

A Systematic, Ecological, Zoogeographical and Biometrical Study of the Scorpions of the Peloponnesus

By

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Abstract. In this paper Peloponnesus scorpions are studied from a systematical, ecological zoogeographical and biometrical point of view. The species established to exist in the area under investigation are *Mesobuthus gibbosus*, *Euscorpium carpathicus*, *Euscorpium (Euscorpium) mesotrichus* and *Euscorpium italicus*.

Measurements made on 35 individuals of the *Mesobuthus gibbosus* species, collected at random, have shown their average length in mm of a) the cephalothorax to be; $22,34 \pm I. 32$, b) the cauda without telson; $26,50 \pm I,69$, c) the vesicle and the aculeus; $6,60 \pm 0,40$, and d) the body as a whole: $55,60 \pm 3,32$. All of which amount to a probability of 95%.

An application of criterion t in the number of the teeth, in combs of the species in question, in the case of specimen size $n_1 = 42$ and $n_2 = 28$ has shown that the difference at a probability of 95% is statistically significant.

In both female and male individuals of *Euscorpium (Euscorpium) mesotrichus* from two different localities the number of trichobothria on the padipalp tibia is 10 to 12. An application of criterion t on specimen size of $n_1 = 32$ and $n_2 = 18$ has shown that at a probability of 95% the difference is statistically insignificant.

Introduction

The Peloponnesus is the largest peninsula of Greece. It is situated at the southernmost end of both this country and the European Continent. It has an area 21,439 sq. kilometres and consists of a primarily mountainous country with few exceptions. The Peloponnesian scorpion fauna cannot be said to consist of a wealth of species. In spite of the fact that we took care to collect our specimens at different times of the year and from many different stations, when systematically processed, the material collected was found to belong to two families only; to Buthidae and the Chactidae.

The scorpions of various parts of Greece have at times been studied by researchers as A. BIRULA (1903), F. WERNER (1928), J. GRUBER (1963), R. KINZELBACH (1975) and D. VOULALAS & K. MICHALIS (1977).

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Material and methods

Our material was collected during the months of March, May, June, July and November of the years 1974 to 1976, the specimens being placed at all times within receptacles containing a 70% proof solution of methyl alcohol.

The systematic and statistic processing of the said specimens took place in the Laboratory with the help of a Baus and Lomb stereoscope.

The main characteristics taken into consideration in the classification of the material collected were; Form of the sternum, number of keels on the caudal segments, arrangement of keels on the cephalothorax, number and arrangement of granules on the movable finger of the pedipalp, proximal tooth, leg spines, number of lateral eyes and shape of the median lemallae on the combs.

Family: Buthidae SIMSON, 1879

Mesobuthus gibbosus (BRULLÉ, 1832)

Synonyms: *Buthus gibbosus* BRULLÉ: Werner, S. B. Ak., Wiss., Wien, 137, 1928; 294 — *Buthus gibbosus* BRULLÉ, 1832; Gruber, Ann., Nat., Mus., Wien, 66, 1963; 307. — KINZELBACH (1975) mentions, among others, the following synonyms: *Androctonus peloponnesis* C. L. KOCH 1836; Arachn., 3 : 34. — *Androctonus stenelus* C. L. KOCH 1841; Arachn., 8: 23.

It is a nocturnal and siccophile animal. During the day it is unusually found under rocks, dry leaves, bales of various kinds of dry grass or straw, etc. in costal regions with low vegetation. The species may also be encountered among the ruins of old houses, storehouses, stables, ect.

It has been recorded in Yugoslavia, Albania, European Turkey, Asia Minor, Bulgaria and elsewhere. In Greece it is widely distributed over both the mainland and the islands of the country.

Distribution in the Peloponnesus; Nafplion (N₁), 15 June 1975: 4♀ and 3♂. Aghios Eleftherios Nafplion (N₂), 20 June 1975: 4♀ and 3♂. Zidaeika, Nafplion (N₃), 5 May 1975: 4♀ and 6♂. Zidaeika Nafplion (N₄), 6 May 1975: 4♀ and 7♂. Areopolis, Lakonia (A₁), 11 October 1976; 2♀ and 3♂.

