

THE FIRST OBSERVATION ON SCORPION BIOGEOGRAPHY BY ARISTOTLE

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Abstract. During 2300 years of rather extensive commentary on Aristotle's works, the sentence in his *History of Animals* addressing scorpion distribution has escaped scrutiny. We demonstrate that when Aristotle wrote (350 BC) that "*in Pharos and other places, the bite of the scorpion is not dangerous*", he most likely meant not the Pharos of Egypt (the later site of the fabled Lighthouse of Alexandria) but the Greek colony of Pharos in the Adriatic Sea, the modern island of Hvar, Croatia. The northern range of toxic scorpions (genus *Mesobuthus*, fam. Buthidae, common in the Ancient Greece) in the Balkans does not reach Croatia, while non-dangerous species of *Euscorpis* (fam. Euscorpiidae) are indeed quite common "*in Pharos and other places*" in Europe (but not in Egypt!), the fact well known to Aristotle.

Key words: Scorpions, Aristotle, biogeography, *Euscorpis*, *Mesobuthus*, Pharos, Egypt, Illyria, Caria, Skythia.

La primera observación sobre biogeografía de escorpiones en Aristóteles

Resumen: Durante 2300 años de extensos comentarios a los trabajos de Aristóteles, las referencias de su 'Historia de los animales' sobre la distribución del escorpión han pasado desapercibidas. En el presente artículo demostramos que cuando Aristóteles escribió (350 A.C.) que "en Pharos y otros lugares, la mordedura del escorpión no es peligrosa", él se refirió muy probablemente no al Pharos de Egipto (el lugar donde posteriormente se ubicaría el legendario faro de Alejandría) sino a la colonia griega de Pharos, en el mar Adriático, en la actual isla de Hvar, Croacia. Los escorpiones tóxicos (género *Mesobuthus*, familia Buthidae, comunes en la Grecia antigua), en los Balcanes no alcanza Croacia, mientras que especies inocuas de *Euscorpis* (familia Euscorpiidae) son de hecho absolutamente comunes "en Pharos y otros lugares" en Europa (¡pero no en Egipto!), hecho bien conocido por Aristóteles.

Palabras clave: Scorpions, Aristóteles, biogeografía, *Euscorpis*, *Mesobuthus*, Pharos, Egipto, Illyria, Caria, Skythia.

Although ancient Egyptians deified scorpion as *Serqet*, or Serket, and gave the clever physician the title of a "Follower of Serket", "One who wields power over the goddess Serket" (or "is powerful over Serket's venom") since the 5th dynasty (2465–2323 BC) (Ghalioungui & El-Dawakhly, 1965), we do not find inscriptions or writings about the kinds and habits of their scorpions. We only know their medical prescriptions and magical spells to heal the stings of scorpions (Kamal, 1964; Budge, 1901).

It was Aristotle (384–322 BC) who, as in so many areas of human knowledge, appears to be first also in publishing zoological information about biogeography of scorpions (Cloudsley-Thompson, 1990, 2001). He could even be considered as a precursor of modern biogeography since he had already "listed variations between similar organisms from different areas – such as the bite of scorpions" (Williams & Ebach, 2008: 228).

Aristotle said (*Hist. Anim.* viii.29): "*locality is an important element in regard to the bite of an animal. Thus, in Pharos and other places, the bite of the scorpion is not dangerous; elsewhere – in Caria, for instances – where scorpions are venomous as well as plentiful and of large size, the sting is fatal to man or beast...*" [information on black swine stung by a scorpion follows, etc.] (translated by D'Arcy Wentworth Thompson). It seems that, during 2300 years of rather extensive commentary on Aristotle's works, this sentence in his *History of Animals* has escaped scrutiny.

Caria, part of classical Greece in Southwestern Anatolia (Muğla Province, modern Turkey), is inhabited by several scorpion species, among them a relatively toxic *Mesobu-*

thus gibbosus (Brullé, 1832) (Buthidae), widely found also within modern Greece. Pliny the Elder (23–79 AD) who "at the best of times, was never able to distinguish fact from fiction" (Cloudsley-Thompson, 2001) mentions, in a commentary on Aristotle, the Mt. Latmos in Caria, modern Beşparmak Dağ, where "scorpions do not wound strangers but kill the natives" (*Hist. Nat.* viii.84). In other translations of Aristotle's texts, based on diverging sources, the toponym "Skythia" appears instead of "Caria"; see 2002 edition by D.P. Balme). Without going into textological analysis, we can note that whichever "Skythia" could be meant here—there were several areas to which this name could be applied in the antiquity, from Ukraine to Central Asia—most of these regions still would contain moderately toxic scorpions, mainly of the genus *Mesobuthus*.

