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Taxonomic survey of the genera *Euophrys*, *Pseudeuophrys* and *Talavera*, with description of *Euochin* gen. n. (Araneae: Salticidae) and with proposals of a new research protocol*¹

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Abstract

The paper presents comparison of main diagnostic characters of all recognizable species of genera *Euophrys* C.L. Koch, 1834, *Pseudeuophrys* Dahl, 1912 and *Talavera* Peckham & Peckham, 1909, also delimiting new genus *Euochin* from China. All that purports to illustrate the current state of classification suggests progress and improvements. Discussed postulates include adding color macrophotographs of live specimens to the routine tools of research, and routine use of precisely documented palps and internal structures of epigyne. Implementation of the above will require change of research protocol of all Salticidae, the conclusions drawn are applicable to studies of other families of spiders.

New taxa described.

Gen. *Euochin* gen. n.

Subgroup of genera EUOPHRYEAE new.

Nomenclatorial corrections documented

Euophrys monadnock: Edwards, 1980: 12 (S, in part). = *Euophrys nearctica* Kaston, 1938c (removal from synonymy, documented - Figs 12B-C with E, as well as relevant facsimiles Figs 32-33).

Icius hamatus (C. L. Koch, 1846) (one of synonyms reinstated, female only) = *Euophrys altera* (Simon, 1868).

Euophrys talassica Logunov, 1997 = *Pseudeuophrys talassica* (Logunov, 1997) - comb. n.,

Euophrys vittata Caporiacco, 1935 - reinstated from "nomen dubium" to "pending revision" status.

Talavera petrensis (C. L. Koch, 1837) = *Euophrys petrensis* C. L. Koch, 1837 (reinstated original combination).

Overdue nomenclatorial corrections:

Ballognatha typica Caporiacco, 1935 - nomen dubium,

¹ Present paper constitutes partial publication of sections of the Internet "Monograph of Salticidae (Araneae) of the World 1995-2016", parts I & II by Prószyński (2016a, b), available at: <http://www.peckhamia.com/salticidae/Subfamilies/> and <http://www.peckhamia.com/salticidae/> respectively. Contribution of authors: J. Prószyński – text and selection of illustrations, J. Lissner and M. Schäfer - provided majority of photographs.

Ballognatha Caporiacco, 1935 - nomen dubium,
Ballognathine Caporiacco, 1935 - nomen dubium.

Key words: taxonomy, *Euochin* gen. n. *Euophrys*, *Pseudeuophrys*, *Talavera*, EUOPHRYINES, EUOPHRYEAE, subgroup of genera, Salticidae, jumping spiders, Palaearctics, China, North America, Africa, research protocol.

Introduction

This paper purports to survey diagnostic characters of 55 species of *Euophrys* C.L. Koch, 1834, 9 species of *Pseudeuophrys* Dahl, 1912, 14 species of *Talavera* Peckham & Peckham, 1909 and delimits new genus *Euochin* gen. n. from China, containing 4 species. All these species were once considered as *Euophrys* and are superficially similar, but differs distinctly by genitalic characters. These are minute to small jumping spiders (2 to 5 mm body length, rarely up to 7 mm), ground dwellers (with preferences for forest litter and mosses), often unnoticeable in their environment because of cryptic dorsal coloration. The only vividly colored parts of their bodies are faces of males, together with palps and frontal surfaces of legs, visible from the perspective of encountered spiders: mates and competitors. These colors are well visible on live specimens, but dull and unnoticeable when preserved in alcohol. Their distributional center is Palaearctic Region, with distinct preference for its warmer parts, while single species migrated to North America. *Euophrys* has also a number of species living in Africa.

The knowledge of these spiders is scanty and insufficient, in part due to difficulty in identification, relating to particularly quick loosing of their natural coloration by specimens submerged in alcohol, to similarity of their palps, differing by indistinct characters, to similarity of external epigyne, and finally to reluctance of arachnologists to use the only distinct difference - internal structures of epigyne (which require making temporary microscopic slides - actually simple and easy procedure).

New, promising method are documentation of appearance of live specimens by color macrophotographs (see Figs 5-9, 23-24, 26), which coincides with interests of amateur photographers, but require parallel documentation of palps and internal structure of epigyne to correlate habitus appearance with genitalic identification (at least for new taxa and for first specimens of studied series). That may require collecting specimens alive for later photographing in laboratory, or home, and later preservation for complementary test of genitalic characters (at least that should be done for first specimens of series observed, and for new species). For the first time handling and storage of large number of photographs will be easy, owing to electronic technology.

Material and Methods

The paper follows methodology of Pragmatic Classification, proposed by Prószyński (2016a, 2017b and subsequent papers). Summary of diagnostic data of such prolific genus as *Euophrys*, and other related, are based on data available in literature, as well as on personal experience of the authors. The digestion of information concentrates on diagnostic characters found previously to be the most representative (palps, epigyne, spermathecae and ducts) in a survey of over 4800 recognizable species of Salticidae (<http://www.peckhamia.com/salticidae/Subfamilies/>), complemented now with macro photographs of live specimens accessible nowadays. A small sample test of value of used characters is presented on Fig. 7.

Conclusion on reliable diagnostic characters in Salticidae

Comparative research on 4800 recognizable species (Prószyński (2016a)) permits to select the following, most reliable diagnostic characters in Salticidae.

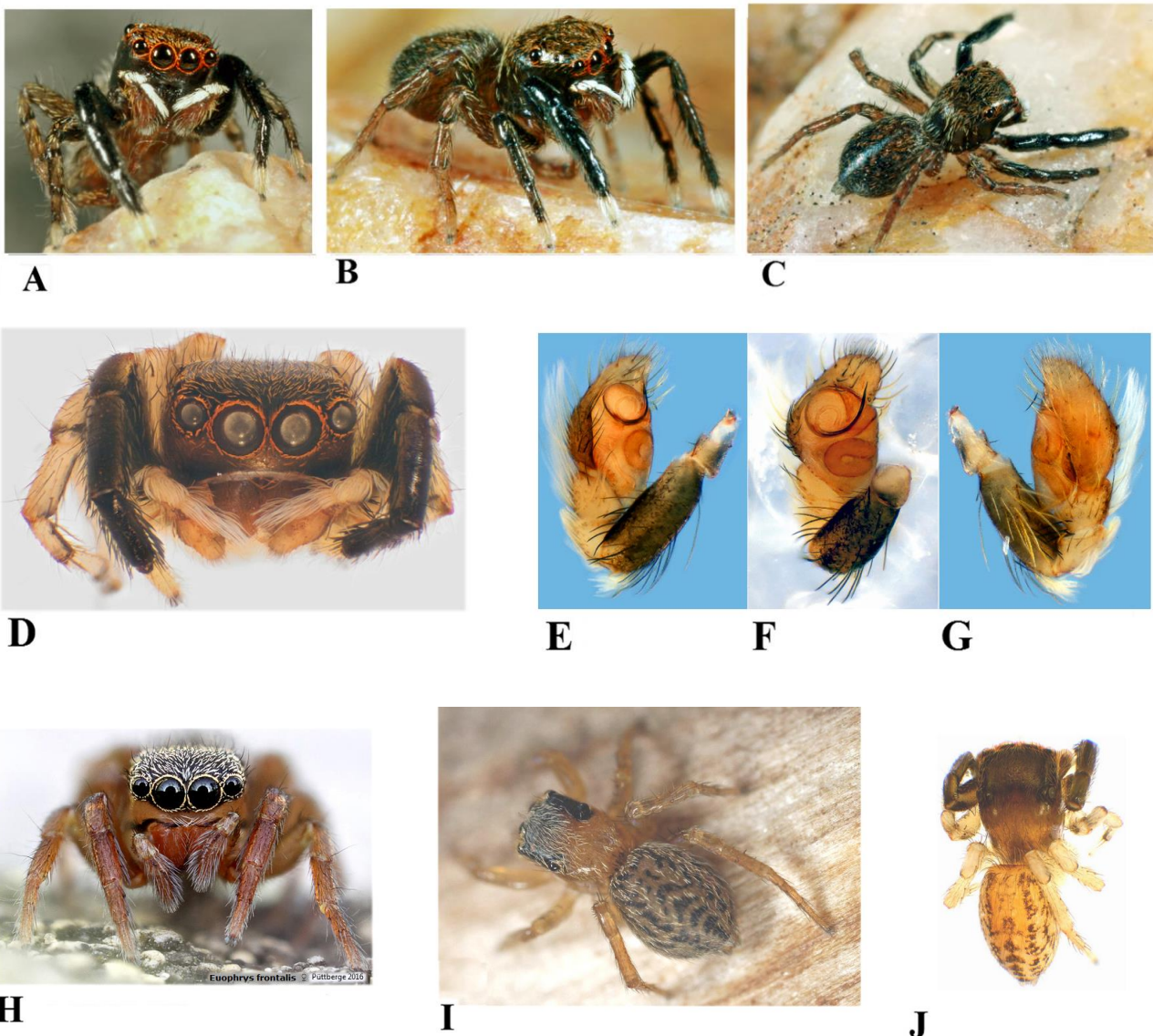
- general body outlook, memorized usually by arachnologists, is useful to classify local genera but can be misleading in cases of little known faunas of distant continents (Fig. 4);
- macrophotographs of color pattern (especially frontal view in males) is sensitive recognition mark for separating species within a genus (Figs 7 and also 4-6, 8-10).

- palp structure - permits to identify groups of genera (subfamilies), to which particular species belongs (Figs 3, 7, 11-17, 19-20);
- internal structure of epigyne, cleared, with membranous parts stained (preferably by Chlorazol Black E)² permits to identify genera to which particular species belong, often also species themselves (Figs 3, 7, 11-17, 19-20);
- external appearance of epigyne - may help to identify local species belonging to well known genera, but can be misleading when applied in broader scale (Figs 3, 7, 11-17, 19-20);

An example of modern protocol of documentation of Salticidae is shown on Fig. 1 and is compared with examples of those used in mid XXth century, excellent at that time (Fig. 2A-D & E).

Protocol of diagnostic documentation

Euophrys frontalis



² Effective work with these character require direct comparison of drawing with drawing and of photograph with photograph, if documentation is located on distant charts, the screen may be divided and required charts displayed side by side, or particular illustrations could be copied from the screen and mounted in a new chart, in required order.

