

Faunitaxys

*Revue de Faunistique, Taxonomie et Systématique
morphologique et moléculaire*



Volume 11
Numéro 3

Janvier 2023

ISSN: 2269 - 6016
Dépôt légal: Janvier 2023

Faunitaxys

*Revue de Faunistique, Taxonomie et Systématique
morphologique et moléculaire*

ZooBank : <http://zoobank.org/79A36B2E-F645-4F9A-AE2B-ED32CE6771CC>

Directeur de la publication, rédacteur, conception graphique et PAO:

Lionel Delaunay

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à l'adresse suivante:

AFCFF (Association française de Cartographie de la Faune et de la Flore)

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Elle est disponible librement au téléchargement à partir du site:

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La parution de *Faunitaxys* est apériodique

Faunitaxys est indexé dans / *Faunitaxys* is indexed in:

- **Zoological Record**

Articles and nomenclatural novelties are referenced by:

- **ZooBank** (<http://zoobank.org>)

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Imprimée sur les presses de SPEED COPIE, 6, rue Tréfilerie, F- 42100 Saint-Etienne

Imprimé le 15 janvier 2023

The scorpion fauna of the Oriental region in Morocco (Scorpiones: Buthidae, Scorpionidae) with description of three new species of the genus *Scorpio* Linnaeus, 1758.

ERIC YTHIER (1,*) & ALEXANDRE FRANÇOIS (2)

(1) BYG Taxa, 382 rue des Guillates, 71570 Romanèche-Thorins, France.

– E-mail : contact@bygtaxa.com

– ZooBank: <http://zoobank.org/06FD0852-A88E-49E5-B8E6-E1494B86C4E1> – Orcid : <https://orcid.org/0000-0002-3194-5184>

(2) Reneco International Wildlife Consultants LLC, Emirates Center for Wildlife Propagation (ECWP), Route de Midelt, 33250 Missouri, Kingdom of Morocco, P.O. Box 47.

– E-mail : afrancois@reneco.org

– ZooBank: <http://zoobank.org/E8848ABC-3732-4100-BE81-5B13BFF6E66F> – Orcid : <https://orcid.org/0000-0003-3665-9483>

* Corresponding author

Keywords:

Scorpion;
Buthidae;
Androctonus;
Buthus;
Hottentotta;
Scorpio;
taxonomy;
new species;
description;
morphology;
Morocco;
Oriental.

Abstract. – A study of the scorpions collected in around 110 locations in the Oriental region and surrounding areas in Morocco by the Emirates Center for Wildlife Propagation (ECWP, Missouri, Morocco) during the last 22 years is presented. 11 species among four genera are recorded, including three new species belonging to the genus *Scorpio* Linnaeus, 1758 (Scorpionidae) which are described here based on material collected in the high plateaus of the Oriental region (*Scorpio touili* sp. n.), in the Beni Snassen mountains (*Scorpio iznassen* sp. n.) and in the middle Moulouya river basin (*Scorpio moulouya* sp. n.). These new taxa raise the number of known species for the genus *Scorpio* to 21, height of them occurring in Morocco. A total of 12 scorpion species are recognized to occur in the Oriental region in Morocco.

Ythier E. & François A., 2023. – The scorpion fauna of the Oriental region in Morocco (Scorpiones: Buthidae, Scorpionidae) with description of three new species of the genus *Scorpio* Linnaeus, 1758. *Faunitaxys*, 11(3): 1 – 15.

DOI: [https://doi.org/10.57800/faunitaxys-11\(3\)](https://doi.org/10.57800/faunitaxys-11(3))

ZooBank: <http://zoobank.org/BE3249AF-00E8-4090-A506-C4F5A617ED27>

Received: 10/01/2023 – Revised: 13/01/2023 – Accepted: 14/01/2023

Introduction

Since the publication of Vachon (1952) on North African scorpions, the scorpion fauna of Morocco has been extensively studied and the number of species has more than doubled in 70 years (Dupré, 2017, Touloun, 2019). This fauna includes a high degree of endemism, mainly due to the complex topography of the country. Taxonomic revisions and other studies on several genera occurring in Morocco (e.g. Lourenço, 2003, 2005, 2009, Sousa *et al.*, 2011) also allowed a better understanding of the complex scorpion fauna of the country. Interestingly, some regions were more thoroughly studied than others, including the Atlas mountains, the south and the west of the country. Eastern Morocco remained poorly studied until the inventory of Touloun *et al.* (2014) conducted in the regions of the Oriental (five locations) and Fez-Meknès (three locations). The present study is the result of the analysis of around 200 specimens among 11 species and four genera, collected in around 110 locations during the last 22 years in the Oriental and surrounding regions (*i.e.* Oriental in a geographic sense, including its periphery

in the Rif, Middle Atlas and eastern High Atlas) by the Emirates Center for Wildlife Propagation (ECWP, Missouri, Morocco). These are illustrated with distribution maps, and comments on the 12 species recognized to occur in the Oriental region and related species are presented. Among the studied material, three new species of *Scorpio* Linnaeus, 1758 (Scorpionidae) are described based on material collected in the Beni Snassen mountains, in the middle Moulouya river basin and in the high plateaus of the Oriental. These new taxa raise the number of currently recognized species for the genus *Scorpio* to 21 (excluding subspecies of *S. maurus* Linnaeus, 1758), height of them occurring in Morocco.

Methods

Illustrations and measurements were made with the aid of a Motic SMZ-1713 stereo-microscope with an ocular micrometer, together with a digital camera Tucsen HD Lite, a Canon EOS 7D camera and a Wacom Intuos drawing tablet. Maps were made using ArcGIS Desktop 10.8.1 (ESRI Inc.) and Adobe Photoshop

Reviewer:

Wilson Lourenço (Muséum national d'Histoire naturelle, ISYEB, UMR7205-CNRS, Paris, France)

– ZooBank: <http://zoobank.org/58448BD6-79D7-46CE-AFDD-91EFF2B7D4EF> – Orcid : <https://orcid.org/0000-0002-2386-363X>



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software. Measurements follow Stahnke (1970) and are given in mm. Trichobothrial notations follow Vachon (1974) and morphological terminology mostly follows Vachon (1952) and Hjelle (1990). Specimens studied herein are deposited in the MNHN (Muséum national d'Histoire naturelle, Paris, France), MHNH (Musée d'Histoire Naturelle de Lyon (Musée des Confluences), Lyon, France), ECWP (Emirates Center for Wildlife Propagation, Missouri, Morocco) and EYPC (Eric Ythier Private Collection, Romanèche-Thorins, France).

Taxonomic treatment

Family **Buthidae** C. L. Koch, 1837

Genus ***Androctonus*** Ehrenberg, 1828

Androctonus amoreuxi (Audouin, 1826)

Material examined (23 ex.).

- Morocco, Bouârfâ, 32.4909 lat. -2.569 lon., ID 14994, 20/III/2013 (L. Bacon), ECWP;
- Morocco, Bouârfâ, 32.47079 lat. -2.05724 lon., ID 15533, 18/III/2014 (J. Gabbard), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.4308 lat. -2.57385 lon., ID 4677, 29/V/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.51403 lat. -2.48135 lon., ID 10527, 26/VI/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.5661 lat. -2.27995 lon., ID 10531, 22/VIII/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.50673 lat. -2.3373 lon., ID 10532, 08/V/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.52544 lat. -2.55285 lon., ID 10534, 05/VI/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.43242 lat. -2.708695 lon., ID 10535, 19/IX/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.56644 lat. -2.279845 lon., ID 10536, 10/VII/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.50707 lat. -2.33679 lon., ID 10537, 05/IX/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.53565 lat. -2.55283 lon., ID 10539, 12/VI/2008 (K. Bourass, S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.27 lat. -2.4297 lon., ID 10540, 03/X/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.53385 lat. -2.5066 lon., ID 10543, 01/V/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.53385 lat. -2.55285 lon., ID 10544, 22/VIII/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.52603 lat. -2.5526 lon., ID 10545, 05/VI/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.506294 lat. -2.33689 lon., ID 10550, 26/VI/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.43275 lat. -2.70845 lon., ID 10551, 22/VIII/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.41818 lat. -2.27401 lon., ID 10552, 28/VIII/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.5337 lat. -2.50666 lon., ID 10553, 28/VIII/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.56644 lat. -2.27984 lon., ID 10555, 19/VI/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.53385 lat. -2.5066 lon., ID 10591, 26/IX/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.44563 lat. -2.39064 lon., ID 21697, 31/III/2015 (J. Gabbard), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.47249 lat. -2.07223 lon., ID 23246, 25/V/2015 (A. François, M. García-Paris, J. L. Ruiz), ECWP.

Distribution and remarks. – *A. amoreuxi* is a desertic species distributed in the south-east of Morocco, approximately south of a line from Zagora to Goulimine, up to the north of the Moroccan Sahara (Vachon, 1952, Lourenço, 2005, Touloun *et al.*, 2014, Dupré, 2017, El Hidan *et al.*, 2017, 2018, Touloun, 2019, Ythier & Lourenço, 2022). This is the first report of *A. amoreuxi* from the Oriental region, where it seems to mainly occur in the south, in the Tamlelt plain which is connected to the Sahara Desert between the eastern High Atlas and the western Saharan Atlas (Fig. 1).

Androctonus australis (Linnaeus, 1758)

Material examined (2 ex.).

- Morocco, Tendirara, N17, 32.89624 lat. -2.05353 lon., ID 15534, 15/IX/2013 (J. Gabbard), ECWP;
- Morocco, Tendirara, 32.74671 lat. -2.36698 lon., ID 15845, 02/V/2014 (L. Bacon), ECWP.

Distribution and remarks. – *A. australis*, a species widely distributed in the neighboring Algeria, was recorded for the first time in Morocco by Geniez (2009) in the south-east of the Oriental region, between Bouarfâ and Tendirara (Touloun *et al.*, 2014, Dupré, 2017, Touloun, 2019, Ythier & Lourenço, 2022). The examined material extends its distribution 30 km to the west (Fig. 1).

Androctonus liouvillei (Pallary, 1924)

Material examined (54 ex.).

- Morocco, Bouânane, 32.13901 lat. -2.8941 lon., ID 8337, 14/V/2011 (J. Gabbard), ECWP;
- Morocco, Bouârfâ, 32.40921 lat. -2.59711 lon., ID 564, 23/IV/2008 (D. Lijnen, S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, ID 565, 23/VI/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.41434 lat. -2.597 lon., ID 566, 01/V/2008 (Y. Hingrat), ECWP;
- Morocco, Bouârfâ, Tamlelt, ID 567, 10/V/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.48212 lat. -2.7282 lon., ID 10590, 22/VIII/2008 (S. Touil), ECWP;
- Morocco, Maatarka, Kehf Tabakhoucht, 32.84563 lat. -3.43927 lon., ID 16145, 16/VII/2014 (T. Dieuleveut), ECWP;
- Morocco, Saïdia, Moulouya mouth, 35.11125 lat. -2.35659 lon., ID 21827, 09/VIII/2015 (A. François, B. Michel), ECWP;
- Morocco, Tendirara, 32.74744 lat. -2.51924 lon., ID 15844, 16/V/2014 (L. Bacon), ECWP;
- Morocco, Enjil, ECWP, 33.14769 lat. -4.58389 lon., ID 21824, 29/VIII/2014 (A. François), ECWP;
- Morocco, Enjil, ECWP, 33.14769 lat. -4.58389 lon., ID 21826, 12/VI/2014 (J. M. Touzet), ECWP;
- Morocco, Enjil, ECWP, 33.13723 lat. -4.58888 lon., ID 5706, 13/VII/2010 (J. Boisard), ECWP;
- Morocco, Enjil, ECWP, 33.13723 lat. -4.58888 lon., ID 6440, 07/VIII/2010 (J. Boisard), ECWP;
- Morocco, Enjil, ECWP, 33.13723 lat. -4.58888 lon., ID 10431, 13/XII/2011 (R. Guérin), ECWP;
- Morocco, Enjil, ECWP, 33.13723 lat. -4.58888 lon., ID 12532, 27/IX/2012 (I. Smaini), ECWP;
- Morocco, Enjil, ECWP, 33.12162 lat. -4.60675 lon., ID 15033, 17/IX/2013 (S. Gomez), ECWP;
- Morocco, Enjil, ECWP, 33.14769 lat. -4.58389 lon., ID 22915, 07/VI/2014 (G. Le Loc'h), ECWP;
- Morocco, Lamjalil, 32.8938 lat. -3.95663 lon., ID 10567, 18/VI/2010 (H. Hdidou), ECWP;
- Morocco, Missouri, 33.01061 lat. -4.11166 lon., ID 10566, 20/VII/2009 (H. Hdidou), ECWP;
- Morocco, Missouri, Al Baten, 33.1997 lat. -3.92071 lon., ID 560, 03/IV/2002 (J. Yvernault), ECWP;

