Note on a natural case of *Scorpio maurus* cannibalism in northwestern Algeria (Scorpiones: Scorpionidae)

Abdelwahab Chedad[1,2*], Mohamed Ait Hammou [3], Abdessalam Chedad[4], Abdelkarim Lachichi [5], Miloud Belli[6] & Salah Eddine Sadine[7]

[1] Department of Biological Sciences, Laboratory of Saharan Bio-Ressources: Preservation and Valorization, University of Ouargla. 30000 Ouargla, Algeria. Tel./fax.: +213-778-610632, agrochedad@yahoo.fr, ORCID: https://orcid.org/0000-0001-8098-1803
[2] Directorate of Forest Conservation of Ghardaïa. 47000 Ghardaïa, Algeria. agrochedad@yahoo.fr
[3] Department and Faculty of Nature and Life Sciences, Laboratory of Agro Biotechnology and Nutrition in Semi-Arid Areas, Ibn Khaldoun University of Tiaret. 14000 Tiaret, Algeria. mohamedaithammou@gmail.com
[4] Independent Naturalist, Bordj Bounaama. Tissemsilt, 38001, Algeria.
[5] Directorate of Forest Conservation of Illizi. 33000 Illizi, Algeria.
[6] Independent Bionaturalist, Bordj Bounaama. Tissemsilt, 38001, Algeria
[7] Laboratoire Valorisation et Conservation des Ecosystèmes Arides (LVCEA). Faculté des Sciences de la Nature et de la Vie et Sciences de la terre, Université de Ghardaïa, Ghardaïa, Algeria. sse.scorpion@yahoo.fr

Abstract: *Scorpio maurus* Linnaeus, 1758 is an omnipresent species in northwestern Algeria**.** Here we report a natural case of predation on a subadult female of the *Scorpio maurus* by another adult female of the same species in the forest of the Ouarsenis massif of Tissemsilt **(**northwestern Algeria). Cannibalism among *Scorpio* species, particularly *Scorpio maurus*, has not been previously reported and it can be considered as a self-regulation strategy to maintain the stability of this population.
Key words: Scorpiones**,** Scorpionidae**,** *Scorpio maurus***,** cannibalism**,** Algeria.

Nota sobre un caso natural de canibalismo en *Scorpio maurus* Linnaeus, 1758 en el noroeste de Argelia (Scorpiones: **Scorpionidae)**
Resumen: *Scorpio maurus* Linnaeus, 1758 es un escorpión omnipresente en el noroeste de Argelia. Se registra un caso natural de depredación de una hembra subadulta por otra hembra adulta de la misma especie en el bosque del macizo Ouarsenis de Tissemsilt, noroeste de Argelia. El canibalismo en especies de *Scorpio*, particularmente *S. maurus*, no se ha reportado previamente y puede considerarse como un mecanismo de autorregulación para mantener la estabilidad de esta población.
Palabras clave: Scorpiones, Scorpionidae**,** *Scorpio maurus*, canibalismo, Argelia.

Scorpions are a group of generalist predators (Lourenço, 2008; Stockman & Ythier, 2010) comprising about 2700 species, widely spread throughout the world (Rein, 2022). In Algeria, up to the present, there are 48 species and subspecies, represent 2.45 % of the world's scorpion diversity (Sadine *et al*., 2020; Lourenço & Sadine, 2021; Ythier *et al*., 2021; Ythier, 2022).

Throughout the animal kingdom, various studies indicate that cannibalism can be more frequent during periods of low resource availability and/or high population density, therefore acting as a self-regulatory agent by maintaining the stability of the population (Solomon, 1949; Polis, 1980).