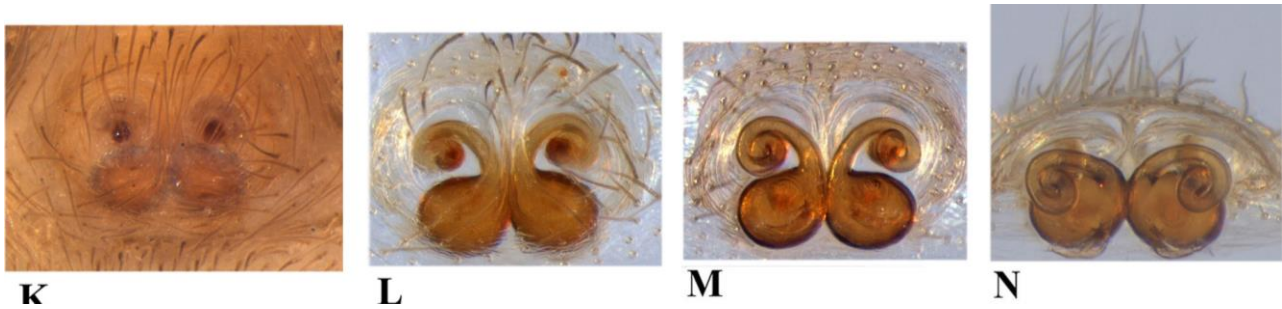
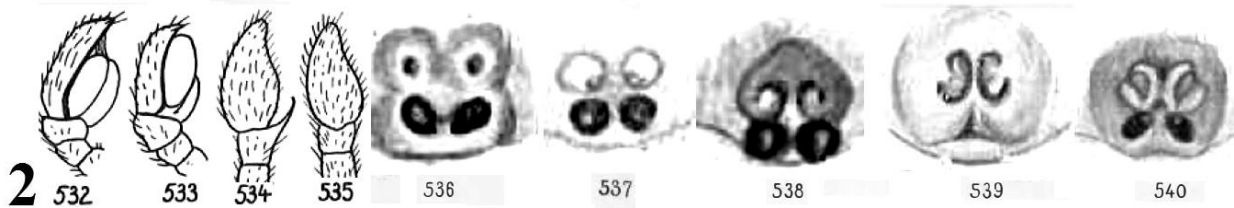


Figure 1. New protocol of macrophotographic diagnostic documentation by Arnaud Henrard, here on example of live *Euophrys frontalis*. It includes three views of both male (A-C) and female (H-I) specimens, two position of palps (F-G) and two views of epigyne (K-L), with some additional views (E, M-N), D - demonstrates disappearance of white setae and hairs in alcohol (compare live specimen at A), J - demonstrates changes of color pattern caused by preservation in alcohol.

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23. Gen.: <i>Euophrys</i> C. L. Koch 1834.	VI, 48	Araneae.
1. ♂ 2	— VM-Ringe oben gelb, unten wie Cl lebhaft rotbehaart; Ceph 1,3, wie vorige, doch dichter u. länger weißbehaart; Abd wie vorige. Sonstige Heiden (ab IV)	5. <i>E. petrénis</i> C. L. Koch
— ♀ 6	6. 2. Ti nur v-l mit 1 Sta-Längsreihe aus 1 od. 2 Sta 7	— 2. Ti v-l mit 1 Sta-Längsreihe aus 3 Sta u. v-m mit 1 Sta-Längsreihe aus 1 od. 2 Sta 8
2. Pp-Ti u. Ta m mit langen, weißen Haarpinseln; VM-Ringe rotbehaart, Cl fast nackt; Ceph 1,6—1,9, schwarz, blaßbehaart; Abd bräunlich, blaßbehaart, mit unscharfen helleren Winkelflecken. Unter Moos u. Steinen (ab V)	1. <i>E. frontális</i> (Walck.)	7. 2. Ti nur v-l mit nur 1 sehr dünnen Sta; Epg T. 8 Fig. 536; Ceph 1,3—1,7
— Pp-Ti u. Ta gleichmäßig behaart, ohne Pinsel 3	— 2. Ti nur v-l mit 2 Sta hintereinander; Epg T. 8 Fig. 537; Ceph 1,6	4. <i>E. æquiples</i> (Cambr.)
3. Pp-Ti l mit deutlich abstehender Ap, diese ↓ sichtbar (T. 7 Fig. 534)	8. Abd schwärzlich, mit helleren Zeichnungen, ± unter dem Haarkleid verdeckt 9	— Abd ± blaßgelb, mit schwärzlichen Zeichnungen; Epg T. 8 Fig. 538; Ceph 2
— Pp-Ti l mit rudimentärer, dem Ta anliegender, ↓ nicht sichtbarer Ap (T. 7 Fig. 535) 5	— Pp-Ta m T. 7 Fig. 533; Ceph 1,3—2, nebst Abd ähnlich voriger. Nur Nieder-Österreich	1. <i>E. frontális</i> (Walck.)
4. Pp-Ta m T. 7 Fig. 532; Ceph 2—2,3, mit weißem mn Haarstreif u. weißberandet, Abd mit gleichem mn Streif. Häufig, niedere Pflanzen, unter Steinen (ab IV)	2. <i>E. errática</i> (Walck.)	3. <i>E. obsoléta</i> (Sim.)
— Pp-Ta m T. 7 Fig. 533; Ceph 1,3—2, nebst Abd ähnlich voriger. Nur Nieder-Österreich	3. <i>E. obsoléta</i> (Sim.)	2. <i>E. errática</i> (Walck.)
5. VM-Ringe u. Cl gelb behaart; Ceph 1—1,2, vorn schwarz, hinten braun, mit schwarzer l Kante; Abd schwarz mit helleren Querbinden; Pp-Ta d T. 7 Fig. 535. An niederen Pflanzen u. Steinen (ab V) 4. <i>E. æquiples</i> (Cambr.)	9. Epg T. 8 Fig. 539; Ceph 1,7 3. <i>E. obsoléta</i> (Sim.)	— Epg T. 8 Fig. 540; Ceph 2 2. <i>E. errática</i> (Walck.)



Roewer, C. F. (1928). Araneae, Echte oder Webspinnen. In: *Die Tierwelt Mitteleuropas*. Leipzig 3(6), 1-144.

222 223 BRITISH SPIDERS SALTICIDE

8. Genus **EUOPHRYS** C. L. Koch 1834.

CHARACTERS OF GENUS. Small spiders, often of speckled appearance. **CARAPACE:** Thorax longer than head. **EYES:** Ocular trapezium twice as broad as long, and parallel-sided. **CHELICERÆ:** With one tooth on inner margin and two smaller ones on outer margin. **LEGS:** With strong spines ventrally; tarsi I-III have one long trichothorium dorsally, while tarsi IV have two. The species can be separated readily by their colour and genitalia.

224 BRITISH SPIDERS

110.— *Euophrys frontalis* Male palps: A, D, 111.— Epigyne

224 BRITISH SPIDERS

TEXT-FIG. 110.—Male palps: A, *Euophrys frontalis* (elc/w); D, do, tibia (above and to outside); B, *E. longica*, tibia (side); C, do, (l/c/w); E, *E. petrénis* (below); F, *E. æquiples* (below); G, *E. erratica* (below).

Locket, G. H. & Millidge, A. F. (1951). British spiders.

***Euophrys frontalis* (Walckenaer).**
(Text-figs. 110, A, D; 111, B)

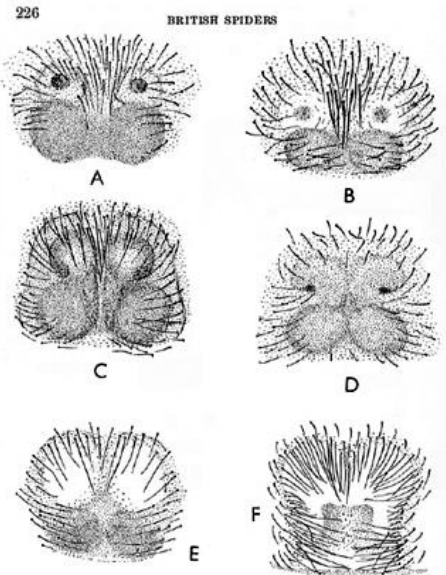
Aranea frontalis C. A. Walckenaer, 1802, p. 246. *Salticus frontalis* J. Blackwall, 1861-4, p. 52. *Euophrys frontalis* O. P. Cambridge, 1879-81, p. 403; C. Chyzer and L. Kulezynski, 1891-7, I, p. 43; E. Simon, 1937, pp. 1172, 1176. *E. macidata* F. Dahl, 1926, p. 35; A. Tullgren, 1944, p. 35.

DESCRIPTION. LENGTH: ♀: 3-5 mm. ♂: 2-3 mm.

♀: CARAPACE: Yellow-brown, with the head suffused with black and with a metallic lustre, and the whole clothed with numerous fine hairs. EYES: Anteriors are fringed with white hairs. ABDOMEN: Pale whitish-yellow with longitudinal rows of black blotches. STERNUM: Pale whitish-yellow, clothed with numerous hairs. LEGS and PALP: Yellow-brown, not annulated. EPIGYNE: Text-fig. 111, B.

♂: CARAPACE: Dark yellow-brown, with the head deep black with a metallic lustre; the whole is clothed with black and white hairs. EYES: Anteriors fringed with vivid orange hairs. ABDOMEN: Yellow-brown with a central row of black chevrons and irregular black bands on either side. LEGS: Tarsi I contrast sharply with the rest of legs I, being white and clothed with white hairs; metatarsi I are deep black, tibiae are olive-black, the remainder shading off gradually to coxae I which are olive-green; the dark-coloured segments, particularly the femora, have a deep bluish-green metallic sheen by reflected light; the remaining legs are yellow-brown except for metatarsi II and tibiae II which are darker and have a metallic sheen. MALE PALP: Text-figs. 110, A, D; the femur is dark brown to black, the remaining segments being yellow-brown: the patella and tibia are thickly clothed with long, stout, white hairs on the inside and above; the tibia has a long, thin, light-coloured apophysis on the outer side.

BCCURRENCE: Common, of widespread occurrence in grass, low bogrowth, etc. Adult during spring and early summer.



D TEXT-FIG. 111.—EPIGYNES: A. *Euophrys aequipes*; B. *E. frontalis*; C. *E. petrensis*; D. *E. molesta*; E. *E. lampera*; F. *E. erratica*.

Locket, G. H. & Millidge, A. F. (1951). British spiders.