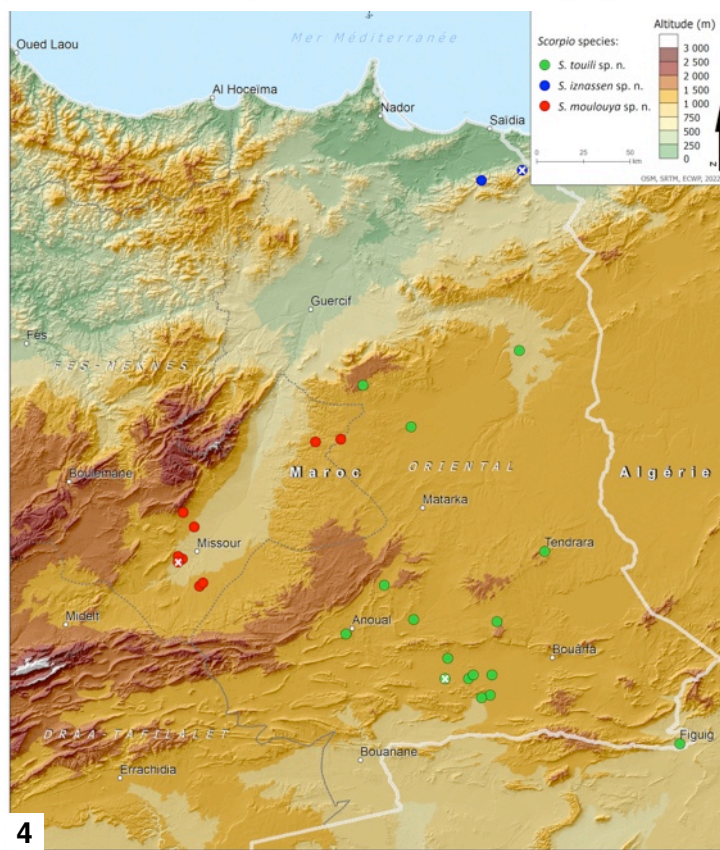
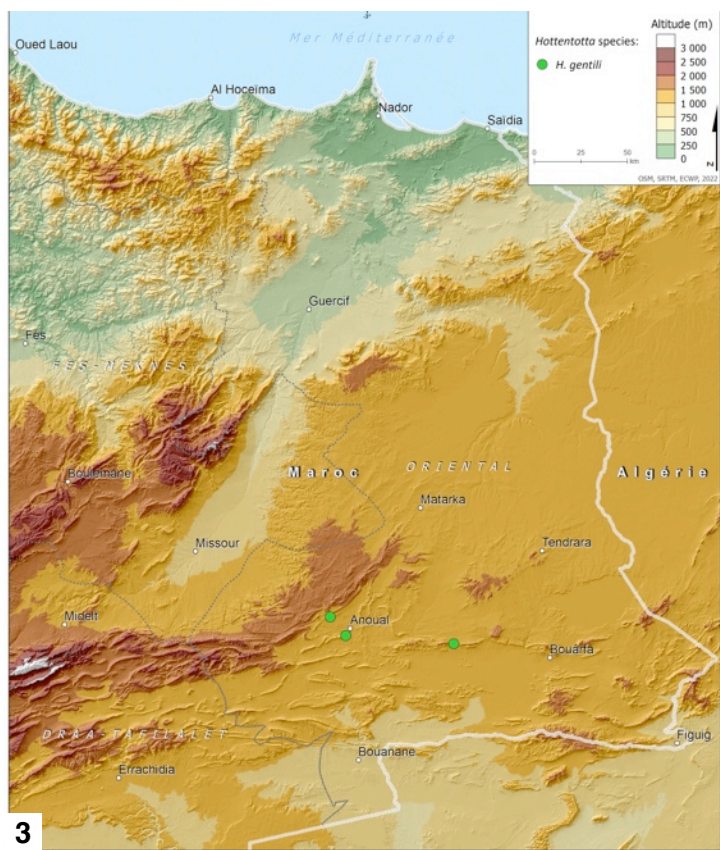
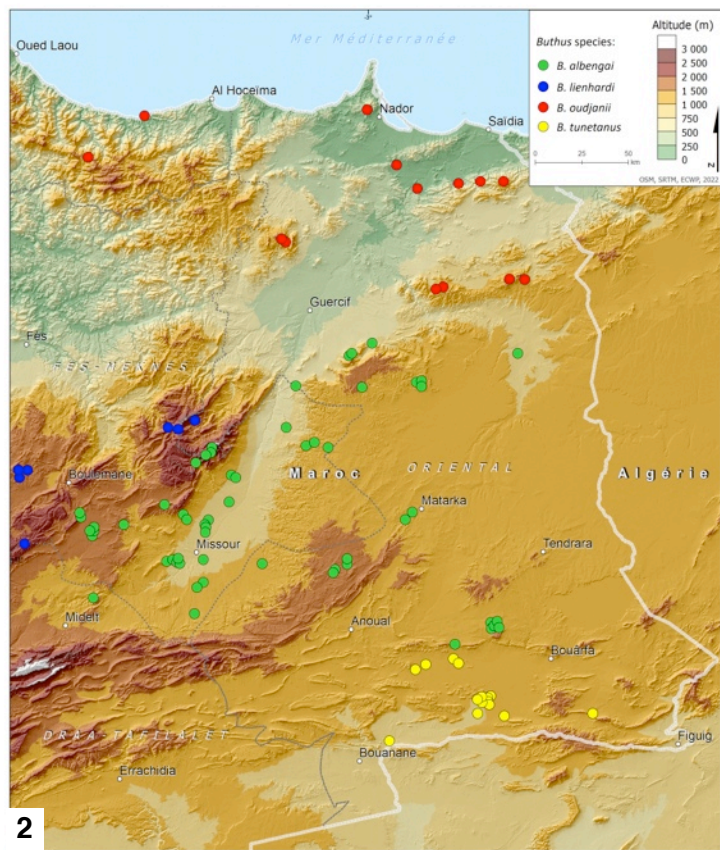
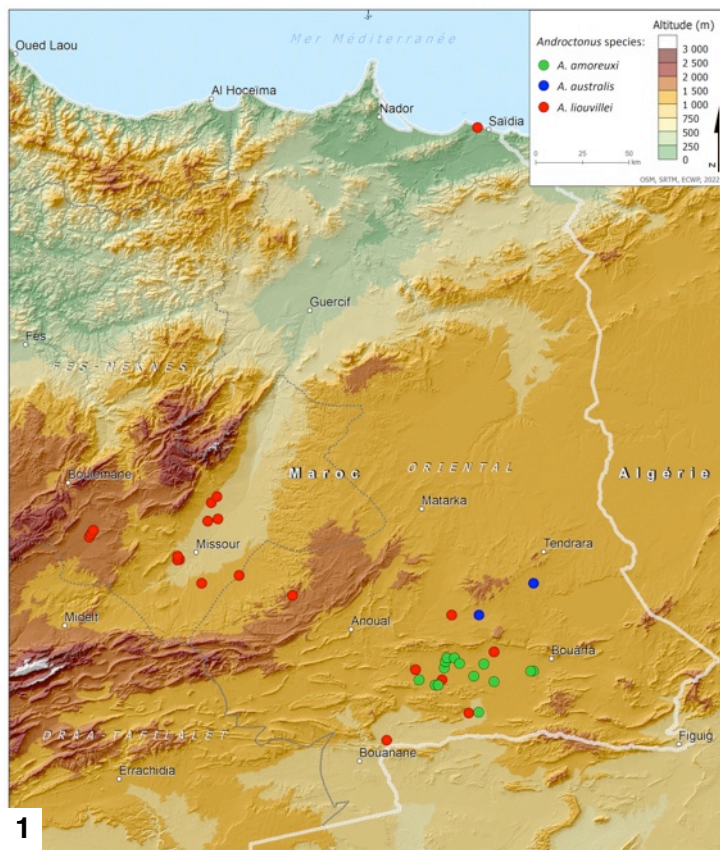


Fig. 1-4. Topographic map of the Oriental region in Morocco and surroundings areas showing the collection sites of *Androctonus*, *Buthus*, *Hottentotta* and *Scorpio* species (symbols with white cross showing the type localities).

1. *Androctonus*. 2. *Buthus*. 3. *Hottentotta*. 4. *Scorpio*.

- Morocco, Missouri, Al Baten, 33.2069 lat. -3.869 lon., ID 561, 28/V/2002 (J. Yvernault), ECWP;
- Morocco, Missouri, Al Baten, 33.28932 lat. -3.91184 lon., ID 562, 27/VI/2002 (J. Yvernault), ECWP;
- Morocco, Missouri, Al Baten, 33.31958 lat. -3.87254563 lon., ID 563, 27/VI/2002 (J. Yvernault), ECWP;
- Morocco, Missouri, ECWP, 33.00722 lat. -4.0976 lon., ID 558, 17/III/2008 (S. Boullenger), ECWP;
- Morocco, Missouri, ECWP, 33.00722 lat. -4.0976 lon., ID 10525, 15/VII/2009 (A. François, C. Leret), ECWP;
- Morocco, Missouri, ECWP, 33.00722 lat. -4.0976 lon., ID 4633, 19/VIII/2009 (C. Leret), ECWP;
- Morocco, Missouri, ECWP, 33.00722 lat. -4.0976 lon., ID 5314, 19/V/2010 (S. Boullenger), ECWP;
- Morocco, Missouri, ECWP, 33.00722 lat. -4.0976 lon., ID 5705, 10/VII/2010 (S. Boullenger), ECWP;
- Morocco, Missouri, ECWP, 33.00722 lat. -4.0976 lon., ID 6438, 19/VIII/2010 (A. François), ECWP;
- Morocco, Missouri, ECWP, 33.00722 lat. -4.0976 lon., ID 7025, 19/VIII/2010 (A. François), ECWP;
- Morocco, Missouri, ECWP, 33.00722 lat. -4.0976 lon., ID 7026, 17/IX/2010 (H. Chaker), ECWP;
- Morocco, Missouri, ECWP, 33.00722 lat. -4.0976 lon., ID 7035, 04/X/2010 (J. Talha), ECWP;
- Morocco, Missouri, ECWP, 33.00722 lat. -4.0976 lon., ID 8823, 01/VII/2011 (A. François), ECWP;
- Morocco, Missouri, ECWP, 33.00722 lat. -4.0976 lon., ID 8824, 02/VII/2011 (A. François, M. Sbai), ECWP;
- Morocco, Missouri, ECWP, 33.00722 lat. -4.0976 lon., ID 9653, 29/VII/2011 (H. Chaker), ECWP;
- Morocco, Missouri, ECWP, 33.00722 lat. -4.0976 lon., ID 9654, 07/VIII/2011 (H. Chaker), ECWP;
- Morocco, Missouri, ECWP, 33.00722 lat. -4.0976 lon., ID 21825, 23/VIII/2015 (S. Lefèvre), ECWP;
- Morocco, Missouri, ECWP, 33.00722 lat. -4.0976 lon., ID 21828, 10/IX/2015 (S. Lefèvre), ECWP;
- Morocco, Missouri, ECWP, 33.00739 lat. -4.08819 lon., ID 10565, 15/VI/2009 (H. Hdidou), ECWP;
- Morocco, Missouri, ECWP, 33.00739 lat. -4.08819 lon., ID 11499, 04/V/2012 (B. El Bachra), ECWP;
- Morocco, Missouri, ECWP, 33.00739 lat. -4.08819 lon., ID 11501, 25/V/2012 (H. Chaker, H. Hdidou), ECWP;
- Morocco, Missouri, ECWP, 33.00739 lat. -4.08819 lon., ID 12237, 03/X/2012 (A. François, M. Sbai), ECWP;
- Morocco, Missouri, ECWP, 33.00739 lat. -4.08819 lon., ID 22460, 16/IX/2012 (M. Chamidou), ECWP;
- Morocco, Missouri, ECWP, 33.00739 lat. -4.08819 lon., ID 24233, 29/VIII/2021 (G. Monchaux), ECWP;
- Morocco, Missouri, ECWP, 33.00739 lat. -4.08819 lon., ID 24281, 12/X/2021 (A. Haddad), ECWP;
- Morocco, Missouri, ECWP, near offices office, 33.00722 lat. -4.0976 lon., ID 559, 21/VI/2008 (A. Haddad), ECWP;
- Morocco, Missouri, ECWP, in an office, 33.00722 lat. -4.0976 lon., ID 4630, 12/VIII/2009 (A. François), ECWP;
- Morocco, Missouri, ECWP, villa F2-4, 33.00722 lat. -4.0976 lon., ID 8076, 26/IV/2011 (P. Salanova), ECWP;
- Morocco, Missouri, ECWP, botanical laboratory, 33.00722 lat. -4.0976 lon., ID 10432, 03/XI/2011 (M. Bidat), ECWP;
- Morocco, Missouri, ECWP, villa, 33.00722 lat. -4.0976 lon., ID 8645, 24/VII/2012 (C. Leret), ECWP;
- Morocco, Missouri, ECWP, restaurant, 33.00722 lat. -4.0976 lon., ID 14652/14653, 12/VII/2013 (A. François), ECWP;
- Morocco, Missouri, ECWP, villa F2-7, 33.00722 lat. -4.0976 lon., ID 14771, 24/VII/2013 (J. F. Léger), ECWP;
- Morocco, Missouri, ECWP, villa F2-7, 33.00722 lat. -4.0976 lon., ID 15532, 19/XI/2013 (A. François), ECWP.