But where is **Pharos**?

Pliny has a strange description of "flying scorpions" (probably scorpion flies, Mecoptera), which seems to be conflated with Aristotle's scorpion statement since Pliny writes: "...they are found, also, in many other places, the vicinity of Pharos, in Egypt, for instance. In Skythia, the scorpion is able to kill a swine even with its sting..." [Aristotle's story of black swine follows] (*Hist. Nat.* xi:30).

This most famous ancient Pharos was a small island off coast Alexandria, Egypt, a natural harbor mentioned already in the *Odyssey*. When Alexander marched there in the autumn of 332 BC, Pharos was no more than a small limestone outcrop before the western mouth of the Delta. The 1500-m mole connecting Pharos to a fishing village, Rhacotis, was built, and the great city of Alexandria begun. The famous, at least 100 m tall, Lighthouse of Alexandria, the last of the

Seven Wonders of the World, was built on Pharos between 285 and 247 BC (Clayton, 1990).

Tradition, based on the so-called *Letter of Aristeas*, ca. 200 BC (mentioned in the Talmud, Josephus, and Philo) also links Pharos to the Septuagint Project, the translation of Torah (Pentateuch) into Koine Greek, commissioned for the Library of Alexandria by Ptolemy II Philadelphus (285–246 BC). “*The seventy-two interpreters were shut up in the island of Pharos; each of them completed his translation in seventy-two days, and all the translations were found to be word for word alike*” (Voltaire, 1843: 129).

Whether the Septuagint interpreters were indeed locked up (in the Lighthouse, we presume), this happened decades after Aristotle’s death. Moreover, Alexandria was founded in 332 BC – but it is believed that *History of Animals* was written in 350 BC, long before he moved back to Macedon to tutor young Alexander in 343 BC. Why then should a small island in Egypt have been important for Aristotle decades before it came into prominence?

More interesting, why should the scorpions of this Pharos be **non-toxic**? Scorpions of Egypt always were, and still are, widely and justly known for their toxicity since the child Horus was stung in the heel (Cloudsley-Thompson, 1990). Several species found currently near Alexandria are: *Androctonus australis*, *Androctonus bicolor*, *Buthacus leptochelys*, *Orthochirus innesi* (Buthidae), and *Scorpio maurus* (Scorpionidae). The first two buthids are among the most dangerous of scorpions to humans. They are always found far from the sea, and west of Alexandria. Natural habitats have considerably changed in 2300 years at the Egyptian coastline of Nile Delta and in Alexandria area due to the erosion which threatens coastal cities. These changes are continuous and increased during the 19th and 20th centuries as a result of a natural decrease of the Nile’s discharge and river controls (Smith & Abdel-Kader, 1988). Also, the human and industrial impacts caused many other changes of the area and repelled most of the living creatures to the south, far from the Mediterranean coastline. Thus we assume that in ancient times dangerous buthids could have been found along the coast. Moreover, we see no reason why the small island of Pharos would be singled out by Aristotle in 340s BC for having scorpions that are “not dangerous”.

Aelian (*De Nat. Anim.* 10.21, cit. from Wilkes, 1992) tells an interesting legend that Pharos was infested by snakes, expelled by Helen of Troy by planting herbs. This is reminiscent of St Patrick expelling Irish snakes. Still, Aristotle says that Pharos scorpions are non-toxic, not that they were expelled.

Our attention turns now to **another** Pharos – the modern Hvar Island, a popular tourist resort off the Croatian coast in the Adriatic Sea. This Pharos was a Greek colony, founded by Ionian settlers from Paros in 385 BC (Diodorus 15.14, cit. from Wilkes, 1992; Stillwell et al. 1975). The only Greek colony on an Adriatic island, Pharos did not keep its independence and fell under the Illyrian dynasty of Argon. It remained an ally of Macedon: its most famous figure, the Demetrius of Pharos, defeated by the Romans in the Second Illyrian War (220–219 BC), fled to the court of Philip V (Polybius 7.13; Wilkes, 1992).

More important for us, this Pharos, now Hvar, is inhabited by scorpions of the genus *Euscorprius* (Euscorpriidae), whose venom is not dangerous for humans. The natural

range of non-dangerous genus *Euscorprius* embraces temperate regions, north to southern France and even high mountains of Switzerland and Austria (see e.g. Fet & Braunwaldner, 2005), and includes all Adriatic islands.

