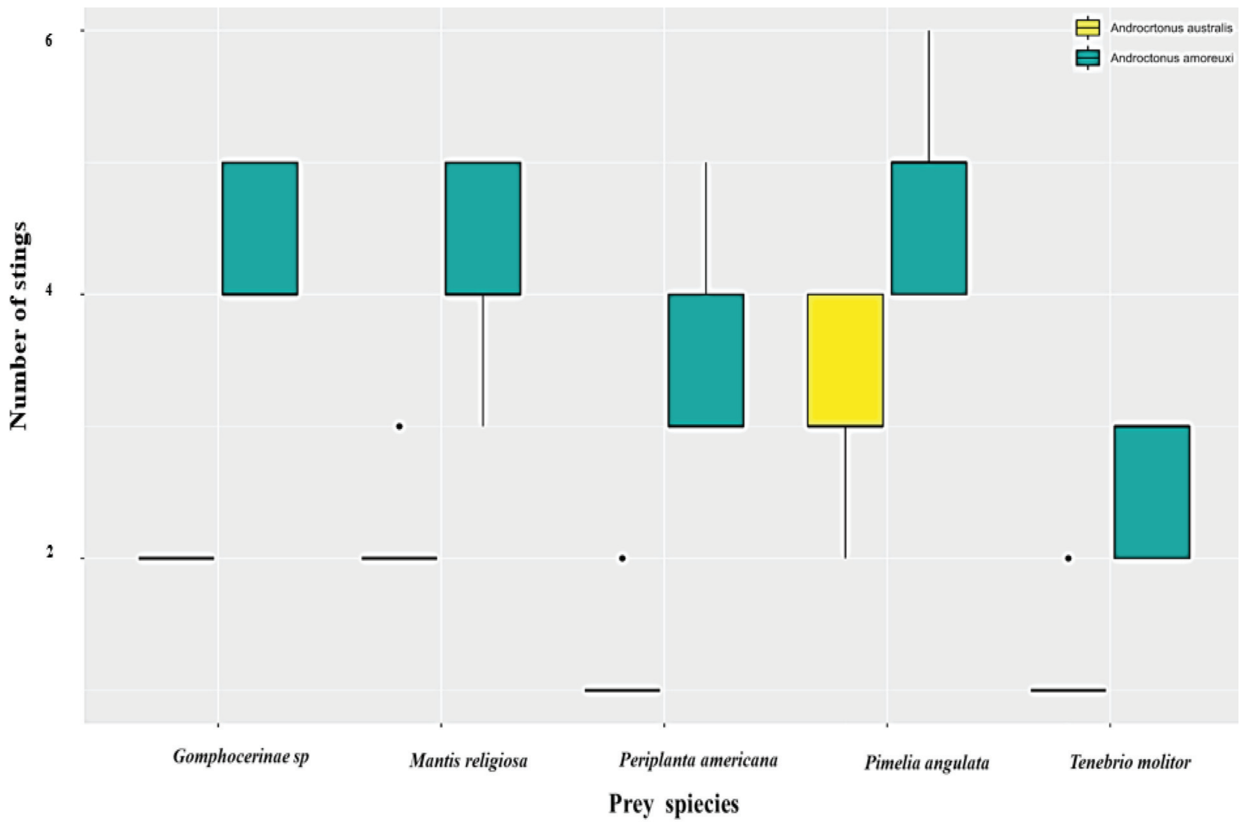

Figure 4. Variations in the number of stings of prey species in *A. amoreuxi* and *A. australis*.

Table 2. Variations of the means of weights and sizes of prey species and the means of prey consumption.