In Algeria, the genus *Scorpio* is represented by five species and subspecies: *S. punicus,* S. *maurus*, *S. maurus trarasensis, S. tassili* and *Scorpio* sp. (Sadine *et al.*, 2012; Lourenço & Rossi, 2016; Hasnaoui *et al*., 2018; Ouici *et al*., 2020; Sadine *et al*., 2020; Touati *et al*., 2021; Mekahlia *et al*., 2021; Chedad *et al*., 2022). The forest of Ouarsenis massif (Tissemsilt, North-West Algeria) is a diversified region in scorpions (8 species) when *Scorpio* listed three species: *S. maurus* , *S. punicus* and *Scorpio* sp. (Chedad *et al*., 2022). According this reference, *S. maurus* was the dominant species (25.14%), with close affinity herbaceous vegetation and a wide altitude range (600 to 1250 m).

This observation was carried out in the Ouarsenis massif at Tissemsilt (North-West Algeria) (35°51'20.62"N 1°40'9.30"E) at an altitude exceeding 870 m a.s.l., (Fig.1) while we were making a diurnal sampling trip of scorpions in this region, we found a natural case of predation on a preadult female *Scorpio maurus* by another adult female of the same species (Fig.2).

Many authors suggested that sexual cannibalism is widespread in scorpions (Gould, 1984; Polis & Sissom, 1990; Elgar, 1992). This is certainly a widely held belief, because mature females during the breeding season contribute to a higher mortality rate of adult males compared to adult females (Brownell, 1977a; 1977b; Gary *et al*., 1979; Peretti *et al.*, 1999). Cloudsley-Thompson (1968) added that mate cannibalism is common among the scorpions and occurs within almost all other orders of arachnids. In particular, scorpion attacks any moving object in the proper size range without apparent discrimination (Polis & Farley, 1979).

The diet of the *Scorpio*, in particularly *Scorpio maurus*, is not well explored, but we found in their burrows a lot of fragments of ants, beetles and fragments of conspecific scorpions. In conclusion, we can judge that this cannibalism is not only for meeting, but a natural attack to feed or as a self-regulatory of this population. This cannibalism by older scorpions is the apparent ultimate selective force favoring the temporal separation of age groups (Polis, 1982)

References

BROWNELL, P.H. 1977a. *Prey localization by scorpions using vibration in sand*. Ph. D. Thesis, Univ. of California at Riverside, Riverside, California, 140 pp.

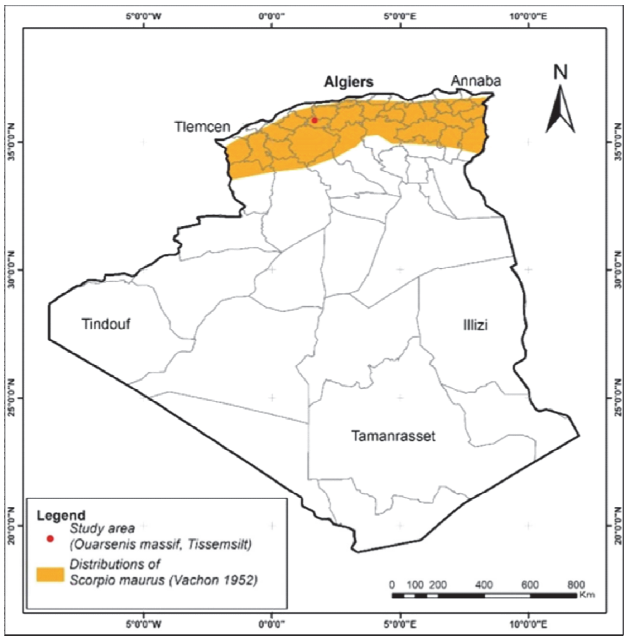
BROWNELL, P.H. 1977b. Compressional and surface waves in sand: Used by desert scorpions to locate prey. *Science*, **197**: 479-482.

CLOUDSLEY-THOMPSON, J. L. 1968. *Spiders, Scorpions, Centipedes, and Mites*. Permagon Press, New York, 228 pp.

ELGAR, M.A. 1992. Sexual cannibalism in spiders and other invertebrates. In: Elgar MA, Crespi BJ, eds. Cannibalism. Ecology and evolution among diverse taxa. Oxford: *Oxford University Press*, 128–155.