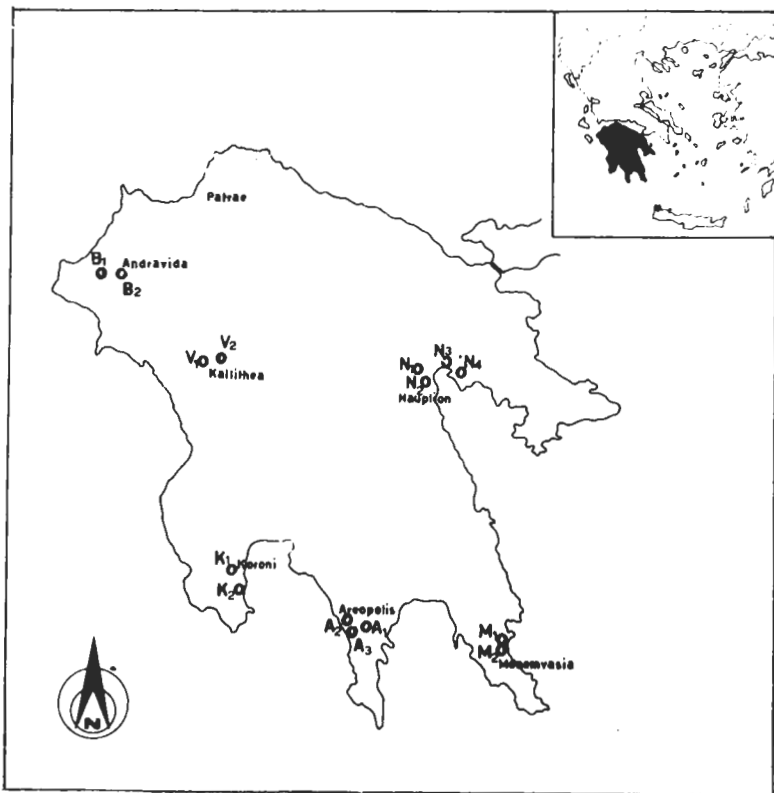
Measurements made on 35 individuals of the species have shown the average length in mm of a) the cephalothorax to be $22,34 \pm 1,32$, b) the cauda without the aculeus: $26,50 \pm 1,69$, c) the vesicle with the aculeus; $6,60 \pm 0,44$ and d) the body as a whole; $55,60 \pm 3,32$. All of the above average lengths are analogous to a probability of 95%.

We have noticed that the range fluctuation number of the teeth on the combs was not constant in the various specimens at our disposal but varied from 21 to 23 in the females and from 27 to 30 in the males. An application of criterion *t* to specimen size $n_1 = 42$ and $n_2 = 28$ to the number of teeth shows that the difference at a probability of 95% is statistically significant.

Family: Chactidae POCKOCK, 1839

Euscorpius carpathicus (LINNAEUS, 1767)

Synonyms: *Scorpio carpathicus* R. CALINESCU & Her. CALINESCU 1930; Bull., de la Scien, XII, 59 — 70. — KINZELBACH (1975) also mentions the following synonyms: *Scorpio carpathicus* LINNAEUS, 1767; System., Nat., 12 ed Holmiae, I, (2); 1038. — *Euscorpius ciliciensis* BIRULA 1828; Horae, Soc.,



Ent., Ross., 33, 136. — *Euscorpium koschevnikovi* BIRULA 1900: Jzw., Obscl., Gest., Mosk., 28, 8–20.
 — *Euscorpium candiata* BIRULA 1903; Ann., Mus., Zool., St., Petersb., 1903; 298.

Similarly to *Mesobuthus gibbosus* it is nocturnal but not so siccophile. Individuals of the species have also been found in humid environments. Specimens have been collected in dark underground parts of houses and storehouses as well as under houses, etc.

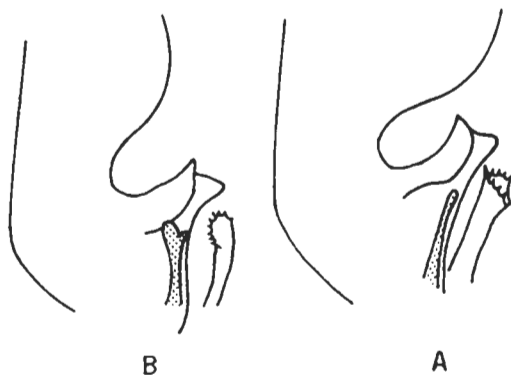
Its distribution begins in N. Africa, crosses over into Spain and proceeds through S. France, Sardinia, Corsica, Italy, the Eastern Alps, the S. Carpathian Mountains, the Balcan Peninsula and Asia Minor to terminate in the Caucasus (KAESTNER, 1957).

In Greece it has been mentioned by various writers such as WERNER (1928) BIRULA (1903) in Crete, and CURCIC (1972) in Corfu, Zante and Antiparos.

Distribution in the Peloponnesus: Corone, Messinia (K₁), 20 March 1976: 9♀ and 2♂. Areopolis, Lakonia (A₂), 19 November 1975: 3♂.

Euscorpium (Euscorpium) mesotrichus (HATJI, 1929)

Synonyms: *Euscorpium italicus mesotrichus* CURCIC: Zool., Rav., Prizot., Mat., Fac., Beograd, 35, 1971: 92–102. — Among other synonymous to the species KINZELBACH (1975) mentions: *Euscorpium tergestinus* C. L. KOCH 1836; Arachn., 3, 106, 247–248. — *Euscorpium carpathicus polytrichus* HADJI, 1929; Loc., Cit., 37.