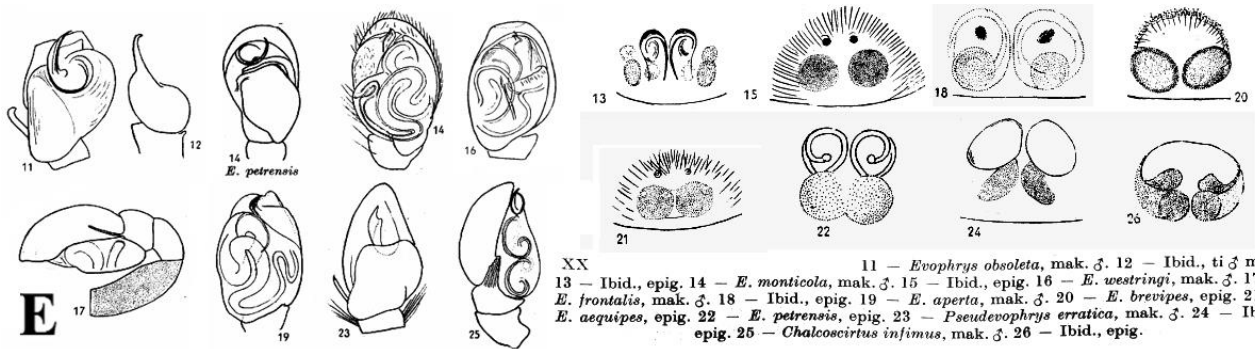
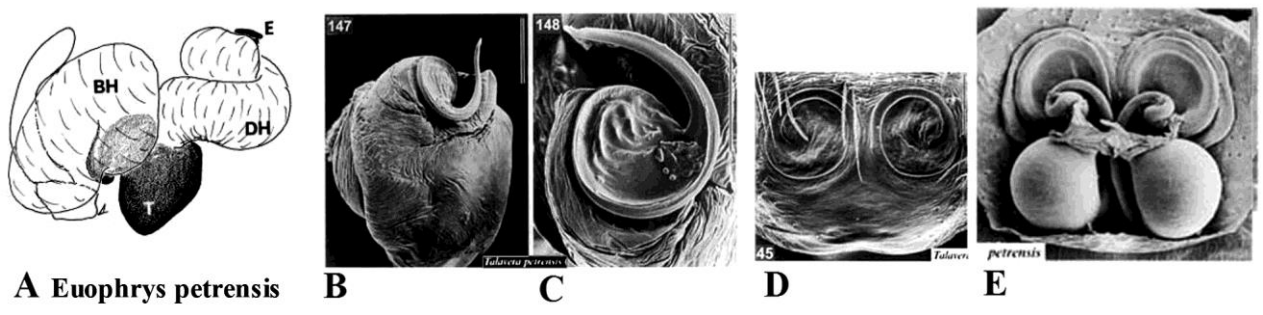
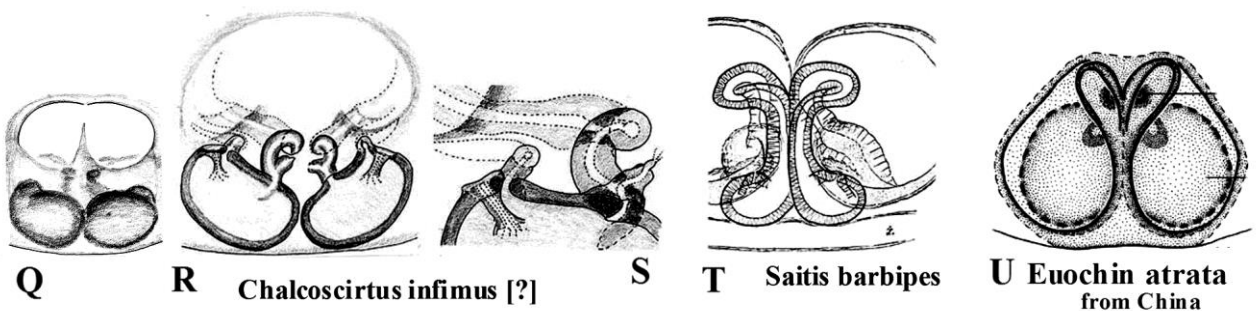
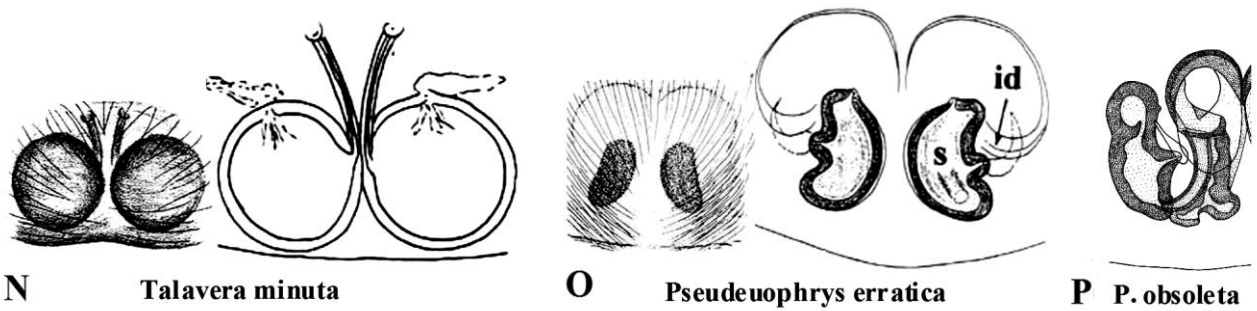
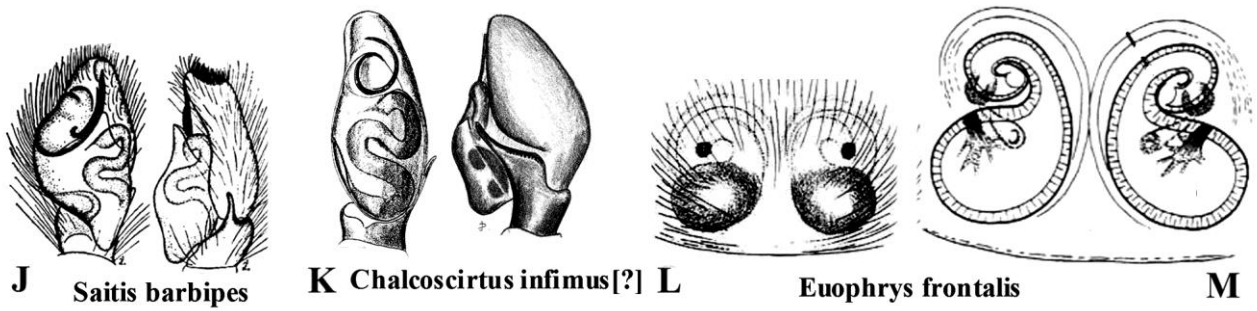
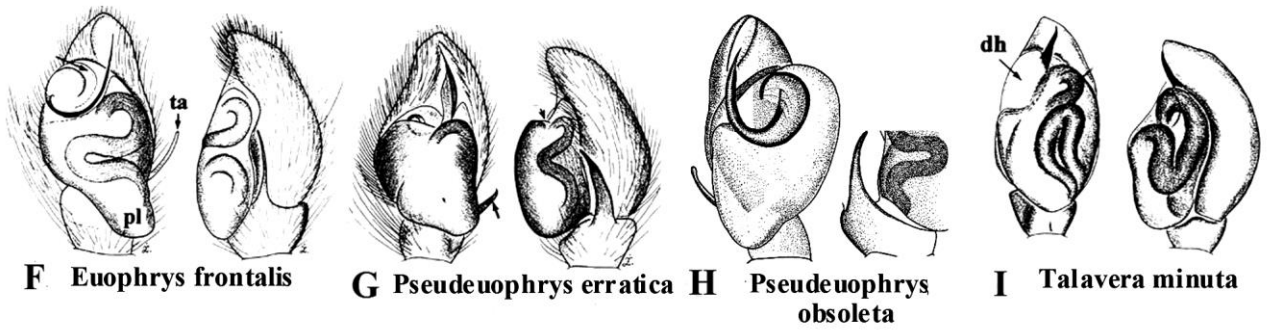


Figure 2. Standard taxonomic definitions, as used in 1928-1971. 1-2 - Roewer. (1928). *Die Tierwelt Mitteleuropas*, . A-D - Locket & Millidge. (1951). British spiders - the best at that time, E - Miller (1971). Pavouci-Araneida. [Personal comment: the above keys were used by J. Prószyński while working on his MSc Thesis. SOURCES: Locket, G. H. & Millidge, A. F. (1951). British spiders. Ray Society, London 1, 1-310, E - Miller, F. (1971). Pavouci-Araneida. Klíč zvířeny ČSSR 4: 51-306, plate XX.(ammended). All ©Copyrights are retained by the original authors and copyright holders, used by their courtesy.]

Cornerstone features



Differences between genera



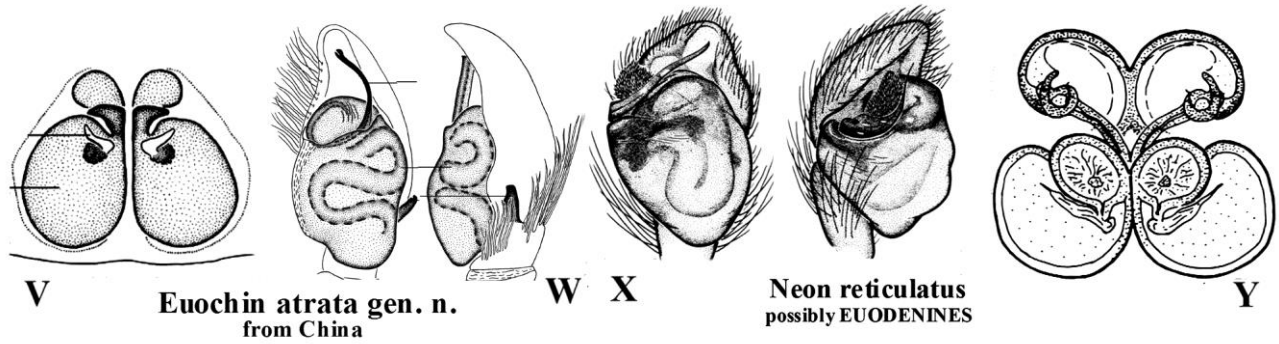
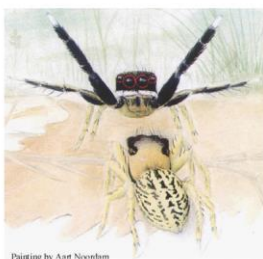


Figure 3. Cornerstone characters of the group of genera EUOPHRYINES on example of *Euophrys petrensis* (**A-E**) and, key characters of European genera (**F-W**) including their Chinese relative (**U-W**), and of a genus of uncertain placement (**X-Y**). **A** - *Euophrys petrensis* expanded palp, **B-C** - same, curled embolus - SEM, **D** - same, epigyne, ventral view, SEM, **E** - same, spermathecae and ducts, dorsal view, SEM). Comparison of genitalic characters of genera (**F-K**, **W-X** - males, **L-V**, **Y** - females), **F** - *Euophrys frontalis*, **G** - *Pseudeuophrys erratica*, **H** - *Pseudeuophrys obsoleta*, **I** - *Talavera minuta*, **J** - *Saitis barbipes* (Simon, 1868), **K** - *Chalcoscirtus infimus* [?] (Simon, 1868), **L-M** - *Euophrys frontalis* , **N** - *Talavera minuta* , **O** - *Pseudeuophrys erratica*, **P** - *Pseudeuophrys obsoleta*, **Q-S** - *Chalcoscirtus infimus* [?], **T** - *Saitis barbipes* (Simon, 1868), **U-W** - Chinese relative *Euochin atrata* gen. n., **X-Y** - *Neon reticulatus* (Blackwall, 1853) - possibly belonging to EUODENINES group of genera.

SOURCES: **A-E** - Logunov, Kronstedt 2003. J. Natural History, 37: 1144-1148, f 23, 45-46, 147-148, **F-G**, **L-M**, **O** - Žabka M. 1997: 46, figs 89-98, **H**, **P** - Prószyński J. 1979. Annales zoologici, 34: 307, f 78-83. , **I**, **J**, **T** - Žabka, 1987b: 452, f. 1-4, **K**, **Q-S** - Prószyński (2003) *Annales Zoologici*, 44, f. 136-137, 142-144., **U-W**- Zha, S., Jin, C. & Zhang, F. (2014). *Zootaxa* 3779(3): 369, 371, f. 1-22, ©Magnolia Press, **X-Y** - Snazell, Jonsson (1999) *Bul. British Aracnol. Soc*, 11(6): 251, f. 5-8. All copyrights are retained by the original authors and copyright holders, used by their courtesy.