Distribution and remarks. – *A. liouvillei* seems to be widely distributed in the Oriental region under 1600 m altitude, with reports in several locations going from the south-east up to the north-east of the region near the Moulouya mouth, as well as in the middle Moulouya river basin (Vachon, 1952, Lourenço, 2005, Touloun *et al.*, 2014, Dupré, 2017, El Hidan *et al.*, 2017, 2018, Touloun, 2019, Ythier & Lourenço, 2022). Its presence on the west side of the lower Moulouya river still needs to be confirmed (Fig. 1).

Genus *Buthus* Leach, 1815

Buthus albengai Lourenço, 2003

Material examined (54 ex.).

- Morocco, Bouârfâ, Aïn Larak, 32.60435 lat. -2.50391 lon., ID 18770, 11/III/2014 (A. François), ECWP;
- Morocco, Debdou, 34.06452 lat. -2.98199 lon., ID 14938, 08/VI/2013 (A. François, L. Castro), ECWP;
- Morocco, between Aïn Bni Mattar and Maatarka, 34.020708 lat. -2.12397 lon., ID 12440, 05/VII/2012 (A. François, C. Galkowski, M. Sbai), ECWP;
- Morocco, between Outat el Haj and Maatarka, 33.58163 lat. -3.31162 lon., ID 8338, 24/V/2011 (A. François, H. Hdidou), ECWP;
- Morocco, between Outat el Haj and Maatarka, 33.57178 lat. -3.36583 lon., ID 8339, 24/V/2011 (A. François, H. Hdidou), ECWP;
- Morocco, between Outat el Haj and Maatarka, 33.56384 lat. -3.23189 lon., ID 8340, 24/V/2011 (A. François, H. Hdidou), ECWP;
- Morocco, Maatarka, 33.21395 lat. -2.78115 lon., ID 8822, 26/IV/2011 (M. Chambouleyron, H. Hdidou), ECWP;
- Morocco, Maatarka, 33.23927 lat. -2.74412 lon., ID 10556, 15/VI/2010 (H. Hdidou), ECWP;
- Morocco, Maatarka, 33.23927 lat. -2.74412 lon., ID 10560, 11/VI/2010 (H. Hdidou), ECWP;
- Morocco, Oriental, 32.9859 lat. -3.60719 lon., ID 21741, 14/IV/2015 (T. Dieuleveut, C. Lucas), ECWP;
- Morocco, Almis des Marmoucha, Jbel Tsiouant, 32.2745 lat. -4.17783 lon., ID 14992, 15/IV/2013 (A. François, J. Gabbard), ECWP;
- Morocco, Enjil, 33.12101 lat. -4.59676 lon., ID 10570, 12/VI/2010 (H. Hdidou), ECWP;
- Morocco, Enjil, 33.2113 lat. -4.6638 lon., ID 18623, 15/IV/2014 (A. François), ECWP;
- Morocco, Enjil, ECWP, 33.14769 lat. -4.58389 lon., ID 21769/21783, 20/V/2014 (J.M. Touzet), ECWP;
- Morocco, Enjil, ECWP, 33.15998 lat. -4.58624 lon., ID 10569, 09/VI/2010 (H. Hdidou), ECWP;
- Morocco, Enjil, ECWP, 33.15049 lat. -4.606 lon., ID 22916, 16/V/2014 (M. Chambouleyron, H. Hdidou), ECWP;
- Morocco, Enjil, ECWP, 33.14769 lat. -4.58389 lon., ID 22917, 20/V/2014 (J. M. Touzet), ECWP;
- Morocco, Enjil, ECWP, gazelle pen, 33.17226 lat. -4.41112 lon., ID 10568, 13/VI/2010 (H. Hdidou), ECWP;
- Morocco, Enjil, Enjil lake, hill between lake and village, 33.22819 lat. -4.66391 lon., ID 585, 21/III/2008 (A. François), ECWP;
- Morocco, Lamjalil, 33.89885 lat. -3.94569 lon., ID 10571, 20/VII/2009 (H. Hdidou), ECWP;
- Morocco, Lamjalil, 33.87449 lat. -3.98817 lon., ID 10573, 18/VI/2010 (H. Hdidou), ECWP;
- Morocco, Midelt Aouli, abandoned mining village, 32.81851 lat. -4.58497 lon., ID 14993, 05/VI/2013 (L. Bacon), ECWP;
- Morocco, Missouri, Al Baten, 33.22951 lat. -4.07098 lon., ID 582, 15/VI/2002 (Y. Hingrat, J. Yvernault), ECWP;
- Morocco, Missouri, Al Baten, 33.20759 lat. -4.05286 lon., ID 588, 19/XII/2001 (Y. Hingrat, J. Yvernault), ECWP;
- Morocco, Missouri, Al Baten, 33.22951 lat. -4.07098 lon., ID 589, 15/II/2002 (Y. Hingrat, J. Yvernault), ECWP;



Fig. 5-8. *Scorpio touili* sp. n., habitus.

5-6. ♂ holotype, dorsal (5) and ventral (6) aspects.

7-8. ♀ paratype, dorsal (7) and ventral (8) aspects.

- Morocco, Missouri, Al Baten, 33.22951 lat. -4.07098 lon., ID 590, 17/V/2002 (Y. Hingrat, J. Yvernault), ECWP;
- Morocco, Missouri, Al Baten, 33.29897 lat. -4.80173 lon., ID 593, 22/V/2002 (Y. Hingrat, J. Yvernault), ECWP;
- Morocco, Missouri, Al Baten, 33.1997 lat. -3.92071 lon., ID 2795, 16/IV/2002 (J. Yvernault), ECWP;
- Morocco, Missouri, Al Baten, 33.17877 lat. -3.94202 lon., ID 2796, 22/IV/2002 (J. Yvernault), ECWP;
- Morocco, Missouri, Al Baten, 33.2294 lat. -4.07156 lon., ID 2797, 22/IV/2002 (J. Yvernault), ECWP;
- Morocco, Missouri, Al Baten, 33.16887 lat. -3.94317 lon., ID 2809, 16/V/2002 (Y. Hingrat), ECWP;
- Morocco, Missouri, Douar Igli, 33.00586 lat. -3.94871 lon., ID 10557, 15/VI/2010 (H. Hdidou), ECWP;
- Morocco, Missouri, ECWP, 33.00722 lat. -4.0976 lon., ID 23250, 09/V/2016 (M. Sbai), ECWP;
- Morocco, Missouri, ECWP, 33.00722 lat. -4.0976 lon., ID 581, 24/IV/2008 (A. François, E. Le Nuz, G. Levêque), ECWP;
- Morocco, Missouri, ECWP, 33.00722 lat. -4.0976 lon., ID 586, 15/VI/2000 (Y. Hingrat), ECWP;
- Morocco, Missouri, ECWP, 33.00722 lat. -4.0976 lon., ID 7105, 07/X/2010 (H. Chaker, H. Hdidou, J. F. Léger), ECWP;
- Morocco, Missouri, ECWP, 33.00722 lat. -4.0976 lon., ID 10011, 30/IX/2011 (A. Chlih), ECWP;
- Morocco, Missouri, ECWP, 33.00251 lat. -4.10432 lon., ID 10572, 07/VI/2010 (H. Hdidou), ECWP;
- Morocco, Missouri, ECWP, 33.00722 lat. -4.0976 lon., ID 13382, 19/X/2012 (G. Levêque), ECWP;
- Morocco, Missouri, ECWP, 33.00722 lat. -4.0976 lon., ID 24202, 23/VIII/2021 (M. Sriri), ECWP;
- Morocco, Missouri, ECWP, insemination laboratory, 33.00722 lat. -4.0976 lon., ID 8829, 07/VII/2011 (N. Abbou), ECWP;
- Morocco, Missouri, ECWP, villa F2.10, 33.00722 lat. -4.0976 lon., ID 15034, 05/IX/2013 (A. François), ECWP;
- Morocco, Missouri, ECWP, villa F2.3, 33.00722 lat. -4.0976 lon., ID 14937, 10/VIII/2013 (E. Le Nuz), ECWP;
- Morocco, Missouri, ECWP, villa F2.6, 33.0119 lat. -4.09692 lon., ID 6450, 20/VII/2010 (A. François), ECWP;
- Morocco, Missouri, ECWP, villa F2.6, 33.0119 lat. -4.09692 lon., ID 10433, 22/X/2011 (A. François), ECWP;
- Morocco, Missouri, Jbel Missouri, pic, 33.00133 lat. -4.16963 lon., ID 5703, 24/VI/2010 (A. François, K. Benlafkih, M. Sbai), ECWP;
- Morocco, Ouled Ali Atchana, 33.5307 lat. -3.92263 lon., ID 14902/14935, 03/VIII/2013 (A. François, A. Achou, C. Heyd, V. Liéron), ECWP;
- Morocco, Ouled Ali Bou Naceur, Tizi n'Silla, 33.56052 lat. -3.90465 lon., ID 14936, 04/VIII/2013 (A. François, A. Achou, C. Heyd, V. Liéron), ECWP;
- Morocco, Tighnest, 33.4051 lat. -3.7733 lon., ID 10559, 17/VI/2010 (H. Hdidou), ECWP;
- Morocco, Tighnest, 33.40538 lat. -3.77373 lon., ID 10563, 07/VI/2010 (H. Hdidou), ECWP;
- Morocco, Tighnest, 33.42168 lat. -3.79447 lon., ID 10564, 10/VI/2010 (H. Hdidou), ECWP;
- Morocco, Zerzaia, 33.65271 lat. -3.47184 lon., ID 21784, 20/IV/2015 (A. François), ECWP.

Distribution and remarks. – *B. albengai*, described from the south of Ifrane, is widely distributed to the east of its type location, mainly in the middle Moulouya river basin, but also up to western part of the high plateaus of the Oriental region (Vachon, 1952, Lourenço, 2003, 2017, Touloun *et al.*, 2014, Dupré, 2017, El Hidan *et al.*, 2017, Sousa *et al.*, 2017, Touloun, 2019) (Fig. 2). Touloun *et al.* (2014) referred to *Buthus paris* (C. L. Koch, 1839) specimen(s) collected in the south of Ain Beni Mathar. This (these) might rather be referred to *B. albengai*, since *B. paris* is a species distributed in the high massifs of the coastal zones of Tunisia and eastern Algeria (up Algiers) and does not occur in Morocco, where it is 'replaced' by its 'occidental form' *B. oudjanii*.

Buthus lienhardi Lourenço, 2003

Material examined (5 ex.).