HADJI (1929, 1931), based on the number of trichobothria especially on the pedipalp tibia ventral surface, considers *Euscorpium* (*Euscorpium*) *mesotrichus* as subspecies of *Euscorpium carpathicus*. KINZELBACH (1975) disagrees, and considers it a species in itself.

We also are of the opinion that this is indeed a case of a separate species. The facts that have led us to the formation of this opinion are: a) morphological, as the size of the specimens under investigation is greater than that of *Euscorpium carpathicus*, the colour ranges from yellow to brown, the dorsal part of the body is darker than the ventral one, the tergal keel is sharp and often horny, the number of their trichobothria is greater (10 to 12) and they differ anatomically in their organs of reproduction (Fig. 2; b) ecological, since *Euscorpium* (*Euscorpium*) *mesotrichus* has not been found together with *Euscorpium carpathicus*. The former is usually found in shady woods of any kind of trees (except pine trees). This is not true of *Euscorpium carpathicus* which is encountered at elevations of 30 to 1500 m. above sea level.

It has been found on the Balearic Islands, Corsica, Elba, Sardinia, parts of S. E. Italy, Dalmatia and the Balkan Peninsula, the southernmost end of its zone of occurrence being Peloponnesus and the easternmost one Turkey.

Distribution in the Peloponnesus: Areopolis, Lakonia (A₂), 19 November 1976: 4♀ and 4♂. Areopolis Lakonia (A₄), 21 November 1976: 4♀ and 4♂. Monemvasia area (M₁), 16 August 1976: 5♀ and 4♂.

The range of fluctuation of the number of trichobothria on the pedipalp tibia of female and male individuals from two different areas, namely Areopolis and Monemvasia, is 10 to 12. The application of criterion *t* to a specimen size of $n_1 = 32$ and $n_2 = 18$ has shown that the difference in respect of this characteristic between the individuals of the two areas mentioned above, at a probability of 95% is statistically insignificant.

Euscorpium italicus (HERBST, 1800)

Synonyms: *Euscorpium* (*Polytrichus*) *italicus* A. BYALYNITSKII-BIRULA; Scorpions 1917, 65. — *Euscorpium* (*Polytrichus*) *italicus* VACHON, Toxicon 1966 (4); 214. — *Euscorpium italicus* (HERBST) D. M. CURCIC: Rapp., Comm., Int., Mep., Med., 1972, 21, 3, 83. — *Euscorpium italicus* VACHON, Études sur les Scorpions. Inst., Past., D'Alger, 1952; 418. — Among other synonyms KINZELBACH (1975) mentions: *Scorpio naupliensis* C. L. KOCH, 1836; Arachn., 3: 93. *Euscorpium italicus zakynthii* DI CAFORIACCO: Atti, R., Acad., Naz., Cinc., Mem., Cl., Biol., 2, (8), (3-4): 172.

It is species rarely to be encountered among the Greek fauna. It has been found in various places of Peloponnesus by HADJI (1929) and DI CAPORIACCO (1950) but has not been reported as existing in any other part of Greece by anybody.

It is the largest scorpion of the Chactidae family. HADJI (1929), based on the number of trichobothria on the pedipalp tibia, considers *Euscorpium italicus* as subspecies. He divides the species into the following three subspecies: *Euscorpium (Mesotrichus) italicus*, *Euscorpium (Polytrichus) italicus* and *Euscorpium (Oligotrichus) italicus*. DI CAPORIACCO (1950) disagrees. He divided the genus into three groups instead of subspecies. KINZELBACH (1975) disagrees with the views of both of the said researchers. He finds that the type of *Polytrichus* found in Peloponnesus is undoubtedly a deviation.

In our opinion, the number of trichobothria on the pedipalp tibia surface alone is not a sufficiently important criterion to serve as the base of a division of the species into subspecies, and anyway, in both of the areas where the species in question was collected and which are considerably distant from each other, we notice that the number of trichobothria ranges 10 to 12.

Its habitat is primarily mountainous regions with high humidity. Contrary to the *Mesobuthus gibbosus* which is a siccophile animal, *Euscorpium italicus* prefers humidity. It is encountered mostly along coasts of low altitude. In other words, the species lives in a humid and warm climate.

Regarding the geographical distribution of this species, BIRULA (1917) reports that it occupies a narrow zone beginning in S. Transcaucasia, proceeds along the North coast of Asia Minor and more extensively in zones of the Balkan and Italian peninsulas. Specifically, the existence of this species is reported on the coast of Asia Minor, the Black Sea, S. Hungary, North Italy (Tyrol), S. Italy (Calabria) and Peloponnesus.

Distribution in the Peloponnesus: Callithea, Eleias (V₂), 20 July 1974: 5♀ and 3♂. Callithea, Eleias (V₁), 21 July 1974: 5♀ and 2♂. Andravida, Eleias (B₁), 22 July 1974: 3♀ and 2♂. Andravida,

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