GOULD, S.J. 1984. Only his wings remained. *Natural History*, **93**(9): 10–18.

HASNAOUI, C., A. MEDDOUR & S. LEBBAL 2018. New data on scorpion diversity in the region of Khenchela, Algeria. *Serket* **16** (1): 1-6.



1a



1b



2

Fig. 1. Study area in Ouarsenis massif, Tissemsilt, Algeria. **a**, map; **b**, general view ofhabitat. **Fig. 2.** A case of cannibalism observed *in situ* between two adults *Scorpio maurus* at Ouarsenis massif, Tissemsilt, Algeria

LOURENÇO, W.R. 2008. Parthenogenesis in scorpions: some history – new data. *Journal of Venomous Animals and Toxins*, **14**: 19-44.

LOURENÇO W.R. & S.E. SADINE 2021. The genus *Orthochirus* Karsch, 1891, in Algeria with description of a new species (Scorpiones, Buthidae). *Bull Soc Entomol Fr.,* **126** (2): 175-181.

MEKAHLIA, M.N., H. ABIDIB, F. SLIMANE, S.E. SADINE, A. DEKAKA & H. CHENCHOUNI 2021. Seasonal patterns of scorpion diversity along a gradient of aridity in Algeria. *Acta Oecologica,* **113**: 103792.

OUICI, H., M. EL BOUHISSI, S.E. SADINE & H. ABIDI 2020. Preliminary study and ecological comments on scorpion diversity in Sidi Bel Abbes region, North-west Algeria. *Serket*, **17**(2): 87-96.

PERETTI, A.V., L.E. ACOSTA & T.G. BENTON 1999. Sexual cannibalism in scorpions: Fact or fiction?. *Biological Journal of the Linnean Society*, **68**: 485-496. 10.1111/j.1095-8312.1999.tb01184.x.

POLIS, G.A. 1980. The effect of cannibalism on the demography and activity of a natural population of desert scorpions. *Behavioral Ecology and Sociobiology*, **7**(1): 23–35.

POLIS, G. A. & R. D. FARLEY 1979. Behavior and ecology of mating in the cannibalistic scorpion, Paruroctonus mesaensis Stahnke (Scorpionida: Vaejovidae). *J. Arachnol*., **7**: 33-46.

POLIS, G.A. & W.D. SISSOM 1990. Life History. In: Polis GA, ed. *The Biology of Scorpions*. Stanford: *Stanford University Press*, 161–223.

REIN, J.O. 2022. *The Scorpion Files*. https://www.ntnu.no/ub/scorpion-files/ (October 2022).

SADINE, SE. 2012. *Contribution à l'étude de la Faune Scorpionique du Sahara Septentrional Est Algérien (Ouargla et El Oued).* [Thesis]. Option Zoophytiatrie, Université de Ouargla, Algérie.

SADINE, S.E., S. Djilani S. & K.E. Kerboua 2020. Aperçu sur les Scorpions de l'Algérie. *Algerian J Health Sci.,* **2** (S): 8-14.

SOLOMON, M.E. 1949. The natural control of animal populations. *Journal of Animal Ecology*, **18**:1–35.

TOUATI, K., A. TAIBI, S.E. SADINE, R. MEDIOUNI, A. AMEUR & S.B.S. GAOUAR 2021. Biometry and inventory of scorpions in the Algerian Northwest. *Genet Biodivers*, **5**(1): 120-135.

YTHIER, E., S.E. SADINE, M.L. HADDADI, W.R. LOURENÇO 2021. A new species of *Buthus* Leach, 1815 from Algeria (Scorpiones: Buthidae) and an interesting new case of vicariance. *Faunitaxys,* **9**(21): 1-9.

YTHIER, E. 2022. A new species of *Buthacus Birula*, 1908 from Western Algeria (Scorpiones: Buthidae). *Faunitaxys,* **10** (28): 1-6.