- Morocco, Bou Iblane, 33.64595 lat. -4.10403 lon., ID 592, 11/X/2008 (A. François, H. Hdidou), ECWP;
- Morocco, Taffert, refuge, 33.68344 lat. -4.01114 lon., ID 4969/4970, 12/IV/2010 (A. François, H. Hdidou), ECWP;
- Morocco, Taffert, refuge, 33.64949 lat. -4.16266 lon., ID 5704, 01/V/2010 (A. François, C. Galkowski, M. Sbai), ECWP;
- Morocco, Almis des Marmoucha, ID 587, 31/III/2002 (J. Yvernault), ECWP.

Distribution and remarks. – *B. lienhardi*, described from the high Atlas in the south of Marrakech, is widely distributed throughout the high Atlas (Vachon, 1952, Lourenço, 2003, 2017, Touloun *et al.*, 2014, Dupré, 2017, El Hidan *et al.*, 2017, Sousa *et al.*, 2017, Touloun, 2019). This is the first report of *B. lienhardi* from the Oriental region, where it was collected in the Djebel Bou Iblane (Fig. 2).

Buthus oudjanii Lourenço, 2017

Material examined (12 ex.).

- Morocco, Jerada, pass between Guenfouda and Jerada, 34.37752 lat. -2.17113 lon., ID 12436, 04/VII/2012 (A. François, C. Galkowski, M. Sbai), ECWP;
- Morocco, Nador, Gourougou, 35.20045 lat. -3.00725 lon., ID 13380, 06/X/2012 (A. François), ECWP;
- Morocco, Oujda, Beni Snassen, forest house El Aïn Almou, 34.84735 lat. -2.20283 lon., ID 12430, 01/VII/2012 (A. François, C. Galkowski, M. Sbai), ECWP;
- Morocco, Oujda, Jbel Bou Keltoum, pic, 34.3701 lat. -2.08187 lon., ID 12435, 04/VII/2012 (A. François, C. Galkowski, M. Sbai), ECWP;
- Morocco, Oujda, Tafoughalt, Beni Snassen, 34.84771 lat. -2.33716 lon., ID 12429/12464, 01/VII/2012 (A. François, C. Galkowski, M. Sbai), ECWP;
- Morocco, Taourirt, Beni Snassen West, 34.81288 lat. -2.70916 lon., ID 12434, 03/VII/2012 (A. François, C. Galkowski, M. Sbai), ECWP;
- Morocco, Taourirt, Jbel Khouali, antenna, 34.3351 lat. -2.56463 lon., ID 12433, 02/VII/2012 (A. François, C. Galkowski, M. Sbai), ECWP;
- Morocco, Taourirt, Tanacherfi, Horsts range, 34.33006 lat. -2.60019 lon., ID 12431/12432, 02/VII/2012 (A. François, C. Galkowski, M. Sbai), ECWP;
- Morocco, Saka, 34.5543 lat. -3.48417 lon., 1558 m alt., ID 25071, 27/XI/2022 (A. François, G. Liénart, C. Landsmann, O. Chabasseur, J. F. Lima Barbero, R. Triguero Ocana), ECWP;
- Morocco, Saka, 34.58319 lat. -3.51407 lon., 1790 m alt., ID 25071, 27/XI/2022 (A. François, G. Liénart, C. Landsmann, O. Chabasseur, J. F. Lima Barbero, R. Triguero Ocana), ECWP;
- Morocco, 9 km N Tafoughalt, 240 m alt., EY0381, X/2014 (O. Touloun), W. R. Lourenço leg., 26/III/2022, EYPC (misidentified as *B. confluens* (Lourenço, Touloun & Boumezzough, 2011) in Touloun *et al.*, 2014).

Distribution and remarks. – *Buthus oudjanii*, described from the region of Tafoughalt, is considered to be the 'occidental form' of *Buthus paris*, a species widely distributed in the high massifs (Tellian Atlas) of the coastal zones of Tunisia and eastern Algeria (up to Algiers) (Vachon, 1952, Lourenço, 2003, 2017, Touloun *et al.*, 2014, Dupré, 2017, El Hidan *et al.*, 2017, Touloun, 2019, Abidi *et al.*, 2021). In this work, *B. oudjanii* has been recorded in a large area in the north of the Oriental region, mainly in the massifs (Fig. 2). Touloun *et al.* (2014) referred to *B. paris* (C. L. Koch, 1839) specimens collected in Oujda as well as 20-30 km north of Ain Beni Mathar. *B. paris* does not occur in Morocco and these might rather be referred to *B. oudjanii*. Also, Touloun *et al.*, 2014 referred to *Buthus confluens* Lourenço, Touloun & Boumezzough, 2011 a specimen collected in Tafoughalt, in the north of the Oriental region. The specimen was examined and it corresponds to *B. oudjanii* (Material section).



Fig. 9-10. *Scorpio iznassen* sp. n., ♂ holotype, habitus (dried specimen).
9. Dorsal aspect. 10. Ventral aspect.

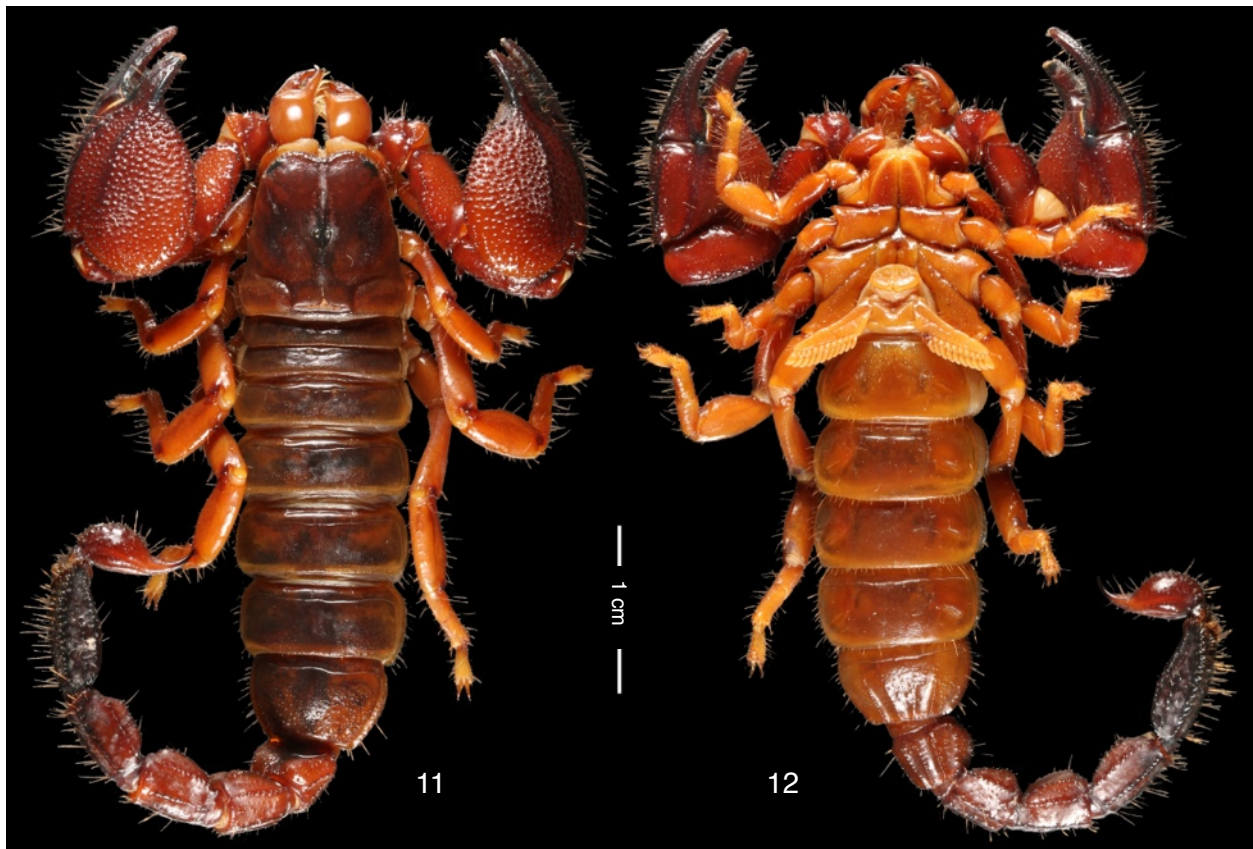


Fig. 11-12. *Scorpio moulouya* sp. n., ♂ holotype, habitus.
11. Dorsal aspect. 12. Ventral aspect.

Buthus tunetanus (Herbst, 1800)**Material examined** (11 ex.).

- Morocco, Bouârfâ, Tamlelt, 32.50613 lat. -2.6698 lon., ID 10526, 19/VI/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.51384 lat. -2.48154 lon., ID 10528, 10/VII/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.50613 lat. -2.6698 lon., ID 10529, 29/V/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.31528 lat. -2.32572 lon., ID 10538, 28/VIII/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.53419 lat. -2.50649 lon., ID 10542, 19/VI/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.48212 lat. -2.7282 lon., ID 10546, 17/VII/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.25143 lat. -2.22581 lon., ID 10547, 16/VII/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.51384 lat. -2.48154 lon., ID 10548, 03/VII/2008 (S. Touil), ECWP;
- Morocco, Bouârfâ, Tamlelt, 32.53385 lat. -2.5066 lon., ID 12541, 03/VII/2008 (S. Touil), ECWP;
- Morocco, Bouânane, Zelmou dam, 32.13496 lat. -2.8807 lon., ID 8482, 11/VI/2011 (A. François, C. Landsmann), ECWP;
- Morocco, between Bouârfâ and Figuig, 32.25457 lat. -1.71231 lon., ID 22918, 24/V/2015 (A. François, M. García-Paris, J. L. Ruiz), ECWP.

Distribution and remarks. – *Buthus tunetanus* is largely distributed in the high plateaus, the Saharan Atlas and Aures mountains and the northern edge of the Sahara Desert from Morocco to northern Libya (Vachon, 1952, Lourenço, 2003, 2017, Touloun *et al.*, 2014, Dupré, 2017, El Hidan *et al.*, 2017, Sousa *et al.*, 2017, Touloun, 2019, Abidi *et al.*, 2021). The northern edge of the Sahara Desert in Morocco (Tamlelt plain, which is connected to the Sahara Desert between the eastern High Atlas and the western Saharan Atlas) seems to be the western limit of its distribution (Fig. 2).

Genus *Hottentotta* Birula, 1908

Hottentotta gentili (Pallary, 1924)**Material examined** (3 ex.).

- Morocco, Anoual, 32.64221 lat. -3.12263 lon., ID 580, 24/V/2008 (A. François, F. Lagarde), ECWP;
- Morocco, Bouârfâ, Aïn Larak, 32.60435 lat. -2.50391 lon., ID 18812, 11/III/2014 (A. François), ECWP;
- Morocco, Oued Bour, 32.73369 lat. -3.21239 lon., ID 21823, 07/VII/2015 (T. Dieuleveut), ECWP.

Distribution and remarks. – In Morocco, *H. gentili* is widely distributed in the south of the High Atlas, from the low Draa valley up to the south of the Oriental region (Vachon, 1952, Sousa *et al.*, 2011, Touloun *et al.*, 2014, Dupré, 2017, El Hidan *et al.*, 2017, Touloun, 2019). In this work, *H. gentili* has been recorded in three locations in the south of the Oriental (Fig. 3).

Family **Scorpionidae** Latreille, 1802

Genus *Scorpio* Linnaeus, 1758

***Scorpio touili* sp. n.**

(Fig. 5-8, 13-14, 17-18, 21, 29, 32)

ZooBank : <http://zoobank.org/761CC1D8-7C61-48D0-A282-9DE3791A55CB>

Holotype, ♂, Morocco, Bouârfâ, Tamlelt, 32.43128 lat. -2.57354 lon., ID 10549, 11/III/2015 (S. Touil), deposited in the MNHN.

Paratypes (3 ex.).

- 1 ♂, Morocco, Bouârfâ, Tamlelt, 32.44389 lat. -2.29296 lon., ID 10541, 11/III/2015 (S. Touil), deposited in the ECWP;
- 1 ♂, Morocco, Bouârfâ, Tamlelt, 32.44350 lat. -2.29312 lon., ID 10554, 11/III/2015 (S. Touil), deposited in the ECWP;
- 1 ♀, Morocco, between Aïn Bni Mattar and Maatarka, 34.02078 lat. -2.12397 lon., ID 12441, 31/XII/2012 (A. François, C. Galkowski, M. Sbai), deposited in the MNHN.