Differences between genera



A *Euophrys frontalis*



B *Euophrys frontalis*



C

Euophrys gambosa



D *Hasarius adansoni*



E *Euophrys pseudogambosa*



F *Pseudeuophrys erratica*



F1 *Pseudeuophrys vafra*

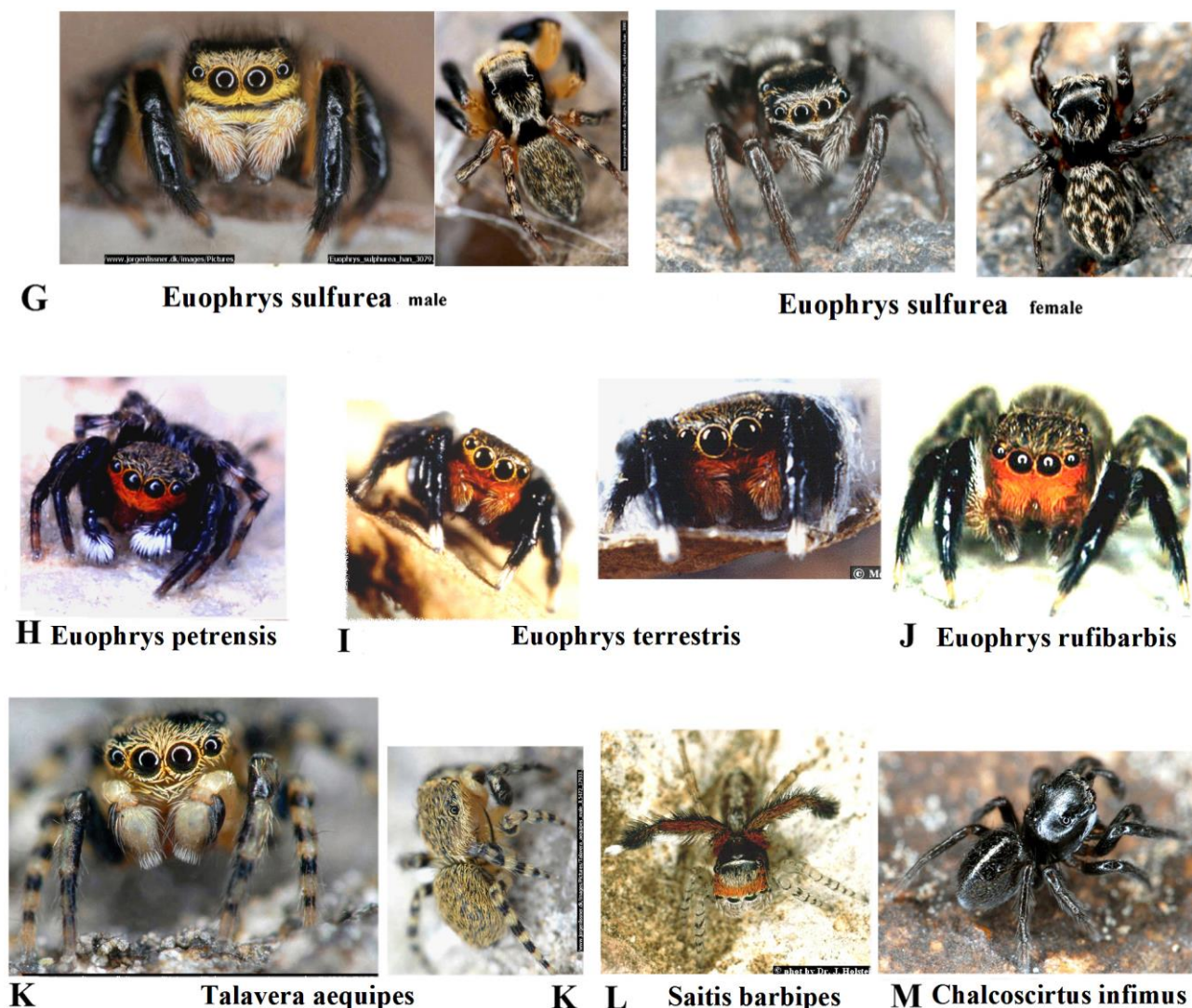


Figure 4. Color pattern diversity in *Euophrys* and some other European genera. **A** - *Euophrys frontalis* male and female in nuptial dance, **B** - *E. frontalis*, male frontal and dorsal view (compare with - **D** - presence of white palpal mane may be misleading), **C** - *E. gambosa*, male frontal and dorsal view, **D** - white palpal mane in *Hasarius adansoni* is comparable with *Euophrys frontalis* (see Fig. 4B) [correction of misinformation in Prószyński. (2018a: 17).], **E** - *E. pseudogambosa*, **F** - *Pseudeuophrys erratica*, male, **F1** - *Pseudeuophrys vafra*, female, **G** - *E. sulfurea*, male and female, frontal and dorsal views, **H** - *E. petrensis*, **I** - *E. terrestris*, **J** - *E. rufibarbis*, **K** - *Talavera aequipes*, **L** - *Saitis barbipes* - (note differences with *Euophrys* spp.: legs I & II thin, legs III thickened, with strikingly black "bottle-brush" of longer setae, tarsus III white), **M** - *Chalcoscirtus infimus*.

SOURCES: **A** - ©Painting by Aart Noordam, **D** - ©Photo by Anna Sostakova, **E** - ©Photo by Amir Weinstein, **B**, **C**, **F**, **G**, **K**, **M** - ©Photo by J. Lissner, **H** -- ©Photo by A. Henrard, **I** - ©Photo by H. Metzner, **J** - ©Photo by B. Knoflach, **L** - ©Photo by J. Holstein. All copyrights are retained by the original authors and copyright holders, used by their courtesy. \

Taxonomy

Suprageneric classification

Informal supragroup of genera EUOPHRYOIDA (sensu Prószyński, 2016a, 2017b: 67) is a preliminary organizational hypothesis referring to mutual morphological properties of large informal groups of genera (= subfamilies) AELURILLINES, BALLINES, BELIPPINES, COLONINES, DENDRYPHANTINES, DIOLENINES, EUODENINES, EUOPHRYINES, HISPONINES, LIGONIPEINES, MYRMARACHNINES, THIRATOSCIRTINES. These groups are characterized by possession of embolus sitting atop inflatable distal haematodocha and usually twisted into a curl, a coil, a spring or, at least,

encircling bulbus as a loose loop (as in MYRMARACHNINES, in which, however, presence of distal haematodocha require confirmation). Embolus, in spite of its usually thin appearance, is a composite structure consisting of external sheath hiding internal hair-like embolus proper (this is proved in a few cases, in majority awaits confirmation). The whole concept is in fact rather abstractive hypothesis, but suggesting alternative direction of searching for relationships.

Informal group of genera EUOPHRYINES (sensu Prószyński, 2016a, 2017b) is a taxonomic unit including, at present, some 821 to 1000 species (according to various classificatory divisions), divided into 129 genera and based on visible, checkable morphological structures. "Groups of genera" serve as informal substitutes for unworkable "subfamilies", used in modern literature with so many various meanings (variable contents of genera) that become meaningless.

Informal subgroup of genera EUOPHRYEAE (sensu Prószyński) - revived now unit of limited number of genera having similar, easily noticeable features, used originally, in somewhat different sense, by Simon (1901-1903). Because of assumed informal character (demonstrated by being written in capital letters), this unit will disregard variety of chaotic^{3*} previous interpretations (various composition of genera) and of paperwork on nomenclatorial priorities. It is intended to facilitate identification of genera and navigation among them (see description below), more genera can be introduced gradually with growing knowledge of morphology and biology of included genera⁴.

Subgroup of genera EUOPHRYDEAE (sensu Prószyński)*

Reference species (= type species): *Euophrys frontalis* (Walckenaer, 1802) (selected also as a type genus of the informal supergroup EUOPHRYINES (= subfamily Euophryinae, = tribe Euophryini), where serves as a good model of all included spiders, useful for comparison with remaining groups of Salticidae.

Etymology. The name is derived from Simon's (1901-1903) group **Evophrydeae**⁵, which contained *Euophrys* and two other unrelated genera, it was also used for defining subfamily Euophryinae, listed now in Pragmatic Classification of Prószyński (2016a, 2017b) as informal group of genera EUOPHRYINES.

³ Delimitation of formal taxa of all ranks in Salticidae is hampered by their variable usage in the past, with various meanings and contents of genera. An additional "nomenclatorial obstacle course" is paper work on synonyms of each name, their priorities and etc., for which I have no time and taste. To be free from all that, I invented my own informal and temporary grouping (groups, supragroups and subgroups of genera – all "sensu Prószyński"), having only the meaning I have assigned to them. To distinguish them from formal groups used by other authors, the names are written with capital letters.

⁴ Good demonstration of importance of new outlook of genera is example of the Australian *Maratus volans* (O. Pickard-Cambridge, 1874) and Mediterranean *Saitis barbipes* (Simon, 1868). Their species were placed by Simon (1901-1903: 517, 558-565) in his group Saiteae, together with seven irrelevant and unrelated genera, by uninspiring character: "labium not longer than its width... sternum short ... broadly truncate", with disregard of behavioral importance of their courtship dance and of exquisite colorful abdomen of *Maratus* (although known to Simon). It took discovery of dancing routine of over 80 species of *Maratus* by J. Otto, compared with dancing *Saitis*, documented in videos, to realize the diagnostic significance of lifting and waving third legs, adapted for semaphore signalization, which is applied now for redefinition of subgroup SAITEAE (Prószyński, Noordam, Oger & Schäfer M. (2018 – in press)).

⁵ According to Simon's interpretation group Evophrydeae (= Euophrydeae) is placed directly within "unidentati" Salticidae (EUOPHRYINES were not delimited yet) and is characterized by the following chain of hierarchically arranged characters: "... 2) Posterior margin of the cephalothorax and the pedicel invisible from above, covered by the abdomen. All coxae on both sides contiguous; ... 6) Inferior margin of the chelicerae with a strong conical tooth; ... 10) Tibia and patella of the third pair of legs longer (or at least not shorter [!]) than the tibia and patella of the fourth pair of legs; ... 18) Small eyes of the second row midway (or nearly) between the anterior and posterior laterals, ... 25) Sternum not attenuated in front and widely truncate between the anterior coxae; ... 26) Posterior legs with numerous strong spines. Thoracic groove very minute, hardly discernible ... ". (Translation from Latin by H. D. Cameron and D. P. Wijesinghe (1977) PECKHAMIA: 3(1)).

Arachnologists disliking classification based on palps and internal structures of epigyne can return to the above classification, well tested in practice during almost a century.

Diagnosis. Average looking small jumping spiders of generalized (= not specialized) appearance (Figs 1A-C, H-J), performing "first leg gesturing" courtship behavior and displaying corresponding morphological adaptations (strikingly black anterior surfaces of legs I and II, contrasting with white tarsus, colorful orbital and clypeal scales, color of setae on cymbium (Figs 4G-J). Epigyne ducts anterior and thin, spermathecae posterior, shaped like ball, or oval (Figs 1K-N). Other characters include minor details of palps (Figs 1E-G) confronting to characteristics of EUOPHRYINES.

Description. General appearance of species included into subgroup is shown on Figs 4-10, palps and internal structure of epigyne on Figs 11-17. Especially informative is Fig. 7, demonstrating relative diagnostic value of palps, spermathecae and frontal color pattern of males in seven species of *Euophrys*, out of which palps are a little imprecise for identification, but frontal appearance of males and spermathecae with ducts seems to be particularly useful. By the way, there are only ten macrophotographs of frontal appearance available for 55 species of *Euophrys*.

Composition. Genera *Euophrys* (Figs 5-18, 22A, D) and *Euochin* (Figs 18-21).