Euscorprius is well known from the Croatian southern group of islands off coast between Split and Dubrovnik (Hadži, 1931; Ćurčić, 1971). At least two species are common in this area: *E. tergestinus* (C. L. Koch, 1837) (Fig. 1) and *E. hadzii* Caporiacco, 1950 (Fet & Soleglad, 2002). Already the map of Hadži (1931) shows records of *E. tergestinus* (as *E. carpathicus mesotrichus*) and respectively on all major islands of this group (Šolta, Brač, Hvar, Vis, Pločica, Korčula, Lastovo, Mljet), and *E. hadzii* (as *E. carpathicus polytrichus*) on Mljet. Based on rich collections of the Naturhistorisches Museum in Vienna, we (Fet & Soleglad, 2002) studied and confirmed *E. tergestinus* from Šolta and Pločica, and *E. hadzii* from Vis, Korčula, Lastovo, and Mljet. Caporiacco (1950) described *E. carpathicus lagostae* from Lastovo (=Lagosta), now a synonym of *E. hadzii*.

At the same time, the modern northern boundary of the range of the only toxic, arid-habitat buthid, the *Mesobuthus gibbosus*, in the Balkans (Fig. 2) runs from southern Albania to southwestern Bulgaria (Fet & Soleglad, 2007). This boundary was probably even further south 2300 years ago, considering postglacial warming and aridization. *M. gibbosus* is widespread on the Aegean islands (Parmakelis et al., 2006), among which it possibly also dispersed with humans (Gantenbein & Largiadèr, 2002).

We think it quite plausible that Aristotle had in mind non-dangerous *Euscorprius spp.* from the Illyrian Pharos (as well as “*other places*”) as compared with toxic *Mesobuthus spp.* from Anatolia (and most of modern Greece). The “*other places*” of Aristotle where scorpions were, and still are, non-dangerous, include all areas around the Mediterranean where only *Euscorprius* but not *Mesobuthus* (or toxic *Buthus occitanus* of Spain and Provence) are found (Fig. 2). These lands stretch from Massalia (now Marseille) in the west, through Corsica and Sardinia, across all of Apennine Peninsula including Magna Graecia (Sicily and Calabria), all islands in the Tyrrhenian, Adriatic and Ionian Seas, most of northern Balkans (from Illyria to Thrace, and north to Danube), and the western rim of Pontus Euxinus to Crimea. Thus, Pharos in the Adriatic emerges as a logical sample locality from this range of non-dangerous *Euscorprius*, to be contrasted with Caria and its dangerous *Mesobuthus*.

Aristotle lived to see his most famous student expanding the Greek world further and further, including into its orbit dozens of species of dangerous desert Buthidae in Africa and Asia—many of which are still being described.

We would like to use this opportunity to acknowledge many of our colleagues in scorpology, first of all Michael Soleglad for his wonderful, long-term interest in the genus *Euscorprius*, and also for providing us with a nice map (Fig. 2); Benjamin Gantenbein for his in-depth contributions to both *Euscorprius* and *Mesobuthus* knowledge; Jürgen Gruber and Boris Sket for supplying us with enough Adriatic *Euscorprius*; and the late Gary Polis for all things scorpion. We thank Ryszard Wiejski-Wolschendorf for his kind permission to use a photograph of *E. tergestinus* he made on the ancient Pharos of Illyria, now Hvar Island, Croatia. This discovery was guided by a young triple deity of Internetos, Googlos, and Wikipedia.



Fig. 1. *Euscorpius tergestinus*. Photos by Ryszard Wiejski-Wolschendorf, made on Hvar Island, Croatia (43°09.881' N 16°26.667' E), October 3, 2006.

Fig. 2. Map of overlapping geographic ranges of *Euscorpius* (blue solid line) and *Mesobuthus* (red dotted line) in the Mediterranean region. Caria, Pharos of Egypt, and Pharos of Illyria are indicated. Based on the map “Greek and Phoenician Settlements in the Mediterranean Basin, about 550 B.C. from “Historical Atlas” by William R. Shepherd, New York, Henry Holt and Company, 1923. Courtesy of the University of Texas Libraries, The University of Texas at Austin, USA.