Other material examined (9 ex.).

- 1 ♂, Morocco, Bouârfâ, Tamlelt, 32.53565 lat. -2.55283 lon., ID 10530, 22/VIII/2008 (S. Touil), ECWP;
- 1 ♂, Morocco, Bouârfâ, Tamlelt, 32.43095 lat. -2.57379 lon., ID 10533, 22/VIII/2008 (S. Touil), ECWP;
- 1 ♂, Morocco, Bouârfâ, Tamlelt, 32.43033 lat. -2.43403 lon., ID 10592, 26/VI/2008 (S. Touil), ECWP;
- 1 ♂, Morocco, Bouârfâ, Tamlelt, 32.44563 lat. -2.39064 lon., ID 20682, 31/III/2015 (J. Gabbard), ECWP;
- 1 ♂, Morocco, between Aïn Bni Mattar and Maatarka, 34.02078 lat. -2.12397 lon., ID 12438, 06/VII/2012 (A. François, C. Galkowski, M. Sbai), ECWP;
- 1 ♂, Morocco, Tendrara, MHNL 47036246, 1984 (G. Chavanon), MHNL;
- 1 pre-adult ♂, Morocco, Figuig, MHNL 47036248, 1979 (G. Chavanon), MHNL;
- 1 ♂, Morocco, Anoual, 32.65387 lat. -3.13153 lon., ID 574, 24/V/2008 (A. François), ECWP;
- 1 ♂, Morocco, Léthima, 32.72258 lat. -2.74343 lon., ID 577, 13/III/2008 (M. Lelièvre, L. Pomarède), ECWP.

Comparative material examined (2 ex.).

Scorpio punicus Fet, 2000:

- Tunisia, Gafsa, 1 ♂, MHNL 44003128, 1903 (Fracques), MHNL;
- Tunisia, El Djennah, 1 ♀, EY0264, J.-B. Lacroix leg. (No. 148), 1993, EYPC.

Etymology. – The specific name honours Mr. Soufiane Touil, staff member of ECWP, who recently passed away. He used to be involved in ECWP's arthropods sampling, and was greatly appreciated for his engagement and conscientiousness. He is also collector of the holotype of the new species.

Diagnosis. – Scorpion of moderate to large size for the genus, with a total length of 61–64 mm for the males holotype and paratypes and 57 mm for the female paratype. Coloration basically yellowish to yellowish brown, without delimited darker pigmentation on carapace and tergites; chela manus of similar colour as body. Genital operculum suboval, formed by two plates having a semi-triangular shape; convex anteriorly and posteriorly in both sexes. Pectinal plate weakly divided in two parts, the posterior part slightly wider than the anterior part; pectines longer than length of third coxa and largely exceeding the distal end of fourth coxa in male, slightly longer than length of third coxa and slightly exceeding the distal end of fourth coxa in female; pectinal count 9–11 teeth in male, 9–11 in female. Leg IV tarsus with 9 internal and 7 external spines. Hemispermatophore with distal lamina curved, terminus enlarged and almost flat; laminar hook close to lamina, long and almost straight.

Description (based on male holotype and female paratype; measurements after the description).

Coloration. – Prosoma: carapace yellowish brown with diffuse brownish variegated spots on the entire surface; median and lateral ocular tubercles marked with dark pigments. Mesosoma: tergites yellowish brown; sternites yellowish. Coxapophysis and sternum yellow; genital operculum and pectines yellow in male, pale yellow in female. Metasoma: yellowish with some greyish pigmentation on ventral face of segments I–III in male, on ventral face of all segments and on lateral and dorsal faces of segment V in female. Telson yellow; aculeus yellowish at its base and black at its extremity. Chelicerae yellow without any variegated spots in male, with some greyish pigmentation at the base in female; fingers yellow with reddish teeth. Pedipalps: femur and patella yellowish brown; chela yellowish brown with carinae and fingers

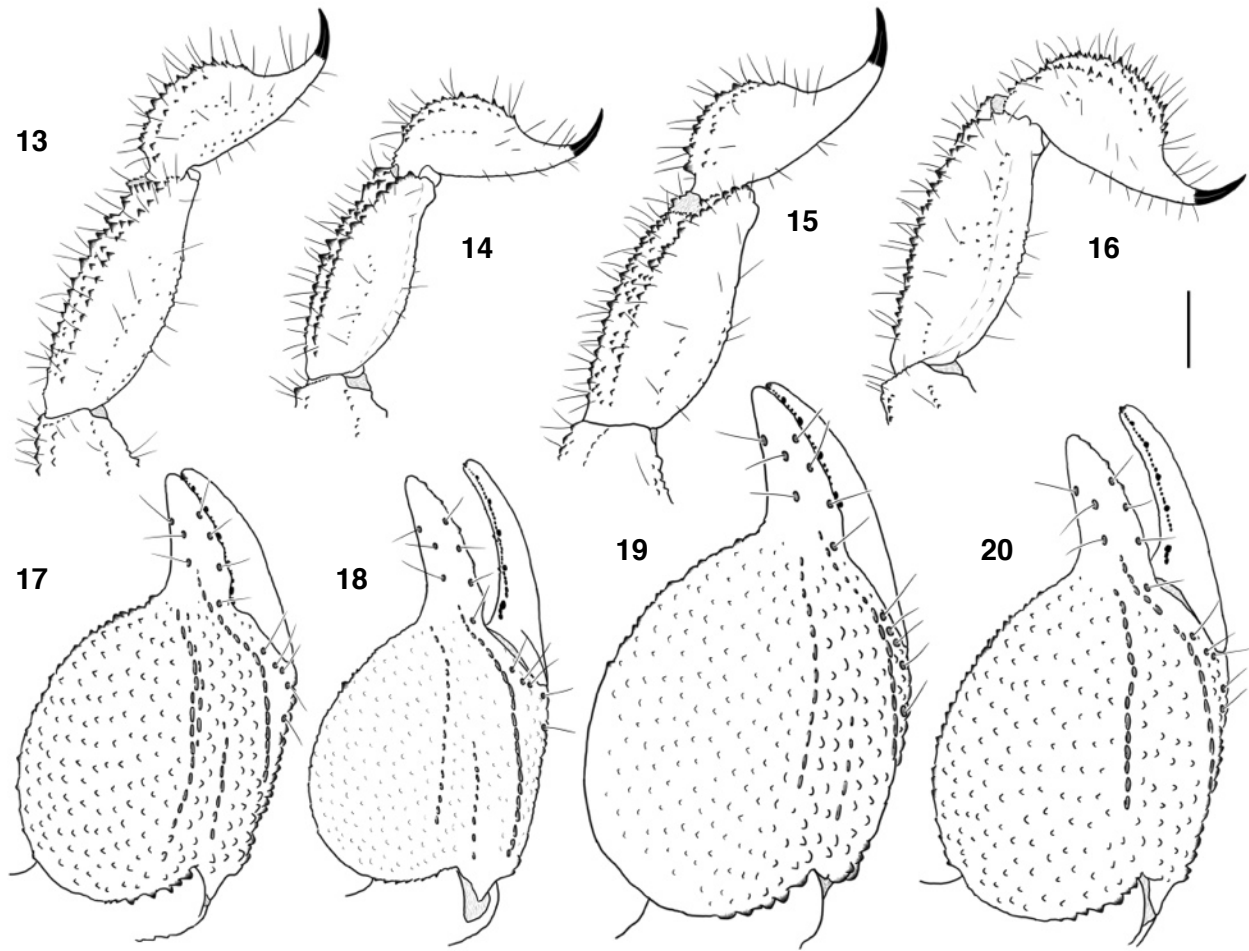


Fig. 13-20. Metasomal segment V, telson and chela of the new *Scorpio* species (Scale bar = 2 mm).

13-16. Metasomal segment V and telson, lateral aspect.

13. *Scorpio touili* sp. n., ♂ holotype. **14.** *Scorpio touili* sp. n., ♀ paratype. **15.** *Scorpio iznassen* sp. n., ♂ holotype. **16.** *Scorpio moulouya* sp. n., ♂ holotype.

17-20. Chela, dorso-external aspect, showing the trichobotrial pattern.

17. *Scorpio touili* sp. n., ♂ holotype. **18.** *Scorpio touili* sp. n., ♀ paratype. **19.** *Scorpio iznassen* sp. n., ♂ holotype. **20.** *Scorpio moulouya* sp. n., ♂ holotype.

darker, reddish black in male, reddish brown in female; dentate margins of fingers black. Legs yellowish.

Morphology. – Carapace acarinate, without any granulations; anterior margin with a moderately (male) to strongly (female) pronounced concavity; posterior furrows moderately pronounced; median ocular tubercle in the centre of the carapace; three pairs of lateral eyes; the first two of equal size, the third slightly reduced. Mesosoma: tergites acarinate and almost smooth, with only some sparse minute granulation on posterior and lateral sides. Sternum pentagonal, slightly wider than high. Venter: genital operculum suboval, formed by two plates having a semi-triangular shape; convex anteriorly and posteriorly in both sexes. Pectinal plate weakly divided in two parts, the posterior part slightly wider than the anterior part. Pectines longer than length of third coxa and largely exceeding the distal end of fourth coxa in male, slightly longer than length of third coxa and slightly exceeding the distal end of fourth coxa in female; pectinal tooth count 9-10 in male, 9-11 in female; fulcra strongly developed. Sternites smooth and shiny; VII with four moderately marked carinae; spiracles linear and conspicuous. Metasoma with moderately to strongly marked carinae on segments I to IV; granulation becomes spiniform on segment V; ventral and latero-ventral carinae intensely spinoid on V; all intercarinal surfaces weakly granular. Telson globular and strongly granular on ventral side with four ventral carinae formed by strong spinoid granules; aculeus shorter than vesicle and moderately curved. Cheliceral dentition characteristic of the Scorpionidae (Vachon, 1963); movable finger with one subdistal tooth and conspicuous basal teeth. Pedipalps: femur with four incomplete carinae, intercarinal surfaces smooth to weakly granulated; patella with dorsal carina

almost complete, intercarinal surfaces smooth to weakly granulated; chela with weakly marked ventral carinae; dorsal carinae moderately marked; dorso-external aspect of the manus coarsely granular, especially in male. Dentate margin on fixed and movable fingers with a series of granules divided by 5 strong accessory granules. Trichobothriotaxy of type C; orthobothriotaxic (Vachon, 1974); femur with 3 trichobothria, patella with 19 and chela with 26. Legs: tarsi of legs I to IV with 7/5, 8-9/6, 9/7, 9/7 internal and external spines arranged in series. Hemispermatophore: distal lamina curved, terminus enlarged and almost flat; laminar hook close to lamina, long and almost straight.

Morphometric values (mm) (male holotype and female paratype).

– **Total length** (including telson): 63.63/57.15.

– **Carapace**

length, 10.25/8.13;

anterior width, 5.63/5.38;

posterior width, 8.75/8.13.

– **Mesosoma**: length, 22.50/22.63.

– **Metasomal segments**

I: length, 3.63/3.13; width, 4.50/3.88;

II: length, 4.0/3.50; width, 4.0/3.63;

III: length, 4.50/3.75; width, 4.0/3.38;

IV: length, 5.25/4.38; width, 3.88/3.25;

V: length, 7.25/6.0; width, 3.63/2.63; depth, 3.25/2.75.

– *Telson*

length, 6.25/5.63;

vesicle width, 2.75/2.63; depth, 2.50/2.25.

– *Pedipalp*

femur length, 5.63/4.88; width, 2.63/2.38;

patella length, 5.63/6.0; width, 3.13/2.75;

chela length, 11.75/11.38; width, 8.38/6.88; depth, 4.13/3.88;

– *Movable finger* length, 6.75/6.75.

Comparisons. – By its light coloration and the general shape of its pectinal plate and male genital operculum plate, *Scorpio touili* sp. n. seems to be more closely related to *Scorpio punicus* Fet, 2000 (formerly known as *Scorpio maurus tunetanus* Birula, 1910), a yellowish brown species largely distributed in the high plateaus, the Saharan Atlas and Aures mountains and the northern edge of the Sahara Desert in Tunisia and Algeria, and the new species might represent the ‘occidental form’ of *S. punicus* (to which it has been referred in Touloun *et al.*, 2014).