Possibility of increase of a number of genera in the subgroup EUOPHRYDEAE depends from learning more about diversity in comparable genera and their compatibility with *Euophrys*. General appearance of *Pseudeuophrys* and *Talavera*, also average looking jumping spiders, make them good candidates, especially that all their species were included in the past to *Euophrys*. However, shape of spermathecae in *Pseudeuophrys* (Figs 22B, F, 23-25) disagree, being oval and sometimes constricted, ducts are running sideward. In *Talavera* (Figs 22C, E, 26, 29) lack of curled embolus disagrees with general definition of >100 genera of EUOPHRYINES, unless we accept hypothesis that their non coiled and drastically reduced embolus is a recent development in evolution of that structure. Another individual feature of *Talavera* is very low clypeus, reduced to almost nil (Fig. 26).

Gen. *Euophrys* C. L. Koch, 1834

Figures 1-18

Type species. *Euophrys frontalis* (Walckenaer, 1802).

Documentation studied. Literature data including both published and unpublished documentation, as well as experience of original research of the author carried out since 1954.

Diagnosis. Specific identification of males (after ascertaining conformity of palps) can be best done by frontal color pattern (orbital scales around eyes I, clypeal scales, anterior surfaces of chelicerae, as well as pigmentation and scales on palps, and legs I-II (Figs 1, 4A-C, E, G-J, 5-7). Specific identification of females by details of thin and gently bent ducts (in some species making distally a loop or knot) as well as by ball shaped spermathecae, and by location of copulatory opening correlated with superficial thickenings of white "windows" membrane.

Description. Small spiders (length of body in majority of species between 3-4 mm, rarely up to 7 mm long), usually with cryptic dorsal coloration, males differing by color of clypeal scales^{6*}, arranged into transverse

⁶ Dr. D. E. Hill, an author of excellent paper on scales in Salticidae (1979) has sent me the following lucid explanation on usage of terms "scales", "setae" and "hairs". "Since "setae" is just the Latin word for "hairs" I use this as a general term for all of these structures that emerge through sockets in the cuticle. Scales (or "scalae" in neoLatin or scientific Latin) are just one type of setae, those that bend after emerging from the socket to lie along the surface. I also suspect that scales lack sensory neurons at the base. I like your term "orbital scales" as this is very descriptive of the specialized scales that commonly surround salticid eyes. Similar terms like "clypeal scales" are also very descriptive. If they are not scales, then I would just call them setae (like clypeal setae). If they are really stout I call these "spines." There are one to several of these between the AME of *Thorelliola* and *Maratus*, for example. Other descriptors, like long scales, short scales, flattened scales, pigmented scales, or iridescent scales, are also useful. **Of course there is**

stripe across clypeus, or just covering the whole clypeus, as well as orbital scales encircling eyes I, also black appearance of legs I-II, usually terminated by white tarsus (Figs 1, 5-7 and 18C), however, note repetition of that pattern in unrelated genera (Figs 3-4).

Palps. Relatively uniform within *Euophrys*, are characterized by single coil of embolus (a curl), in resting position located anterolaterally in front of tegulum, with diameter equal to about one half of width of bulbus (Fig. 1F, 3F and other). There are two translucent loops of spermophor (out of complicated knot deeper in bulbus), the anterior 3/4 complete, of the posterior one only half of a bent is visible, they are separated by a tightly compressed remnants of a loop, opening retrolaterally. The width of spermophor loops vary, but seldom exceed mid-line of the bulbus. The shape of bulbus is elongate oval, unusually with posterior third distinctly narrower. Palps shown on Figs 11-12, 13A-C, 14B, 15B-C, E-F are relatively uniform. Tibial apophysis in this genus is generally thin, almost setae-like and difficult to notice, in some cases are not marked on drawings, possibly missing.

Epigyne, external view. Partially hidden among dense setae on ventral surface of abdomen, its tegument is whitish and contains a pair of membranous "window" in its anterior half, with posterior half dark due to translucent dark, sclerotized spermathecae (Fig. 1K, 8D, 11C). Proportions of white and dark areas, their comparative length and width are diagnostic characters, but unfortunately differences between species are not striking. There are no distinct limits of "window" and their separating divider is often indistinct, the surface of "windows" has indistinct thickening, oval, or broadly spiral shaped (these may be of diagnostic value. More useful character is provided by translucent internal structures, but these are only partially visible without clearing and staining.

Internal structures of epigyne - spermathecae and ducts. Although visible as translucent in natural appearance of epigyne, these can be studied precisely **only** after clearing of epigyne of soft tissues, preferably stained and mounted in a temporary slide^{7*}

These structures are most important characters confirming identification of a genus, and separating some species. Spermathecae in *Euophrys* are sclerotized, ball shaped, and are extended anteriorly by broad, gradually narrowing ducts having the same thickness of the walls (Figs 1, 11D), anteriorly bent, coiled or even twisted into a knot (Figs 1L-M, 3M, 7, 8D, 11D, F, G, I, L, M, 12C, D-L). In some species ducts may be thinner and rather attached to than looking just as extension of sclerotized spermathecae, (somewhat intermediate to these in *genus Talavera*) but are still not membranous (Figs 12F, G, L, 13C). Relative shape of ducts of *Euophrys petrensis* is presented differently in various papers, usually as very thin, *Talavera*-like (Fig. 2N) but in SEM photograph looks much broader (Fig. 3E – compare Fig. 22B). Structure and shape of ducts is so different in *E. subtilis* (Fig. 16H) and *E. falciger* (Fig. 13J) that their classification is uncertain. Interesting variation of ducts, twisted loose spring like, is visible in *E. terrestris* (Fig. 16J). Ducts shown on Figs 13F, G, 14A are looking still different, and those on Figs 14D, E even more. Interpretations of all these differences require more research.

nothing like a photograph. Once preserved, one can still dry a specimen and determine the iridescent color, but of course pigments are lost in alcohol. If I can't see a bend at the base of a seta, and it is not flattened or compressed, I just call it a seta. Generally the scales of salticids point in the direction in which the old cuticle is pulled off during a molt, but there are exceptions. for example, the orientation of scales on the dorsal opisthosomal plate (scute) of adult male Maratus can be quite variable."

⁷ The epigyne can be detached from the body by sliding the tip of a small scalpel (or tip of thin siringe) under it, and cutting the tegument around the epigyne. Clearing of soft tissues could be done by bathing in COOL aqueous 10-20% solution of KOH for some 24 hours, next stained in the very light colored alcohol solution of Chlorazol Black E for a short time. **Examination** should be done under a compound microscope, photographed with camera with automatic setting and timing device, attached to a photo tube of microscope. The best method of drawing is to use "net micrometer" (a piece of glass with a fine grid of minute squares inside the ocular of the microscope), and to draw the examined structures as seen in each square, on a sheet of paper with a grid drawn on it (or translucing from a grid put beneath paper).. Palps should be examined detached from body, under alcohol in a Petri dish, fixed in requested position in a layer of fine sand covering bottom of a dish. After examination/ epigyne or palp should be stored in a minute vial (which can be self made from glass tubing), put into specimen vial.

General appearance. Standard documentation of general appearance of a salticid should become macrophotographs of live specimen, showing animal in three views (dorsal, frontal and lateral), with photographs of preserved specimen as additional, documentation for Museum bound researchers. Stress on macrophotographs may be troublesome, but scientific result will be worth of that. Deep change of color pattern takes place during preservation in alcohol - the deterioration of colors may be slow, taking years in some genera, but very rapid and tremendous in other, including *Euophrys*, when the animal become unrecognizable within minutes[!] after submerging specimen in alcohol (compare photos of live *Euophrys* - Figs 4-9 with photos of specimens preserved in alcohol - Fig. 10, see also FOOTNOTE 7 (page 44) on *Euophrys pseudogambosa* below). Although drawings and photographs of preserved specimens do not convey their true outlook, they are still valuable partial documentation. Producing photographs of live *Euophrys* is difficult for a laboratory bound taxonomist, but somehow it should be done for demonstration of true properties of described species. The recognition markings are located on parts of body visible to other spiders, on level of their vision, that is on face (orbital and clypeal scales, pigmentation and scales pattern on chelicerae, palps and legs I and II). Natural coloration is unchanged in spiders preserved dry, like insects, but these specimens become shrunken. The remedy would be routine photographing of collected specimens before preservation. Also white setae become transparent in alcohol and disappear (compare Figs 1A-B with D) (simple solution may be temporary drying up of specimens taken out from alcohol - an operation practiced routinely in XIX century, for instance by E. Simon and W. Kulczyński).

Testing relative value of diagnostic characters - is demonstrated on Fig. 7 - it conforms superiority of internal structure of epigyne and frontal color pattern in males, while palps seem to be too uniform to separate species. Note that color pattern is not correlated with genitalic characters (Fig. 7): red or yellow stripe on clypeus in males does not correlate with epigyne of their respective females, while palps of respective males do not show noticeable differences. Several males with red clypeus differ, however, by colors of palps, bunches of setae on palps and by color of orbital scales. Apparently single characters are insufficient to separate displayed species, a number of characters should be considered.

Remarks. This paper accepts (somewhat tentatively) 55 species of *Euophrys* as recognizable (that is having diagnostic drawings of genitals, at least for one sex), another 21 "*Euophrys*" are pending re-classification, unrecognizable species are not included. Catalogue of whereabouts of 114 nominal species and types of "*Evophrys*" (including *Pseudeuophrys* and *Talavera*) in collections is given by Prószyński (1971: 404-408, data repeated in 2016b).

Distribution. *Euophrys* is distributed in Palaearctics and Africa, with 2 species penetrating North America. Reports on occurrence in South and Central America (<http://www.peckhamia.com/salticidae/salticidae.php>) are apparently based on misidentifications (Fig. 17).