	Prey species	MIPW	MPWAP	PC	PPC	PS
A. amoreuxi	*Pimelia angulata*	1.47 ± 0.04	0.98 ± 0.04	0.49 ± 0.06	33.33%	26.00 ± 1.60
	Gomphocerinae sp.	1.11 ± 0.10	0.26 ± 0.03	0.42 ± 0.06	37.84%	25.06 ± 0.90
	Mantis religiosa	1.11 ± 0.12	0.39 ± 0.09	0.71 ± 0.05	63.96%	41.40 ± 2.01
	Periplaneta americana	0.48 ± 0.04	0.03 ± 0.01	0.45 ± 0.05	93.75%	24.45 ± 2.55
	Tenebrio molitor	0.14 ± 0.01	00.00	0.14 ± 0.01	100%	12.84 ± 0.75
A. australis	*Pimelia angulata*	1.66 ± 0.22	1.01 ± 0.16	0.53 ± 0.08	31.93%	25.20 ± 1.04
	Gomphocerinae sp.	0.77 ± 0.17	0.21 ± 0.05	0.55 ± 0.06	77.42%	22.06 ± 0.63
	Mantis religiosa	1.13 ± 0.23	0.26 ± 0.09	0.86 ± 0.13	76.10%	40.74 ± 2.43
	Periplaneta americana	0.47 ± 0.04	0.05 ± 0.02	0.41 ± 0.05	87.23%	25.51 ± 2.96
	Tenebrio molitor	0.21 ± 0.040	00.00	12.84 ± 0.75	100%	13.46 ± 0.97

MIPW: mean of initial prey weight (g), MPWAP: mean of prey weight remaining after predation (g), PC: mean of weight of prey consumed (g), PPC: percentage of prey consumed (%), and PS: average prey size (mm).

Table 2 represents the variation in the means of weights and sizes of the prey species, as well as the means of the rates of consumption of the prey by each species of scorpion. Scorpion species completely consume the mealworms (*T. molitor*). *P. americana* is the second most consumed prey species with a consumption rate of 93.75% for *A. amoreuxi* and 87.23% for *A. australis*. *M. religiosa* and *Gomphocerinae* sp. are also preferred by scorpions, with a consumption rate greater than 64%, except for *Gomphocerinae* sp., which is less appreciated by *A. amoreuxi* (37.84%). Despite its significant weight, the consumption proportion of *P. angulata* was low (33% to 35%).

Our observations show that it is not necessary for scorpions to complete their prey to be full. The remaining parts of the prey species consist mainly of shells, wings/legs, and parts of the heads, which are often hard residues and difficult to digest.

Cannibalism and intra-guild interaction

The results clearly indicate that prey acceptance and fixation times in intra-grid interactions vary between the two species studied (Figure 5). We note that the attack durations are relatively long in intra-guild interactions compared to inter-guild interactions and that

A. amoreuxi is highly cannibalistic, showing a short time to attack and fixate its scorpion prey between 285 and 890 minutes. On the other hand, in the case of intra-guild interactions, *A. australis* demonstrates rapid predation with an immediate attack on its prey, in contrast to *A. amoreuxi,* whose prey acceptance and predation time (PAT) is longer, ranging from 175 to 630 minutes. Figure 5 highlights this difference in the predation strategies of the two species.

Our results of cannibalism show that in both species of *Androctonus* the consumption time varies between 10 minutes and 180 minutes. The duration is shorter in *A. amoreuxi* (58.00 ± 49.699 minutes) compared to *A. australis* (69.00 ± 69.946 minutes). The results of intra-guild interactions for *Androctonus* species show that the consumption time varies between 20 and 95 minutes. The duration is shorter in *A. amoreuxi* (53.00 ± 24.135 minutes) compared to *A. australis* (53.00 ± 32.711 minutes).

The result of intra-guild interaction (Figure 6) shows that the number of stings differs between the two species of scorpions. It ranges between 4 and 7 stings for *A. amoreuxi* and between 1 and 5 stings for *A. australis* in the case of cannibalism and from 3 to 7 stings for *A. amoreuxi* and from 4 to 2 stings for *A. australis* in the case of intra-guild predation.

The variation of the means of the weights and the sizes of the scorpion prey and the means of the rates of consumption by each species of scorpion are represented in Table 3.

Table 3 represents the intra-guild predation and cannibalism in *A. austalis* and *A. amoreuxi*. The results indicate that the average rate of voracity in *A. australis* (33.25%) is higher than in *A. amoreuxi* (22.89%) and the parts affected by cannibalism and predation are generally prosoma and mesosoma.