S. touili sp. n. can however be easily distinguished from *S. punicus* notably by the following main features:

- (i) pectinal plate with posterior part slightly wider than anterior part (same width in *S. punicus*; Fig. 21, 25, 29–30);
- (ii) male pectine largely exceeding the distal end of the fourth coxa (reaching or only slightly exceeding the distal end of the fourth coxa in *S. punicus*);
- (iii) female pectine length slightly longer than length of third coxa (as long as third coxa in *S. punicus*);
- (iv) male genital operculum plate generally slightly less flattened with high/length ratio 0.7 (high/length ratio 0.6 in *S. punicus*; Fig. 21, 25);
- (v) female genital operculum plate more convex anteriorly (more flattened anteriorly in *S. punicus*; Fig. 29–30);
- (vi) hemispermatophore with laminar hook almost straight (more curved in *S. punicus*, Fig. 32, 34);
- (vii) leg IV tarsus with 9 internal and 7 external spines (n=4) (8 internal and 6–7 external spines in *S. punicus*).

S. touili sp. n. can also be easily distinguished from another new species described in this work, *S. moulouya* sp. n., mainly occurring in the middle Moulouya river basin, but with some potential zones of sympatry between both species (Fig. 4), notably by the following main features:

- (i) an overall lighter coloration, yellowish to yellowish brown (brownish to dark brown in *S. moulouya* sp. n.);
- (ii) chela manus of similar colour as body (lighter than body in *S. moulouya* sp. n.);
- (iii) hemispermatophore with distal lamina more curved (almost straight in *S. moulouya* sp. n.), lamina terminus enlarged and almost flat (not enlarged and ending with a 45° angle in *S. moulouya* sp. n.) and laminar hook longer and closer to lamina (smaller and further apart from lamina in *S. moulouya* sp. n., Fig. 32–33).

Finally, *S. touili* sp. n. can be easily distinguished from *Scorpio atlasensis* Khammassi, Harris & Sadine, 2023, a species recently described from the Tellian Atlas of north-western Algeria (Khammassi *et al.*, 2023) and reported in Morocco from two locations in the high plateaus and Saharan Atlas, by the following main features:

- (i) carapace and mesosoma without delimited darker pigmentation (dark triangular zone on carapace and median dark line on mesosoma in *S. atlasensis* sp. n.);

- (ii) female genital operculum plate more convex anteriorly (more flattened anteriorly in *S. atlasensis*; Fig. 29, 31);

- (iii) leg IV tarsus with 9 internal and 7 external spines (n=4) (8 internal and 7 external spines in *S. atlasensis*. NB. internal and external spine numbers seem to be inverted in Khammassi *et al.*, 2023).

Distribution and remarks. – In Morocco, *Scorpio touili* sp. n. seems to be mainly distributed in the high plateaus of the Oriental region, bordered to east by the Moulouya river basin, to the north by the Tellian Atlas and to the south by the Saharan Atlas and the Sahara Desert (Fig. 4). The new species most probably also occurs in the high plateaus of Western Algeria. As previously mentioned, *Scorpio touili* sp. n. might represent the ‘occidental form’ of *S. punicus*, a species occurring in the high plateaus, the Saharan Atlas and Aures mountains and the northern edge of the Sahara Desert in Tunisia and Algeria (Vachon, 1952, Lourenço & Rossi, 2016).

Khammassi *et al.* (2023) recently described a new *Scorpio* species, *S. atlasensis*, from one location in the Tellian Atlas of north-western Algeria on the basis of two female specimens (one adult and one pre-adult) and reported the same species to also occur in the Moroccan high plateaus (north Tendirra; one specimen) and Saharan Atlas (south Figuig; one specimen) based on molecular comparison of partial sequences of the mitochondrial Cytochrome Oxidase I gene. Considering the type location of *S. atlasensis* and the distribution of *Scorpio touili* sp. n. (Fig. 4) as well as the morphological differences between both species (Comparisons section), we believe that *S. atlasensis* is restricted to the Tellian Atlas of Algeria and the two mentioned locations in Morocco might rather refer to *S. touili* sp. n.

Touloun *et al.* (2014) referred to *S. hesperus* Birula, 1910 for specimens collected around Ain Beni Mathar. Considering the type location (Tanger) and biotope of *S. hesperus*, these might rather be referred to *S. touili* sp. n.

***Scorpio iznassen* sp. n.**

(Fig. 9–10, 15, 19, 22)

ZooBank: <http://zoobank.org/5598657E-7F40-4CBA-9BC8-0C68C1ED1EC8>

Holotype, ♂, Morocco, Guerbous pass, MHNL 47036249, 11/III/1984 (G. Chavanon), deposited in the MHNL.

Paratypes (2 ex.).

– 1 ♂, Morocco, Guerbous pass, MHNL 47036247, 26/II/1984 (G. Chavanon), deposited in the MHNL;

– 1 ♀ (right chela), Morocco, Beni Snassen, Tafoughalt, 34.84771 lat. -2.33716 lon., ID 16569, 01/VII/2015 (A. François, C. Galkowski, M. Sbai), deposited in the ECWP.

Comparative material examined (3 ex.).

Scorpio maurus Linnaeus, 1758: Algeria, Zurich (= Sidi Amar), 2 ♂, 1 ♀, MHNL 44003122, 1889 (Massard), MHNL.

Etymology. – The specific name is placed in apposition to the generic name and refers to the Beni Snassen (Aït Iznassen in Tamazight) tribe, living in the area where the new species occurs.

Diagnosis. – Scorpion of moderate size for the genus, with a total length of 50–58 mm for the males holotype and paratype. Coloration basically blackish brown. Genital operculum suboval, formed by two plates having a semi-triangular shape; convex anteriorly and flattened posteriorly. Pectinal plate strongly constricted medially; pectines slightly longer than length of third coxa and slightly exceeding the distal end of fourth coxa in male; pectinal count 9–10 teeth in male. Chela fixed finger internal length shorter than manus ventral length in male. Leg IV tarsus with 9 internal and 7 external spines.

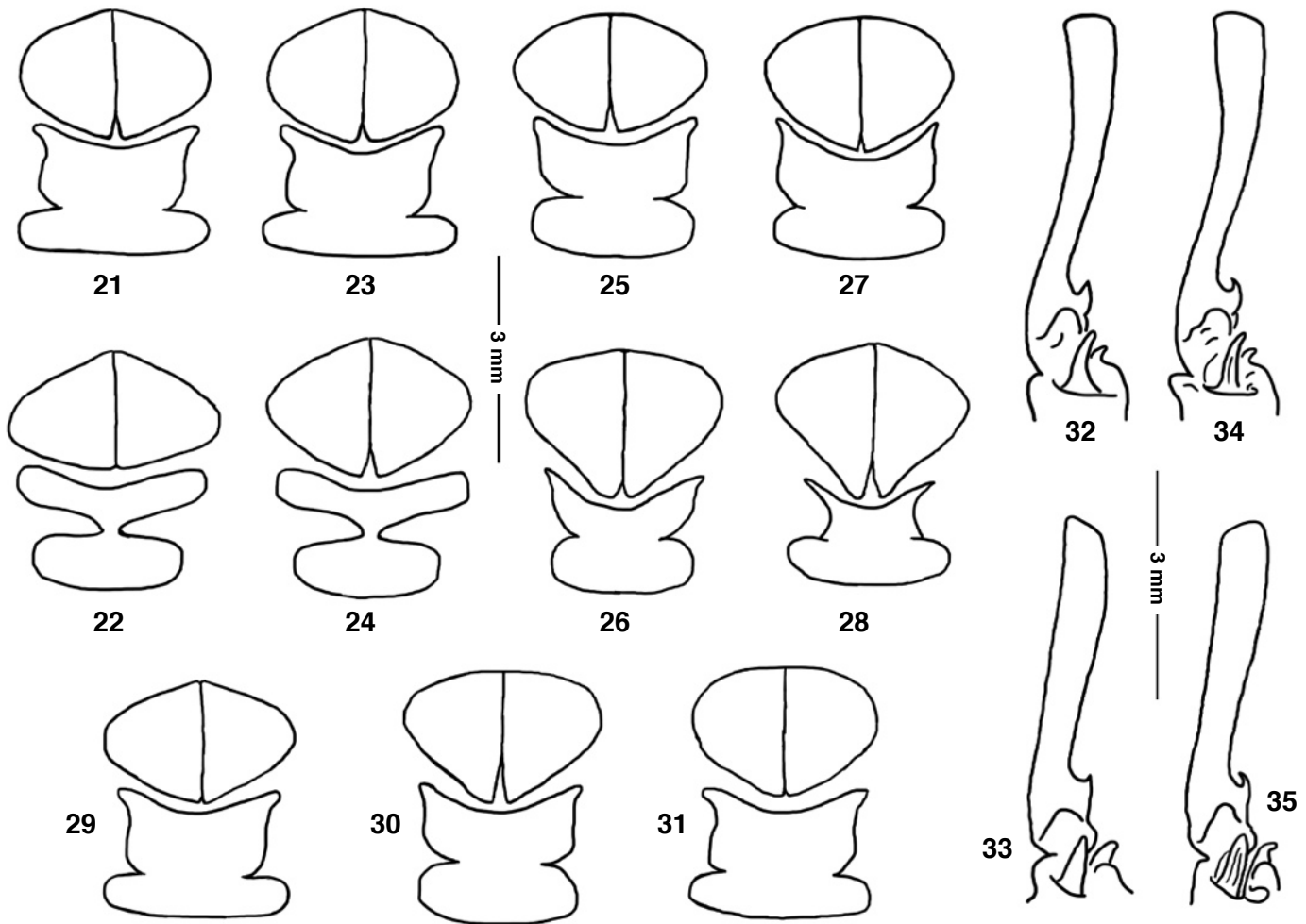


Fig. 21-31. Genital opercula and pectinal plates of the *Scorpio* species discussed in this work .

21-28. Males. **21.** *Scorpio touili* sp. n., holotype. **22.** *Scorpio iznassen* sp. n., holotype. **23.** *Scorpio moulouya* sp. n., holotype. **24.** *Scorpio maurus*. **25.** *Scorpio punicus*. **26.** *Scorpio birulai*. **27.** *Scorpio fuliginosus*. **28.** *Scorpio hesperus*.

29-31. Females. **29.** *Scorpio touili* sp. n., paratype. **30.** *Scorpio punicus*. **31.** *Scorpio atlasensis*, holotype. (24-28 and 30 modified after Vachon, 1952 and Lourenço, 2009; 31 modified after Khammassi *et al.*, 2023).

Fig. 32-35. Right hemispermatophores of some of the *Scorpio* species discussed in this work, external aspect.

32. *Scorpio touili* sp. n., holotype. **33.** *Scorpio moulouya* sp. n., paratype. **34.** *Scorpio punicus*. **35.** *Scorpio fuliginosus*. (34-35 modified after Vachon, 1952 and Lourenço, 2009).

Description (based on male holotype; measurements after the description).

Coloration. – Prosoma: carapace blackish brown with diffuse black variegated spots on the entire surface; median and lateral ocular tubercles marked with black pigments. Mesosoma: tergites blackish brown; sternites reddish black. Coxapophysis and sternum reddish yellow; genital operculum and pectines yellowish. Metasoma: dark brown with blackish pigmentation on ventral carinae of all segments. Telson yellowish brown with some brownish pigmentation on ventral and lateral surfaces; aculeus reddish at its base and black at its extremity. Chelicerae yellowish with brownish variegated spots close to the fingers; fingers yellowish with reddish teeth. Pedipalps: femur and patella brownish with carinae blackish; chela reddish brown with carinae and fingers blackish; dentate margins of fingers black. Legs brownish.