Composition (diagnostic drawings in brackets). Type species: *Euophrys frontalis* (Walckenaer, 1802) (Figs 1-A-N, 3-F, L-MO, 4-A-B, 5A, 7A, 8A, 11A-D, 22A, D). The following species are included: *Euophrys acripes* (Simon, 1871) (Fig. 12A), *E. albimana* Denis, 1937 (Fig. 13E), *E. baliola* (Simon, 1871) (Fig. 15F), *E. bifida* Wesolowska, Azarkina & Russell-Smith, 2014 (Fig. 10A, 13F), *E.[?] bryophila* Berry, Beatty & Prószyński, 1996 (Fig. 16A-B), *E. catherinae* Prószyński, 2000 (Fig. 12F, 22A), *E. cochlea* Wesolowska, Azarkina & Russell-Smith, 2014 (Fig. 10B, 14A), *E. convergentis* Strand, 1906 (Fig. 14B), *E. dhaulagirica* Žabka, 1980 (Fig. 14C), *E. declivis* Karsch, 1879 (Fig. 14D), *E. difficilis* (Simon, 1868) (Fig. 15A), *E. elizabethae* Wesolowska, Azarkina & Russell-Smith, 2014 (Figs. 10C, 13D), *E. evae* Žabka, 1981 (Fig. 11G), *E. everestensis* Wanless, 1975 (Fig. 14F), *E. falciger* Wesolowska, Azarkina & Russell-Smith, 2014 (Figs 10H, 16I-J), *E. flavoatra* (Grube, 1861) (Fig. 15C), *E. gambosa* (Simon, 1868) (Figs 4C, 11H-J), *E. cf. gambosa* (Figs 11K-L), *E. gracilis* Wesolowska, Azarkina & Russell-Smith, 2014 (Figs 10D, 13H), *E. herbigrada* (Simon, 1871) (Fig. 5C, 7C, 12G, 22A, D), *E. kataokai* Ikeda, 1996 (Figs 10P, 13A), *E. kawakaban* Wesolowska & van Harten, 2007 (Fig. 15L), *E. kirghizica* Logunov, 1997 (Figs 12L), *E.[?] kororensis* Berry, Beatty & Prószyński, 1996 (Figs 16C-D), *E. limpopo* Wesolowska, Azarkina & Russell-Smith, 2014 (Figs 10I, 15D), *E. maseruensis* Wesolowska, Azarkina & Russell-Smith, 2014 (Figs 10J, 15E), *E. meridionalis* Wesolowska, Azarkina & Russell-Smith, 2014 (Fig. 10K, 15E), *E. miranda* Wesolowska, Azarkina & Russell-Smith, 2014 (Fig. 10L, 17G), *E. monadnock* Emerton, 1891 (Figs 12B-C, 22D), *E. namulinensis* Hu, 2001 (Fig. 15J), *E. nana* Wesolowska, Azarkina & Russell-Smith, 2014 (Figs 10M, 15H), *E. nangqianensis* Hu, 2001 (Fig. 14E), *E. nearctica* Kaston, 1938 (Fig. 12E), *E. nepalica* Žabka, 1980 (Fig. 15I), *E. nigritarsis* (Simon, 1868) (Fig. 5E, 8D), *E. nigromaculata* (Lucas, 1846) (Fig. 10N), *E. omnisuperstes* Wanless, 1975 (Fig. 14G), *E. petrensis* C. L. Koch, 1837 (Fig. 3A-E, 4H, 6A, 7E), *E. proszynskii* Logunov, Cutler & Marusik, 1993 (Fig. 13B), *E. pseudogambosa* Strand, 1915 (Figs 4K, 11M-N, 18A-C),

E. pulchella Peckham & Peckham, 1894 (Fig. 15K), *E. purcelli* Peckham & Peckham, 1903 (Figs 10G, 13G), *E. quadripunctata* (Lucas, 1846) (Fig. 10O), *E. recta* Wesolowska, Azarkina & Russell-Smith, 2014 (Figs 10F, 15B), *E. rufibarbis* (Simon, 1868) (Figs 6C, 7F, 9B, 12H-I, 22A, D), *E. subtilis* Wesolowska, Azarkina & Russell-Smith, 2014 (Figs 10E, 16G-H), *E. sulphurea* (L. Koch, 1867) (Figs 5B, 7B, 8F, 11F), *E. talassica* Logunov, 1997 (Fig. 12M), *E. terrestris* (Simon, 1871) (Figs 6E, 7G, 12J-K, 22A, D), *E. turkmenica* Logunov, 1997 (Fig. 13C), *E. uphami* (Peckham & Peckham, 1903) (Fig. 15M), *E. uralensis* Logunov, Cutler & Marusik, 1993 (Figs 12D-E), *E.[?]* *wanyan* Berry, Beatty & Prószyński, 1996 (Figs 16E-F), *E. wenzianensis* Yang & Tang, 1997 (Fig. 15G), *E. yulungensis* Žabka, 1980 (Figs 14H-I). 55 species.

Species pending reclassification (diagnostic drawings in brackets). "Euophrys" "*Euophrys*" *alabardata* Caporiacco, 1947 (Fig. 17Q), "*E.*" *albobatellata* Petrunkevitch, 1914 (Fig. 17C), "*E.*" *altera* (Simon, 1868) male – reinstated synonym (Fig. 17A1), "*E.*" *altera* - female = *Icius hamatus* (Fig. 17A2), "*E.*" *alticola* Denis, 1955, (Fig. 17B), "*E.*" *bifoveolata* Tullgren, 1905 (Fig. 17D), "*E.*" *concolorata* Roewer, 1951 (replacement name) (Fig. 17G1), "*E.*" *cooki* Žabka, 1985 (Fig. 17I), "*E.*" *griswoldi* Wesolowska, Azarkina & Russell-Smith, 2014 (Figs 17H), "*E.*" *jirica* Žabka, 1980 (Fig. 17E), "*E.*" *megastyla* Caporiacco, 1949 (Fig 17I.1), "*E.*" *melanoleucus* Mello-Leitão, 1944 (Fig. 17L), "*E.*" *menemerella* Strand, 1909 (Fig. 17J), "*E.*" *miranda* Wesolowska, Azarkina & Russell-Smith, 2014 (Fig. 17G), "*E.*" *newtoni* Peckham & Peckham, 1896 (Fig. 17K), "*E.*" *patellaris* Denis, 1957 (Fig. 17F), "*E.*" *sima* Chamberlin, 1916 (Fig. 17M), "*E.*" *testaceozonata* Caporiacco, 1922 (Fig. 17N), "*E.*" *valens* Bösenberg & Lenz, 1895 (Fig. 17P), "*E.*" *ysobolii* Peckham & Peckham, 1896 (Fig. 17R), **Y-Z** - *Euophrys griswoldi* (Figs 17H), *E. tengchongensis* Lei & Peng, 2012: 5, f. 3a-b, 7a-g (Dmf). – pending classification but have no permission to copy these diagnostic drawings). 21 species.

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A

Euophrys frontalis



B

Euophrys sulphurea



C

Euophrys herbigrada

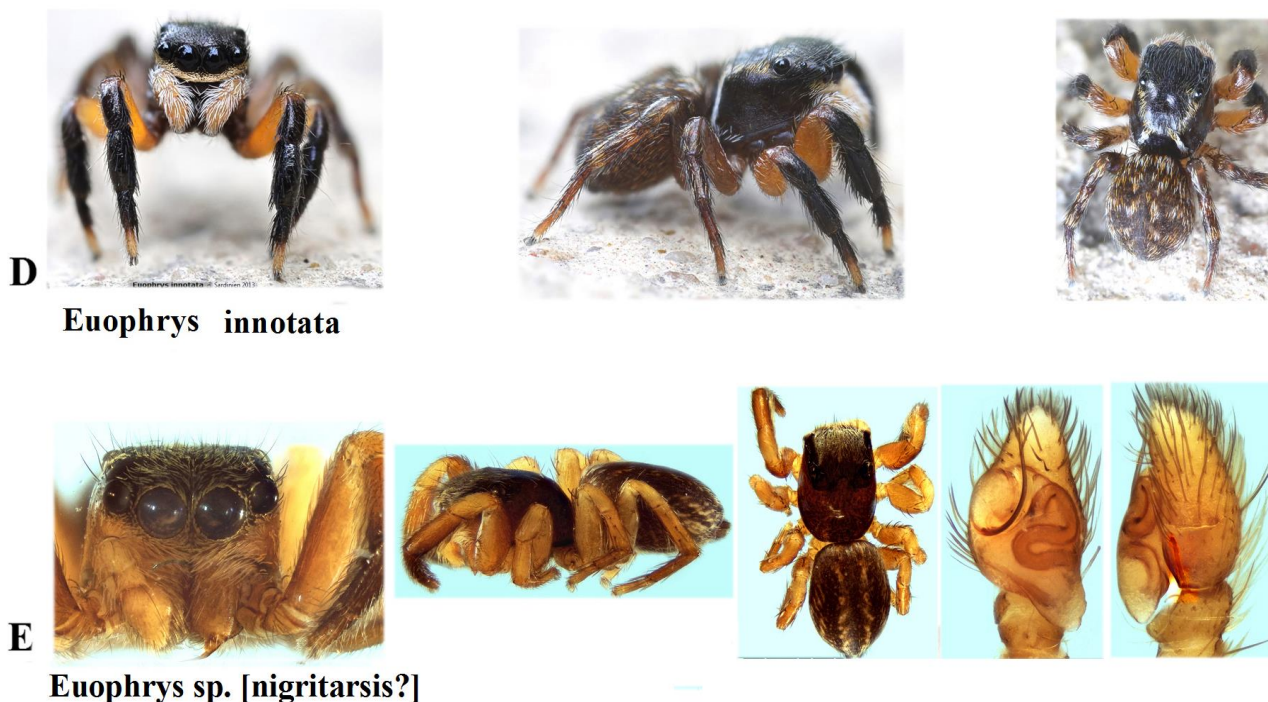
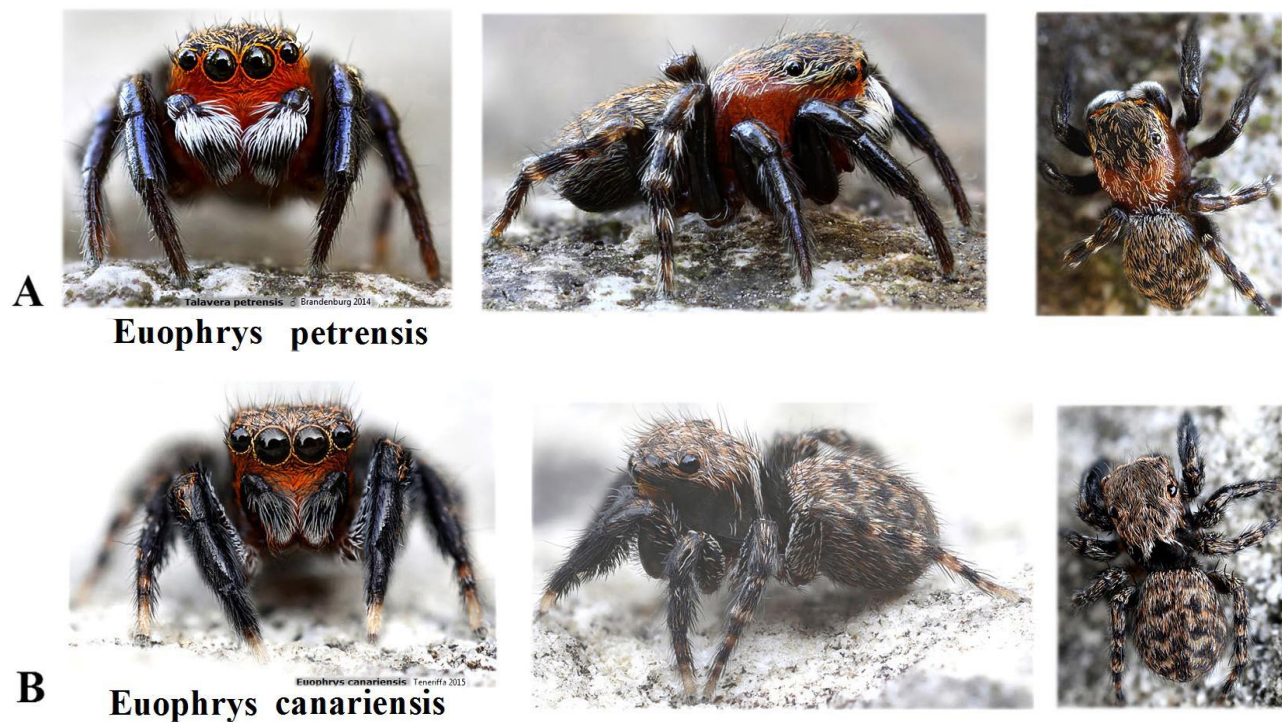


Figure 5. Habitus diversity in male *Euophrys* (part I) (frontal, lateral and dorsal views). **A** - *Euophrys frontalis* (type species), **B** - *Euophrys sulfurea*, **C** - *E. herbigrada*, **D** - *E. innotata*, **E** - *E. sp. [nigritarsis?]*.