The results of the Gaussian-linked generalized linear mixed model (GLMM) analysis presented in Table 4 for the variable PAT reveal that only the prey species as a variable has a statistically significant effect ($F = 4.7413, p < 0.01$). In contrast, neither weight (weight, g, $F = 0.0001$, $p > 0.05$) nor size (size, mm, $F = 0.3397$, $p > 0.05$) showed a significant effect on PAT. Our GLMM test results on the voracity time (VT) variable reveal differential effects of the variables studied. Prey species has the most significant impact ($F = 7.3369$, $p < 0.001$), indicating a strong influence on VT. Weight (weight, g) also shows a significant effect, albeit less pronounced

Table 3. Variations of the means of weights and sizes of scorpion prey and the means of scorpion prey consumption.

Scorpion species	MIPW	MPWAP	PC	PPC	PS
A.amoreuxi	3.67 ± 0.78	2.83 ± 0 ,045	0.84 ± 0,013	22.89%	8.04 ± 0.98
A.australis	3.39 ± 0.46	2.45 ± 0.79	0.94 ± 0,025	33.25%	7.49 ± 0.52

MIPW: mean of initial prey weight (g), MPWAP: mean of prey weight remaining after predation (g), PC: mean of weight of prey consumed (g), PPC: percentage of prey consumption (%), and PS: average prey size (cm).

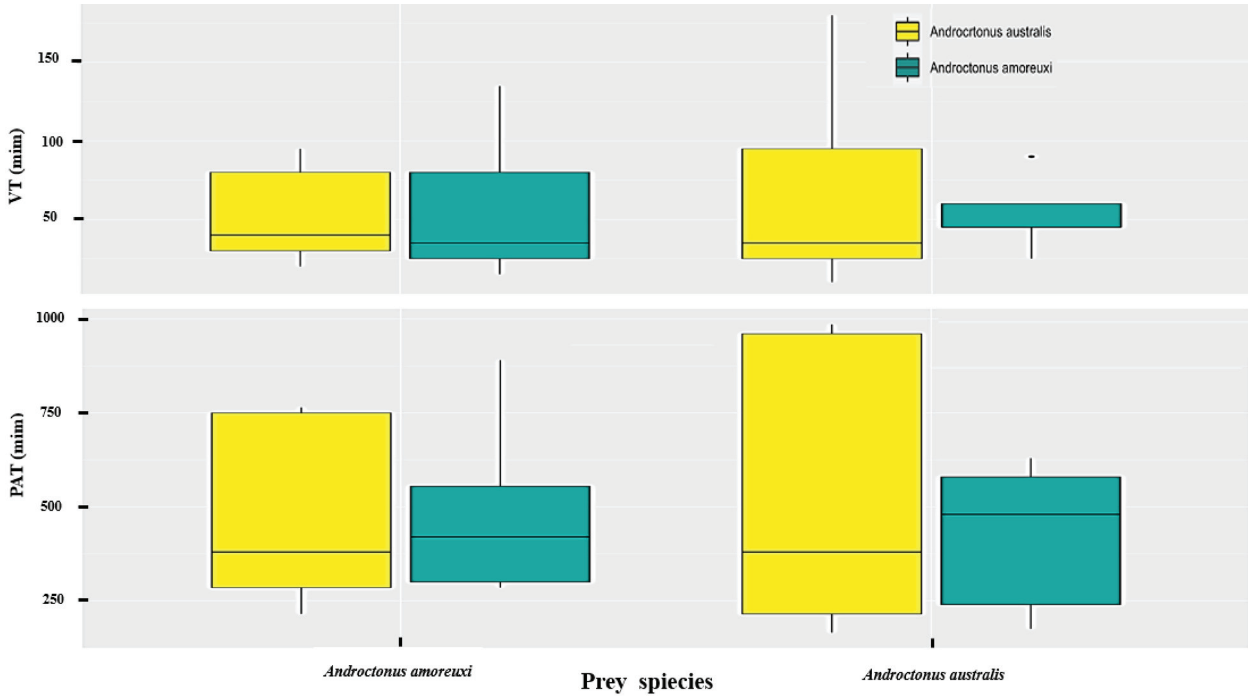

Figure 5. Variation in prey acceptance time (PAT) and voracity time (VT) in intra-guild interaction for *A. amoreuxi* and *A. australis*.