Morphology. – Carapace acarinate, without any granulations; anterior margin with a strongly pronounced concavity; posterior furrows moderately pronounced; median ocular tubercle in the centre of the carapace; three pairs of lateral eyes; the first two of equal size, the third slightly reduced. Mesosoma: tergites acarinate and minutely granular, coarser on VII. Sternum pentagonal, slightly wider than high. Venter: genital operculum suboval, formed by two plates having a semi-triangular shape; convex

anteriorly and flattened posteriorly. Pectinal plate strongly constricted medially. Pectines slightly longer than length of third coxa and slightly exceeding the distal end of fourth coxa; pectinal tooth count 9-10 in male; fulcra strongly developed. Sternites smooth and shiny; VII with four moderately marked carinae; spiracles linear and conspicuous. Metasoma with moderately to strongly marked carinae on segments I to IV; granulation becomes spiniform on segment V; ventral and latero-ventral carinae intensely spinoid on V; all intercarinal surfaces weakly granular. Telson globular and strongly granular on ventral side with four ventral carinae formed by strong spinoid granules; aculeus shorter than vesicle and moderately curved. Cheliceral dentition characteristic of the Scorpionidae (Vachon, 1963); movable finger with one subdistal tooth and conspicuous basal teeth. Pedipalps: femur with four incomplete carinae, intercarinal surfaces smooth to weakly granulated; patella with dorsal carina almost complete, intercarinal surfaces smooth to weakly granulated; chela with weakly marked ventral carinae; dorsal carinae moderately marked; dorso-external aspect of the manus coarsely granular. Dentate margin on fixed and movable fingers with a series of granules divided by 5 strong accessory granules; fixed finger internal length shorter than manus ventral length. Trichobothriotaxy of type C; orthobothriotaxic (Vachon, 1974); femur with 3 trichobothria, patella with 19 and chela with 26. Legs: tarsi of legs I to IV with 7/5, 8/6, 8/7, 9/7 internal and external spines arranged in series.

Morphometric values (mm) (male holotype).– **Total length** (including telson): 57.78.– **Carapace**length, 9.88;
anterior width, 5.38;
posterior width, 11.13.– **Mesosoma**: length, 16.0.– **Metasomal segments****I**: length, 3.63; width, 5.13;
II: length, 4.38; width, 4.88;
III: length, 4.75; width, 4.75;
IV: length, 5.63; width, 4.38;
V: length, 6.88; width, 3.50; depth, 3.50.– **Telson**length, 6.63;
vesicle width, 3.25; depth, 2.75.– **Pedipalp**femur length, 6.50, width, 3.0;
patella length, 7.75, width, 3.75;
chela length, 14.38, width, 9.50, depth, 6.0;
movable finger length, 8.88.

Comparisons. – By its general coloration and its pectinal plate strongly constricted medially, *Scorpio iznassen* sp. n. seems to be more closely related to *Scorpio maurus* Linnaeus, 1758, a dark species largely distributed on the northern flanks of Tellian Atlas in Tunisia and eastern Algeria, and the new species might represent the ‘occidental form’ of *S. maurus*.

S. iznassen sp. n. can however be easily distinguished from *S. maurus* notably by the following main features:

- (i) an overall darker coloration, blackish brown (reddish brown to dark reddish brown in *S. maurus*);
- (ii) a smaller overall size in male with 50-58 mm (60-70 mm in *S. maurus*);
- (iii) male pectine length slightly longer than length of third coxa (as long as third coxa in *S. maurus*);
- (iv) male genital operculum plate more flattened posteriorly (more convex posteriorly in *S. maurus*; Fig. 22, 24);
- (v) male chela fixed finger internal length shorter than chela manus ventral length (as long as manus ventral length in *S. maurus*).

S. iznassen sp. n. can also be easily distinguished from the two other dark species present in northern Morocco, namely *Scorpio birulai* Fet, 1997 (formerly known as *Scorpio maurus subtypicus* Birula, 1910) described from the Fahs-Anjra Province and *Scorpio hesperus* Birula, 1910 described from the surroundings of Tanger, notably by the following main features:

- (i) general coloration blackish brown (reddish brown to dark reddish brown in *S. birulai*);
- (ii) pectinal plate strongly constricted medially (only slightly constricted in *S. birulai* and *S. hesperus*; Fig. 22, 26, 28);
- (iii) male pectine length slightly longer than length of third coxa (as long as third coxa in *S. hesperus*);
- (iv) male genital operculum plate suboval, flattened posteriorly (strongly subtriangular posteriorly in *S. birulai* and *S. hesperus*; Fig. 22, 26, 28);
- (v) male chela fixed finger internal length shorter than chela manus ventral length (longer than manus ventral length in *S. hesperus*);
- (vi) moreover, the new species present a totally allopatric distribution from *S. birulai* and *S. hesperus*, separated notably by the Moulouya river basin.

Distribution and remarks. – *Scorpio iznassen* sp. n. is only known from the type locality, in the Beni Snassen mountains. As previously mentioned, notably by its pectinal plate strongly constricted medially, *S. iznassen* sp. n. seems to be more closely related to *S. maurus*, occurring on the northern flanks of the Tellian Atlas in Tunisia and eastern Algeria (up to Algiers; Vachon, 1952) than *S. birulai* and *S. hesperus* from the north-west of Morocco. The new species might represent the ‘occidental form’ of *S. maurus*.

It should also be mentioned that a former subspecies of *S. maurus*, *S. m. trarasensis* Bouisset et Larrouy, 1962, now synonymized with *S. maurus* (Kovařík, 2009), was described from Tlemcen, in the Tellian Atlas of north-western Algeria, close to the border with Morocco (about 100 km from the type locality of *S. iznassen* sp. n.). It can however easily be distinguished from the new species by the shape of the pectinal plate, not strongly constricted medially (one can then wonder about its synonymization with *S. maurus*). It should also be noted that *S. atlasensis* is considered to be related to *S. m. trarasensis* (Khammassi et al., 2023).

Scorpio moulouya sp. n.

(Fig. 11-12, 16, 20, 23, 33)

ZooBank: <http://zoobank.org/1EE98653-BDC8-469D-BC78-B8A488E19720>

Holotype, ♂, Morocco, Missouri, ECWP, in front of the Ecology laboratory, 33.00722 lat. -4.09760 lon., ID 5313, 13/III/2015 (A. François, H. Hdidou), deposited in the MNHN.

Paratypes (3 ex.).

- 1 ♂, Morocco, Missouri, 33.00768 lat. -4.08838 lon., ID 10558, 11/III/2015 (H. Hdidou), deposited in the ECWP;
- 1 ♂, Morocco, Lamjalil, 33.89382 lat. -3.95681 lon., ID 10561, 11/III/2015 (H. Hdidou), deposited in the MNHN;
- 1 ♂, Morocco, Tenzil, 33.59808 lat. -3.16118 lon., ID 15016, 31/XII/2013 (T. Dieuleveut), deposited in the ECWP.

Other material examined (9 ex.).

- 1 ♂, Morocco, Missouri, ECWP, 33.01021 lat. -4.09602 lon., ID 12080, 15/VIII/2012 (A. François, B. Michel), ECWP;
- 1 ♂, Morocco, Missouri, ECWP, 33.00722 lat. -4.0976 lon., ID 12198, 15/X/2012 (C. Robin), ECWP;
- 1 ♂, Morocco, Missouri, ECWP, 33.00722 lat. -4.0976 lon., ID 21822, 05/VI/2014 (S. Boullenger), ECWP;
- 1 ♂, Morocco, Missouri, ECWP, villa F2-6, 33.01191 lat. -4.09693 lon., ID 24231, 28/III/2021 (A. François), ECWP;
- 1 ♂, Morocco, Missouri, Al Baten, 33.16383 lat. -4.01174 lon., ID 573, 10/V/2002 (J. Yvernault), ECWP;
- 1 ♂, Morocco, Missouri, Al Baten, 33.22951 lat. -4.07098 lon., ID 2870, 17/V/2002 (Y. Hingrat, J. Yvernault), ECWP;
- 1 ♂, Morocco, Lamjalil, Ouizghet, ID 576, 17/VI/2000 (A. François, G. Chavanon), ECWP;
- 1 ♂, Morocco, Lamjalil, Ouizghet, 33.8872 lat. -3.9641 lon., ID 4634, 24/VIII/2009 (H. Hdidou), ECWP;
- 1 ♂, Morocco, Tenzil, ID 575, 17/VI/2000 (Y. Hingrat), ECWP.

Comparative material examined (3 ex.).

Scorpio fuliginosus (Pallary, 1928): Morocco, Djebel Toubkal, 1 ♂, 2 ♀, EY0052, 2010 (E. Ythier), EYPC.

Etymology. – The specific name is placed in apposition to the generic name and refers to the Moulouya River Basin, where the new species mainly occurs.

Diagnosis. – Scorpion of moderate to large size for the genus, with a total length of 53-67 mm for the males holotype and paratypes. Coloration basically brownish to dark brown, without delimited

darker pigmentation on carapace and tergites; chela manus lighter than body. Genital operculum suboval, formed by two plates having a semi-triangular shape; convex anteriorly and posteriorly. Pectinal plate weakly divided in two parts, the posterior part slightly wider than the anterior part; pectines longer than length of third coxa and largely exceeding the distal end of fourth coxa in male; pectinal count 9-11 teeth in male. Leg IV tarsus with 9 internal and 7 external spines. Hemispermaphore with distal lamina almost straight, terminus not enlarged and ending with a 45° angle; laminar hook apart from lamina, small and almost straight.

Description (based on male holotype; measurements after the description).

Coloration. – Prosoma: carapace brownish with diffuse dark brown variegated spots on the entire surface; median and lateral ocular tubercles marked with dark pigments. Mesosoma: tergites brownish to dark brown; sternites reddish yellow. Coxapophysis and sternum reddish yellow; genital operculum and pectines yellowish. Metasoma: yellowish brown with some blackish pigmentation on ventral face of all segments and on lateral and dorsal faces of segment V. Telson yellowish brown with some brownish pigmentation on ventral and lateral surfaces; aculeus yellowish at its base and black at its extremity. Chelicerae yellow with greyish variegated spots close to the fingers; fingers yellowish with reddish teeth. Pedipalps: femur and patella yellowish brown; chela yellowish brown with carinae and fingers reddish black; dentate margins of fingers black. Metasoma: yellowish brown.

Morphology. – Carapace acarinate, without any granulations; anterior margin with a moderately pronounced concavity; posterior furrows moderately pronounced; median ocular tubercle in the centre of the carapace; three pairs of lateral eyes; the first two of equal size, the third slightly reduced. Mesosoma: tergites acarinate and almost smooth, with only some sparse minute granulation on posterior and lateral sides. Sternum pentagonal, slightly wider than high. Venter: genital operculum suboval, formed by two plates having a semi-triangular shape; convex anteriorly and posteriorly. Pectinal plate weakly divided in two parts, the posterior part slightly wider than the anterior part. Pectines longer than length of third coxa and largely exceeding the distal end of fourth coxa; pectinal tooth count 10-11 in male; fulcra strongly developed. Sternites smooth and shiny; VII with four moderately marked carinae; spiracles linear and conspicuous. Metasoma with moderately to strongly marked carinae on segments I to IV; granulation becomes spiniform on segment V; ventral and latero-ventral carinae intensely spinoid on V; all intercarinal surfaces weakly granular. Telson globular and strongly granular on ventral side with four ventral carinae formed by strong spinoid granules; aculeus shorter than vesicle and moderately curved. Cheliceral dentition characteristic of the Scorpionidae (Vachon, 1963); movable finger with one subdistal tooth and conspicuous basal teeth. Pedipalps: femur with four incomplete carinae, intercarinal surfaces smooth to weakly granulated; patella with dorsal carina almost complete, intercarinal surfaces smooth to weakly granulated; chela with weakly marked ventral carinae; dorsal carinae moderately marked; dorso-external aspect of the manus coarsely granular. Dentate margin on fixed and movable fingers with a series of granules divided by 5 strong accessory granules. Trichobothriotaxy of type C; orthobothriotaxic (Vachon, 1974); femur with 3 trichobothria, patella with 19 and chela with 26. Legs: tarsi of legs I to IV with 7/5, 8/6, 9/7, 9/7 internal and external spines arranged in series. Hemispermaphore: distal lamina almost straight, terminus not enlarged and ending with a 45° angle; laminar hook apart from lamina, small and almost straight.

Morphometric values (mm) (male holotype).

– **Total length** (including telson): 66.71.

– **Carapace**

length, 9.50;
anterior width, 6.50;
posterior width, 9.75.

– **Mesosoma**: 25.13.