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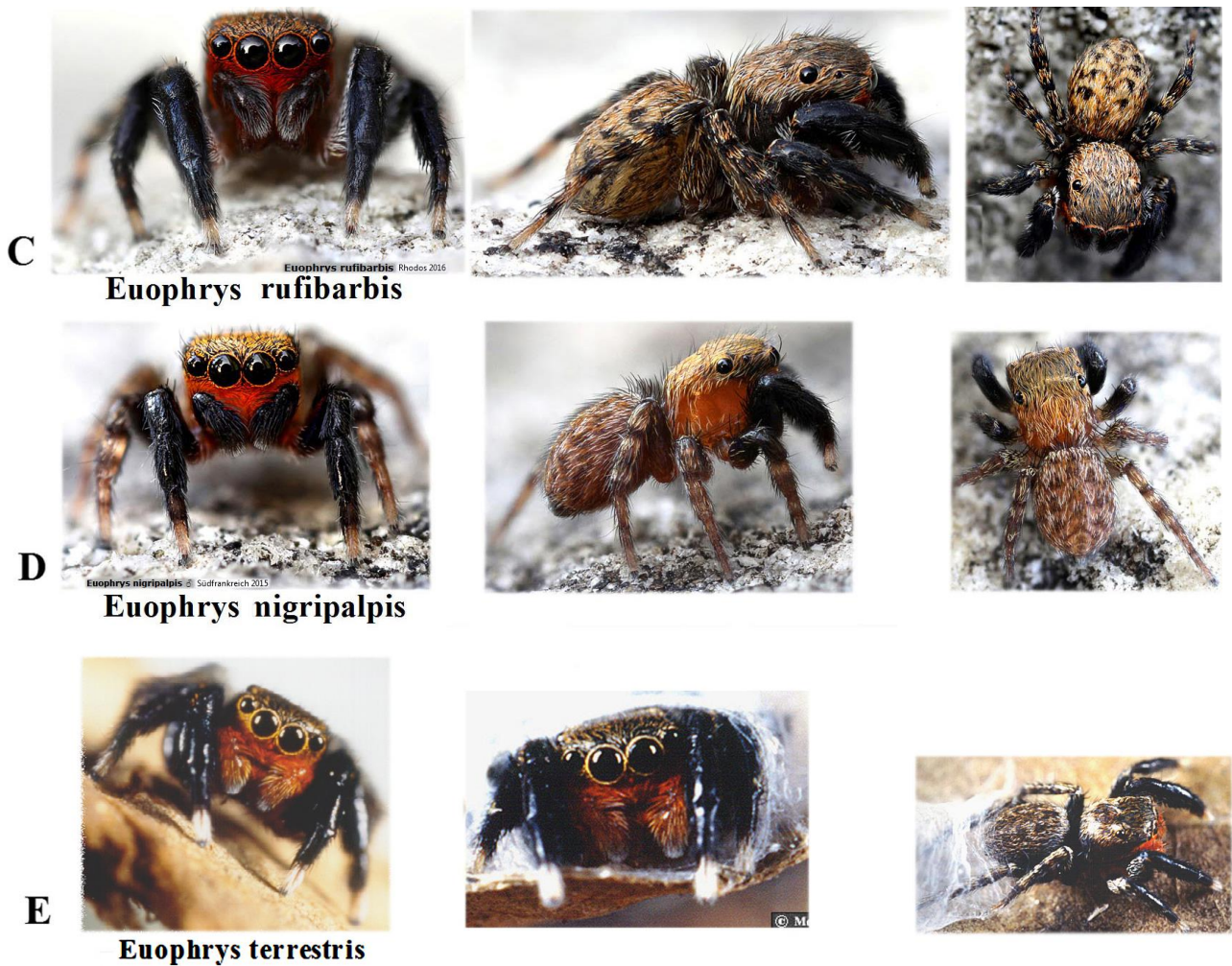
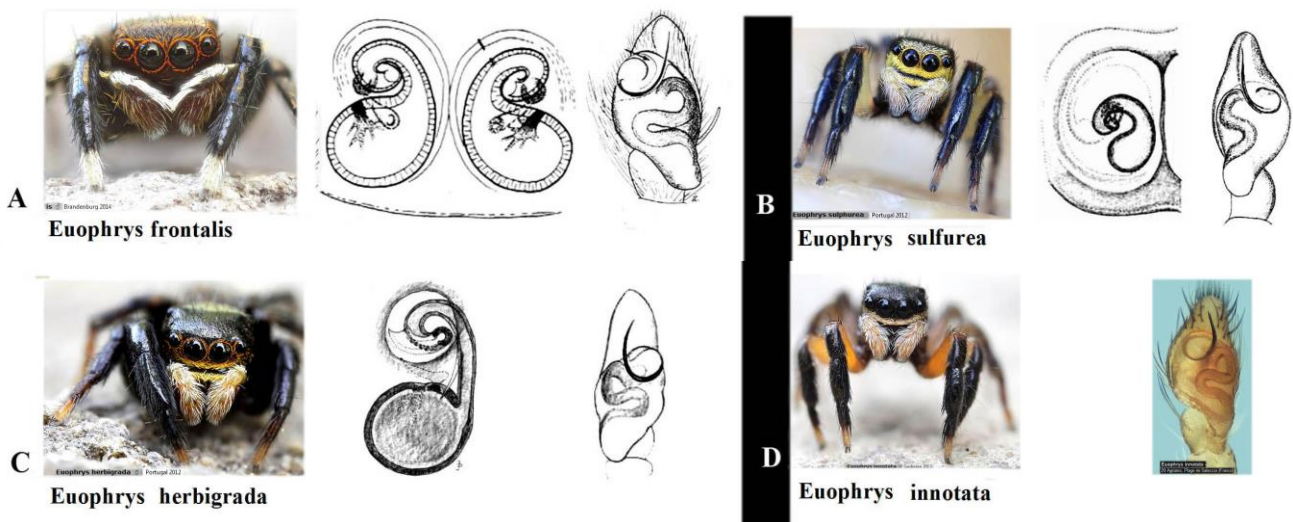


Figure 6. Habitus diversity in male *Euophrys* (part II) (frontal, lateral and dorsal views). **A** - *Euophrys petrensis*, **B** - *E. canariensis*, **C** - *E. rufibarbis*, **D** - *E. nigripalpis*, **E** - *E. terrestris*.

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Comparison of diagnostic value of characters



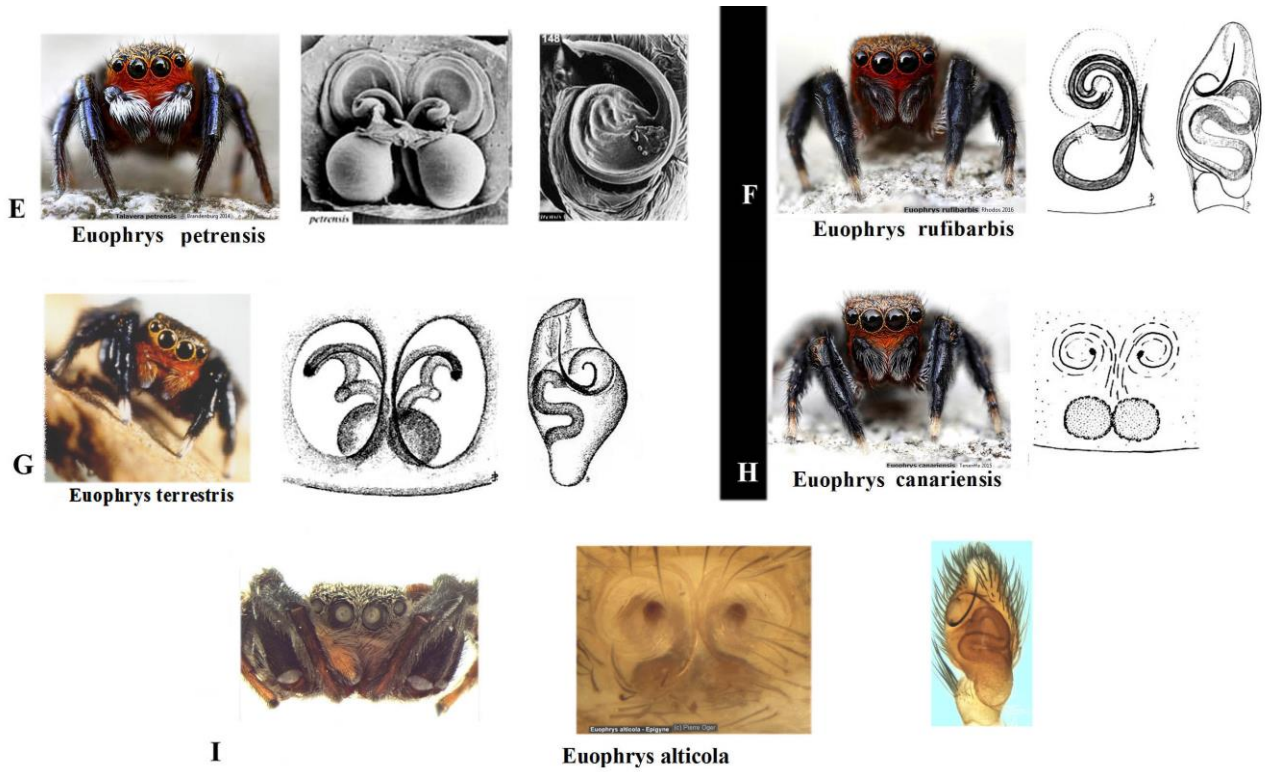
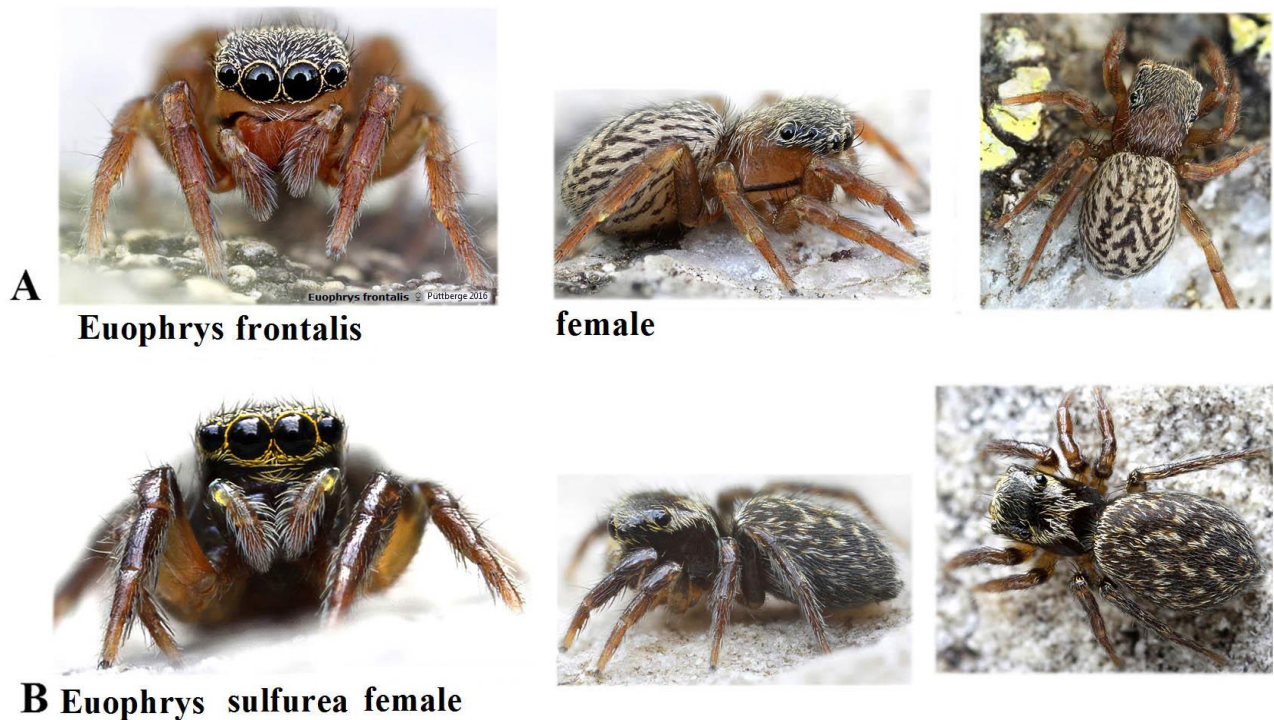


Figure 7. Comparison of diagnostic value of characters (frontal color pattern, internal structure of epigyne and palps) in nine species of *Euophrys*. **A** - *Euophrys frontalis*, **B** - *E. sulfurea*, **C** - *E. herbigrada*, **D** - *E. innotata*, **E** - *E. petrensis*, **F** - *E. rufibarbis*, **G** - *E. terrestris*, **H** - *E. canariensis*, **I** - *Euophrys alticola*.