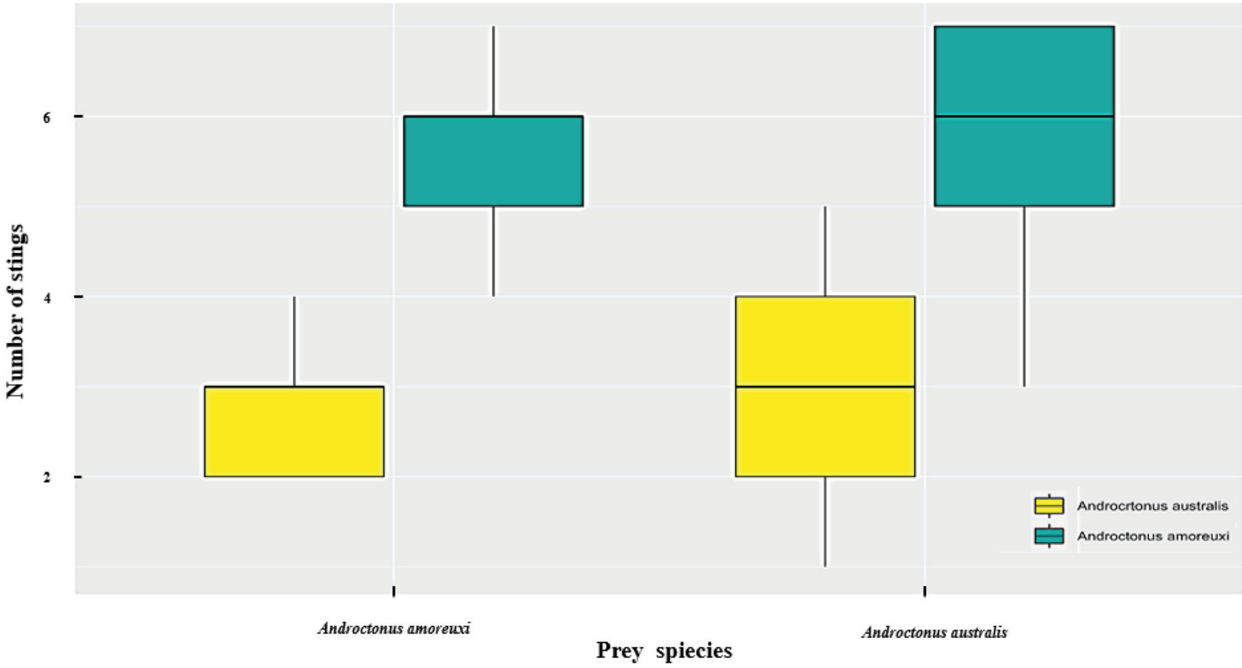

Figure 6. Variation in the number of stings between *A. amoreuxi* and *A. australis.*

Table 4. Results of generalized linear mixed models (GLMM) analysis for the effects of prey acceptance time (PAT), voracity time (VT), number stings (NS), and rate of consumption (RC) on weight, size, and prey species variables.

		Sum Sq	Mean Sq	umdf	Dendf	F value	Pr (>F)
PAT	weight, g	0	0.1	1	43	0.0001	0.993340
	size, mm	621	620.9	1	43	0.3397	0.563055
	prey species	34667	8666.7	4	43	4.7413	0.002938 **
VT	weight, g	1295.3	1295.26	1	43	4.7233	0.0353100 *
	size, mm	30.8	30.81	1	43	0.1124	0.7390972
	prey species	8047.9	2011.97	4	43	7.3369	0.0001348 ***
		Sum Sq	Mean Sq	npar	DenDF	F value	*p* value
NS	weight, g	6.9442	6.9442	1	/	6.9442	0.85928
	prey species	0.0800	0.0800	1	/	0.0800	0.52296
	size, mm	2.0853	0.5213	4	/	0.5213	0.71764
RC	weight, g	2.59447	2.59447	1	/	2.5945	0.12817
	prey species	0.61647	0.61647	1	/	0.6165	0.23227
	size, mm	0.22445	0.05611	4	/	0.0561	0.62686

(F = 4.7233, $p < 0.05$). Height (size, mm), on the other hand, had no significant effect (F = 0.1124, $p > 0.05$).