Bibliography

- ARISTOTLE 2002. *Historia Animalium*. 1: I–X. Cambridge Classical Texts and Commentaries (No. 38). Ed. by D. M. BALME. Prepared for publication by A. GOTTHELF.
- ARISTOTLE 2007. *The History of Animals*. Translated by D'Arcy Wentworth Thompson. *eBooks@Adelaide*, <http://etext.library.adelaide.edu.au/a/aristotle/history/complete.html>.
- BUDGE, E. A. W. 1901. *Egyptian Magic*. London: Kegan, Paul, Trench, Trübner & Co., 234 pp.
- CLAYTON, P. A. 1990. Pharos of Alexandria. Pp. 138–157 in CLAYTON, P.A. & M. PRICE (eds.) *The Seven Wonders of the Ancient World*. Routledge, 178 pp.
- CLOUDSLEY-THOMPSON, J. L. 1990. Scorpions in mythology, folklore and history. Pp. 462–485 in POLIS, G.A. (ed.) *The Biology of Scorpions*. Stanford, CA: Stanford University Press.
- CLOUDSLEY-THOMPSON, J. L. 2001. Scorpions and spiders in mythology and folklore. Pp. 391–402 in FET, V. & P. A. SELDEN (eds.) *Scorpions 2001. In Meomriam Gary A. Polis*.
- ĆURČIĆ, B. P. M. 1971. The new finding places of scorpions in Yugoslavia. *Vestnik Československé Společnosti Zoologické*, **35**(2): 92–102.
- FET, V. & M. E. BRAUNWALDER 2005. Systematik und Bestimmung/Sistematica e determinazione. Pp. 17–50 in: BRAUNWALDER, M. E. *Fauna Helvetica 13. Scorpiones (Arachnida)*. Neuchâtel: Centre suisse de cartographie de la Faune/Schweizerische Entomologische Gesellschaft, 240 pp.
- FET, V. & M. E. SOLEGLAD 2002. Morphology analysis supports presence of more than one species in the *Euscorpius carpathicus* complex (Scorpiones: Euscorpiidae). *Euscorpius*, **3**: 1–51.
- FET, V. & M. E. SOLEGLAD 2007. Fauna and zoogeography of scorpions (Arachnida: Scorpiones) in Bulgaria. Pp. 405–422 in FET, V. & A. POPOV (eds) *Biogeography and Ecology of Bulgaria*. Springer.
- GANTENBEIN, B. & C. R. LARGIADÈR 2002. *Mesobuthus gibbosus* (Scorpiones: Buthidae) on the island of Rhodes – Hybridization between Ulysses' stowaways and native scorpions? *Molecular Ecology*, **11**: 925–938.
- GHALIOUNGUI, P. & Z. EL-DAWAKHLY 1965. *Health and Healing in Ancient Egypt*. Dar Al- Cairo: Maaref, 55+50 pp.
- HADŽI, J. 1931. Geografski razmestaj skorpija u Jugoslaviji (Geographic distribution of scorpions in Yugoslavia). Pp. 126–129 in: *Zbornik Radova na III Congressu Slovenskikh Geografa i Etnografa u Jugoslaviji 1930 (Transactions of the III Congress of Slovenian Geographers and Ethnographers in Yugoslavia, 1930)* (in Serbo-Croatian).
- KAMAL, H. 1964. *Ancient Egyptian Medicine*. Cairo, 2nd ed., **2**(4): 199–719 (in Arabic).
- PARMAKELIS A., I. STATHI, M. CHATZAKI, L. SPANOS, C. LOUIS & M. MYLONAS 2006. Evolution of *Mesobuthus gibbosus* (Brullé, 1832) (Scorpiones: Buthidae) in the northeastern Mediterranean region. *Molecular Ecology* **15**(10): 2883–2894.
- PLINY THE ELDER 1892. *The Natural History*. BOSTOCK, J & H.T. RILEY (eds.). London: George Bell & Sons.
- SMITH, S. E. & A. ABDEL-KADER 1988. Coastal erosion along the Egyptian Delta. *Journal of Coastal Research*, **4**(2): 245–255.
- STILLWELL, R., W. L. MACDONALD & M. H. MCALISTER 1975. *The Princeton Encyclopedia of Classical Sites*. Princeton, NJ: Princeton University Press, 1019 pp.
- VOLTAIRE, DE. 1843. *A Philosophical Dictionary*. Vol. 2. London: W. Dugdale.
- WILKES, J. J. 1992. *The Illyrians*. Wiley-Blackwell, 384 pp.
- WILLIAMS, D.M. & M. C. EBACH 2008. *Foundations of Systematics and Biogeography*. New York, NY: Springer, 310 pp.