– **Metasomal segments**

I: length, 3.69; width, 5.0;
II: length, 4.13; width, 4.63;
III: length, 4.38; width, 4.25;
IV: length, 5.50; width, 3.88;
V: length, 7.50; width, 3.13; depth, 3.13.

– **Telson**

length, 6.88;
vesicle width, 3.25; depth, 2.88.

– **Pedipalp**

femur length, 6.25, width, 3.13;
patella length, 6.25, width, 3.13;
chela length, 13.75, width, 9.63, depth, 5.0;
movable finger length, 7.88.

Comparisons. – By the general shape of its pectinal plate and male genital operculum plate, *Scorpio moulouya* sp. n. seems to be more closely related to another new species described in this work, *Scorpio touili* sp. n., mainly occurring in the high plateaus of the Oriental region, but with some potential zones of sympatry between both species (Fig. 4).

S. moulouya sp. n. can however be easily distinguished from *S. touili* sp. n. notably by the following main features:

- (i) an overall darker coloration, brownish to dark brown (yellowish to yellowish brown in *S. touili* sp. n.);
- (ii) chela manus lighter than body (similar colour as body in *S. touili* sp. n.);
- (iii) hemispermaphore with distal lamina almost straight (more curved in *S. touili* sp. n.), lamina terminus not enlarged and ending with a 45° angle (enlarged and almost flat in *S. touili* sp. n.) and laminar hook smaller and further apart from lamina (longer and closer to lamina in *S. touili* sp. n., Fig. 32-33);

S. moulouya sp. n. can also be easily distinguished from another dark species to which it has previously been referred to (Touloun *et al.*, 2014), *Scorpio fuliginosus* (Pallary, 1928) described from High Atlas flanks and notably the region of Toubkal, notably by the following main features:

- (i) an overall lighter coloration, brownish to dark brown (similar coloration but always darker in *S. fuliginosus*);
- (ii) chela manus lighter than body (same colour or only slightly lighter than body in *S. fuliginosus*) and vesicle lighter than metasoma (same colour as metasoma in *S. fuliginosus*);
- (iii) pectinal plate with posterior part slightly wider than anterior part (same width in *S. fuliginosus*; Fig. 23, 27);
- (iv) male pectine length longer than length of third coxa (as long as third coxa in *S. fuliginosus*) and largely exceeding the distal end of the fourth coxa (reaching the distal end of the fourth coxa in *S. fuliginosus*);
- (v) male genital operculum plate more convex anteriorly (more flattened anteriorly in *S. fuliginosus*; Fig. 23, 27);
- (vi) hemispermaphore with distal lamina terminus ending with a 45° angle in the opposite way of *S. fuliginosus* and with laminar hook smaller and further apart from lamina (longer and closer to lamina in *S. fuliginosus*, Fig. 33, 35);
- (vii) moreover, both species present a totally allopatric distribution.

Finally, *S. moulouya* sp. n. can be easily distinguished from *Scorpio atlasensis* Khammassi, Harris & Sadine, 2023, a species recently described from the Tellian Atlas of north-western Algeria (Khammassi *et al.*, 2023) and reported in Morocco from one location in the middle Moulouya river basin, by the following main features:

- (i) carapace and mesosoma brownish to dark brown without delimited darker pigmentation (yellowish to yellowish brown with a dark triangular zone on carapace and a median dark line on mesosoma in *S. atlasensis*);
- (ii) chela manus lighter than body (similar colour as body in *S. atlasensis*);

(iii) leg IV tarsus with 9 internal and 7 external spines (n=4) (8 internal and 7 external spines in *S. atlasensis*. NB. internal and external spine numbers seem to be inversed in Khammassi *et al.*, 2023).

Distribution and remarks. – *Scorpio moulouya* **sp. n.** seems to be mainly distributed in the middle Moulouya river basin, with some incursions on the westernmost part of the high plateaus of the Oriental region (Fig. 4).

Khammassi *et al.* (2023) recently described a new *Scorpio* species, *S. atlasensis*, from one location in the Tellian Atlas of north-western Algeria on the basis of two female specimens (one adult and one pre-adult) and reported the same species to also occur in the middle Moulouya river basin (50 km south of Guercif; one specimen) based on molecular comparison of partial sequences of the mitochondrial Cytochrome Oxidase I gene. Considering the type location of *S. atlasensis* and the distribution of *S. moulouya* **sp. n.** (Fig. 4) as well as the morphological differences between both species (Comparisons section), we believe that *S. atlasensis* is restricted to the Tellian Atlas of Algeria and the mentioned location in Morocco might rather refer to *S. moulouya* **sp. n.**

Touloun *et al.* (2014) referred to *S. fuliginosus* for specimen(s) collected in the middle Moulouya river basin (80 km south of Guercif). Considering the type location (Toubkal) and biotope of *S. fuliginosus*, this (these) might rather be referred to *S. moulouya* **sp. n.**

Ecological comments on the distribution of the new *Scorpio* species

The high plateaus of the Oriental region, where *Scorpio touili* **sp. n.** occurs, extend over an area of approximately 30,000 km² lying between 1000-1700 m altitude, delimited to the north by the chain of Horsts (Jerada mountains), to the south by the eastern High Atlas and Saharan Atlas, to the west by the middle Moulouya river basin and to the east by the Algerian-Moroccan border. The Oriental high plateaus represent the western part of the high plateaus stretching from northeastern Morocco to the Aures mountains in eastern Algeria. The climate is arid with cold winters. Temperatures are high during Summer (average highest temperature 35-40°C) and low during winter (average lowest temperature 0-4°C) with a mean temperature variation of 20°C. Mean annual precipitation range from under 200 mm (south-east) to above 550 mm (north-west), with maximum precipitation during autumn and winter. Vegetation is predominantly composed of steppe formations (*Macrochloa tenacissima* (L.) Kunth, *Artemisia inculta* Del.) as well as pre-desert goosefoots (*Krascheninnikovia ceratoides* (L.) Gueldenst.) and sparse pistachio trees (*Pistacia atlantica* Desf.) and jujube trees (*Ziziphus lotus* (L.) Lam.). *S. touili* **sp. n.** also occurs in the southern part of this area (Tamlelt plain, Figuig surroundings) where vegetation includes north Saharan elements (*Fredolia aretioides* (Coss. & Moq. ex Bunge) Ulbr., *Stipagrostis pungens* (Desf.) De Winter) on rocky grounds with some sandy surfaces (El Harradji, 1997, Defaut & François, 2019).

The Beni Snassen mountains, where *Scorpio iznassen* **sp. n.** occurs, stretch over 100 km (between 6-20 km wide) along the Mediterranean coast and is delimited to the north by the Triffa plain, separating it from the Mediterranean coast, to the south by the Angad plain, to the west by the Moulouya river and to the east by the Oued Kiss, along the Algerian-Moroccan border. It has an average altitude of 800 m with its highest point rising to 1535 m (Ras Foughal). The climate is Mediterranean with hot and dry summers and fresh and wet winters. Mean annual temperature is 17-18°C, with average highest temperature of approximately 30°C during Summer and average lowest temperature of approximately 3°C during winter. Mean annual precipitation range from 550 to 650 mm. Vegetation is predominantly composed of woody vegetation

including evergreen oaks (*Quercus ilex* L.), Barbary thujas (*Tetraclinis articulata* (Vahl.) and kermes oaks (*Quercus Coccifera* L.) (Boumeaza T., 1985, Defaut & François, 2019).

The Moulouya river, originating on the eastern slopes of the Middle Atlas and flowing about 600 km up to the Mediterranean sea, has a basin extending over an area of approximately 54,500 km². Its middle basin, where *Scorpio moulouya* **sp. n.** occurs, is characterized by an arid to semi-arid climate with cold winters. Mean temperature range from 18-31°C during Summer and from 5-18°C during winter. Mean annual precipitation range from under 200 to 350 mm, concentrating on a limited number of days. In the areas with the lowest precipitation (Missour - Outat Oulad el Haj area), steppes are overgrazed and with high proportion of bare ground; the vegetation is characterized by *Hammada scoparia* (Pomel) Iljin and *Lycium intricatum* ssp. *pujosii* Sauvage. Elsewhere, the vegetation is predominantly composed of steppe formations (*Macrochloa tenacissima* (L.) Kunth, *Artemisia inculta* Del.) as well as sparse pistachio trees (*Pistacia atlantica* Desf.) and jujube trees (*Ziziphus lotus* (L.) Lam.)). In the more watered reliefs, vegetation is mainly composed of sparse forests of evergreen oaks (*Quercus ilex* L.) and junipers (*Juniperus* sp.) (El Hannani *et al.*, 2014, Defaut & François, 2019).

Composition of the scorpion fauna of the Oriental region in Morocco

Based on the material examined in this work, and comments on related species, 12 species are recognized to occur in the Oriental region in Morocco. The status of *Androctonus mauritanicus* (Pocock, 1902), collected in the north of the region (Tafoughalt; Touloun *et al.*, 2014), would need to be clarified, considering the distribution of the species on the western slopes of the Atlas, from Agadir to Tanger:

- *Androctonus amoreuxi* (Audouin, 1826)
- *Androctonus australis* (Linnaeus, 1758)
- *Androctonus liouvillei* (Pallary, 1924)
- *Androctonus mauritanicus* (Pocock, 1902) ?
- *Buthus albengai* Lourenço, 2003
- *Buthus lienhardi* Lourenço, 2003
- *Buthus oudjanii* Lourenço, 2017
- *Buthus tunetanus* (Herbst, 1800)
- *Hottentotta gentili* (Pallary, 1924)
- *Scorpio touili* **sp. n.**
- *Scorpio iznassen* **sp. n.**
- *Scorpio moulouya* **sp. n.**

Acknowledgements

Funds and samples used in this study were provided by the International Fund for Houbara Conservation (IFHC). We are grateful to His Highness Sheikh Mohamed bin Zayed Al Nahyan, President of the United Arab Emirates and founder of the IFHC, His Highness Sheikh Theyab bin Mohamed Al Nahyan, Chairman of the IFHC, and His Excellency Mohammed Ahmed Al Bowardi, Deputy Chairman, for their support. This study was conducted under the guidance of Reneco International Wildlife Consultants LLC, a consulting company that manages the IFHC's conservation programmes. We thank Dr Frédéric Lacroix, Managing Director of Reneco, for his supervision, as well as all staff of Reneco who participated in data collection. We also express our gratitude to Grégoire Liénart and Hayat Hachimi for the maps implementation.

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Résumé

Ythier E. & François A., 2023. – La faune scorpionique de la région de l'Oriental au Maroc (Scorpiones: Buthidae, Scorpionidae) avec la description de trois nouvelles espèces du genre *Scorpio* Linnaeus, 1758. *Faunitaxys*, 11(3): 1 – 15.

Une étude des scorpions collectés dans l'Oriental et régions proches au Maroc par l'*Emirates Center for Wildlife Propagation* (ECWP, Missouri, Maroc) durant les 22 dernières années est présentée. Environ 200 spécimens appartenant à quatre genres et 11 espèces sont répertoriés, incluant trois nouvelles espèces appartenant au genre *Scorpio* Linnaeus, 1758 (Scorpionidae) décrites sur la base de matériel collecté dans les hauts plateaux de l'Oriental (*Scorpio touili* sp. n.), dans le massif des Beni Snassen (*Scorpio iznassen* sp. n.) et dans la haute vallée du fleuve Moulouya (*Scorpio moulouya* sp. n.). Ces nouveaux taxons portent le nombre actuellement connu d'espèces de *Scorpio* à 21, huit d'entre elles étant présentes au Maroc. Un total de 12 espèces de scorpions sont reconnues pour la région de l'Oriental au Maroc.

Mots-clés. – Scorpion, Buthidae, *Androctonus*, *Buthus*, *Hottentotta*, *Scorpio*, taxonomie, nouvelle espèce, description, morphologie, Maroc, Oriental.

Faunitaxys

Volume 11, Numéro 3, Janvier 2023

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Illustration de la couverture :

Natural habitat of *Scorpio moulouya* **sp. n.**, in Missour, Oriental, Morocco.

Crédits:

ECWP : Fig. 1-4.

Eric Ythier : Fig. 5-33 (24-28, 30, 34-35 modified after Vachon, 1952 and Lourenço, 2009; 31 modified after Khammassi *et al.*, 2023) & couverture.

Publié par l'Association Française de Cartographie de la Faune et de la Flore (AFCFF)