The results from the GLMM with a Poisson link function indicate that none of the studied factors (weight, size, prey species) has a statistically significant effect on the number of stings (NS), as evidenced by the high p-values (> 0.05). Similarly, the GLMM with a binomial link function did not reveal any significant effects of weight, size, or prey species on the rate of consumption (RC). Although weight approached marginal significance (p = 0.12817), no variable reached the conventional threshold of significance ($p < 0.05$).

ANOVA results, which are detailed in Table 5, showed significant differences in scorpion feeding behaviour according to prey species, but not according to scorpion species. No significant differences were observed for prey acceptance time (PAT), voracious time (VT) or rate of consumption (RC) between scorpion species, although a significant effect was noted on the number of scorpion stings observed (NS) ($p < 0.001$). On the other hand, significant differences were identified for PAT (F = 17.909, $p < 0.001$), VT (F = 4.980, p = 0.00034), and RC (F = 249.563, $p < 0.001$) among prey species, indicating that scorpions spend varying amounts of time feeding and voraciously consuming different prey species, and consume certain prey preferentially. In addition, significant differences were observed for the number of bites (NS) (F = 4.042, p = 0.002), underlining the impact of prey species on scorpion activity.

Table 5. ANOVA of the effects of prey and scorpion species on feeding behaviour.

	F value	Pr (> F)
PAT (min) *Scorpion species	0.180	0.673
VT (min) *Scorpion species	0.034	0.215
RC % *Scorpion species	0.215	0.645
NS *Scorpion species	55.791	0.0001 ***
PAT (min) *Prey species	17.909	0.0001***
VT (min) *Prey species	4.980	0.00034***
RC% *Prey species	249.563	0.00011***
NS *Prey species	4.042	0.002**

DISCUSSION

Our study demonstrated that, under laboratory conditions, the time required for the acceptance and attachment of different prey varied but was similar between *A. australis* and *A. amoreuxi*, as illustrated in Figure 3. Once the prey was released into the terrarium, both scorpion species prepared for attack by entering a state of alert, opening their chelae, and raising their tails as soon as they detected the presence of prey. The prey capture behaviours also vary from one individual to another among the two scorpion species studied. Some scorpions sometimes use their pedipalps and telson to capture and immobilize their prey, while others only use their chelicerae. However, the most common behaviour is to capture prey with their pedipalps. These observations of prey capture behaviours are similar to the behavioural acts recorded in *Bothriurus bonariensis*, as noted by Simone et al. (2018).

The availability of such a nutrient-rich food source can influence scorpion population dynamics by affecting their growth rates and reproductive success, as well as impacting their interactions with other predators and prey within their ecosystem (Polis 1986). In our study, the larva of *Tenebrio molitor* was the most frequently attacked and easiest to handle species. Many studies have noted that the larval stage of *T. molitor* is considered one of the most promising due to its nutritional value and its capacity for mass production (Rumpold and Schlüter 2013; Costa et al. 2020). This prey species, one of the largest beetles in stored agricultural products, has an average protein content of 54% in its larvae, including essential amino acids as well as vitamin and mineral properties (Hagstrum et al. 2013). Therefore, the availability of such a nutritious resource can significantly affect scorpions' growth and survival by providing high-quality nourishment.

Furthermore, *T. molitor* was the most consumed prey due to its smooth and easy-to-crush nature, with a consumption rate of 100% for both species. This high consumption rate can be attributed not only to its significant protein and water content (Sánchez-Muros et al. 2014; Van Huis et al. 2015; Kouřimská and Adámková 2016; Kim et al. 2019) but also to its soft body, which facilitates handling and ingestion by scorpions.

In the second position, *Androctonus* species preferred the consumption of cockroach *P. americana*, despite its high-speed making it a difficult prey for certain predators (Domenici et al. 2008). These results are in agreement with the results of the voracity test of Sadine (2005) and Oonincs and Dierenfeld (2011) and indicate that cockroaches possess high nutritional quality. Important results include the two species *Gomphocerinae* spp. and *Mantis religiosa* are also very appreciated by the two scorpions studied.

Also, both species studied are large, they take a long time and a lot of energy to fix and consume the prey *Pimelia angulate*. This prey species plays a significant role in desert ecosystems (Aubert 1971). However, its hard carapace and low nutritional value make it less favoured by scorpions. In the Algerian Sahara, scorpions show a preference for prey other than ants and beetles, which are among the least favoured species (Idder et al. 2012).

McCormick and Polis (1990) demonstrated that scorpions use their venom to paralyze their prey after capturing it with their pedipalps. Our experiments with two species of the genus *Androctonus* revealed that prey are often stung repeatedly until paralysis is achieved, even within the context of intra-guild interactions. Several studies have indicated that the role of venom in prey capture by scorpions has not been extensively investigated, with venom doses and sting usage often limited to defensive behaviours (Nisani et al. 2007; van der Meijden et al. 2013, 2015; Coelho et al. 2017; Lira et al. 2017).

In our laboratory study, which involved feeding *Androctonus* species with available prey, the number of stings varied according to the scorpion species. *A. amoreuxi* delivered between 4 and 7 stings, while *A. australis* delivered between 1 and 5 stings. Considering that venom is injected with each sting (Lourenço and Cuellar 1995; Yigit and Benli 2008), the total amount of venom expended to paralyze a prey item can be substantial. Although the use of stinging to capture prey has been observed in only a few scorpions (Cushing and Matherne 1980; Casper1985; Edmunds and Sibly 2010), the application of venom may be influenced by scorpion ontogeny and the activity level of the prey.

The size of the prey is a crucial factor influencing foraging behaviour, which in turn affects the diet and foraging success of predators. This effect is clearly demonstrated in our results presented in Table 4 of the GLMM test. Numerous studies have indicated that the size and/or age of the predator can influence foraging success by affecting both the type and efficacy of foraging methods and diet (Cisneros and Rosenheim 1997;

Smith and Petranka 1987; Dionisio-da-Silva et al. 2024). This phenomenon represents an asymmetrical interaction, where larger predators typically prey on smaller conspecifics (Polis 1981).

Our results show that *A. amoreuxi* exhibits a high rate of cannibalism compared to *A. australis,* which demonstrates rapid predation. This observation is clearly illustrated in the results presented in Figures 5 and 6. Forbes and Kyriazakis (1995) suggested that animal's food preferences may not always be directly reflected by the types of food it consumes. Cannibalism and intra-guild predation are critical factors influencing feeding behaviour and mortality in scorpions (Polis and Strong 1996) and can be considered key interactions affecting the distribution, behaviour, and population structure of these species (Polis 1981; Leonardsson 1991; Rudolf 2006). Indeed, numerous studies have documented scorpion-scorpion predation, encompassing both cannibalism and intra-guild predation, across various scorpion communities worldwide (Vachon 1952; Polis and Farley 1979; Polis 1981; Polis and McCormick 1987; Leonardsson 1991; Rudolf 2006; Teruel 2015; Sadine and El Bouhissi 2021; Chedad et al. 2022, 2023). These interactions are fundamental to understanding population dynamics and the structuring of scorpion communities.

CONCLUSION

This study examines the feeding preferences of two *Androctonus* scorpions, revealing a strong preference for *Tenebrio molitor*, followed by *Periplaneta americana, Gomphocerinae* sp. and *Mantis religiosa*. In general, *A. amoreuxi* is more aggressive in inter- and intra-guild interactions than *A. australis*. The results indicate that scorpion feeding behaviour is primarily influenced by prey type, with no significant impact of scorpion species. These results underline the importance of prey diversity in the study of scorpion trophic interactions and to better understand their ecological role.

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