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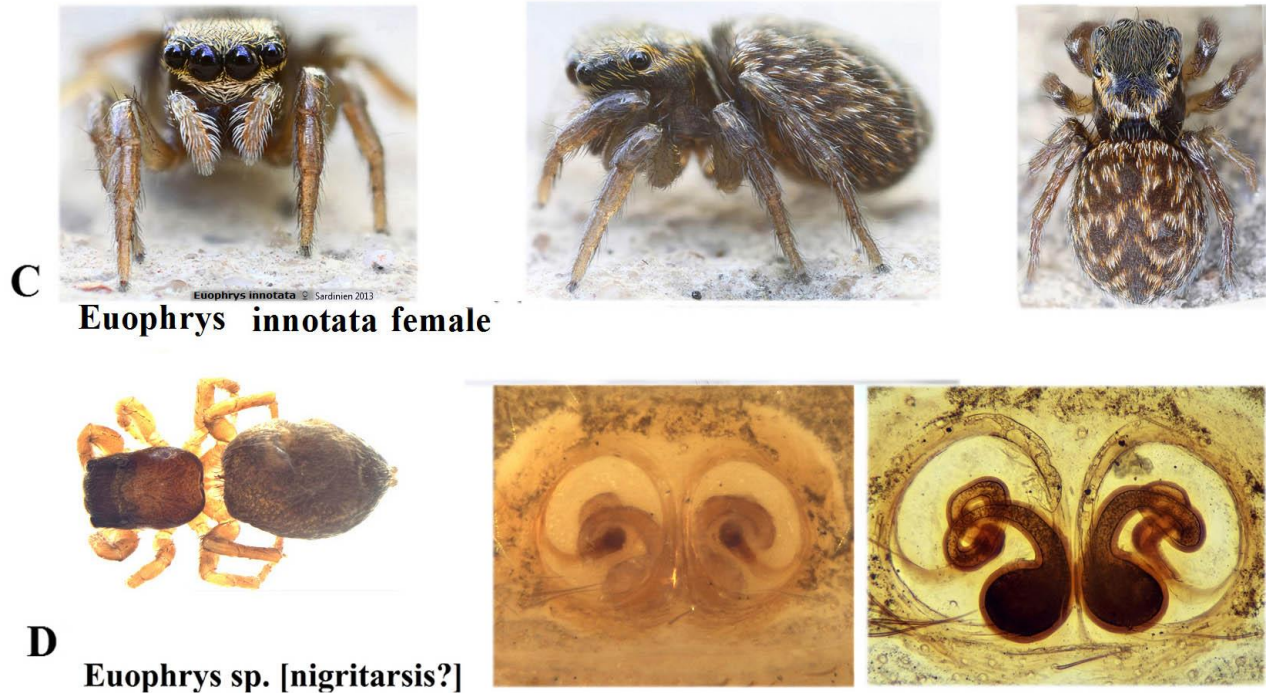
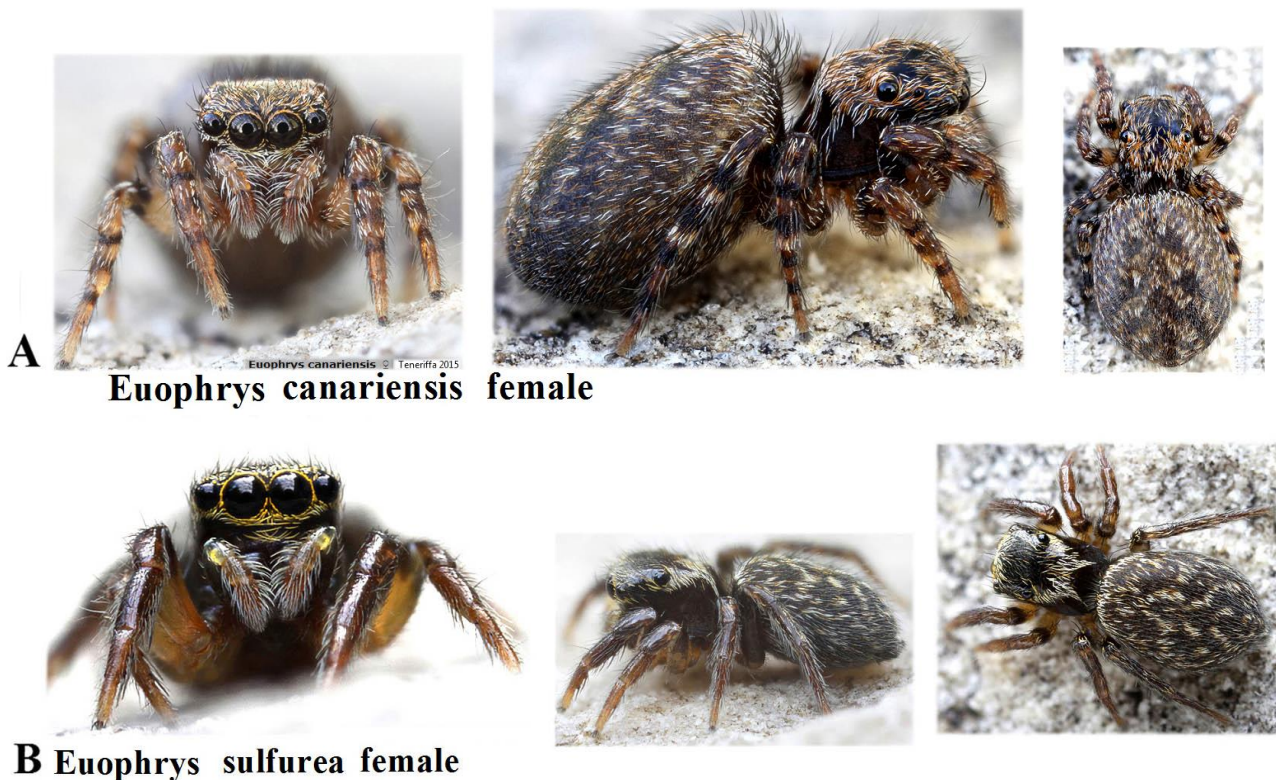


Figure 8. Habitus diversity in female *Euophrys* (part I) = frontal, lateral and dorsal views. **A** - *Euophrys frontalis* (type species), **B** - *E. sulfurea*, **C** - *E. innotata*, **D** - *E. nigritarsis*.

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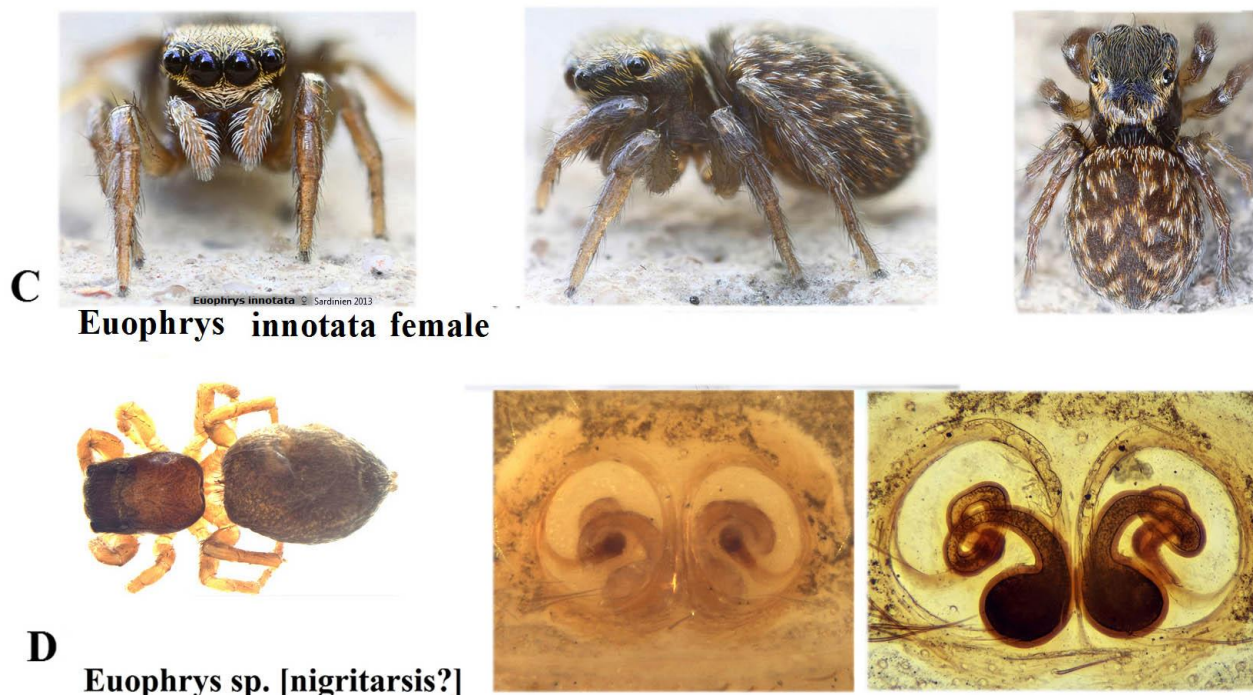


Figure 9. Habitus diversity in female *Euophrys* (part II) (frontal, lateral and dorsal views). **A** - *Euophrys canariensis*, **B** - *E. rufibarbis*, **C** - *E. nigripalpis*.

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Species requiring some comments

Euophrys altera (Simon, 1868) (Figs 17A1-A2)

Attus alter Simon, 1868b: 63, pl. 1 [=5], f. 15 [face] (Dmf).

Euophrys altera Simon, 1901a: 568, f. 685[=B], 687[=D] (m).

Euophrys altera Prószyński, 1976: 150, f. 98 (m). (miniature drawing of palp, copied from Simon 1901).

Euophrys altera Prószyński, 1984a: 41 – [female, misidentified *Icius hamatus*?, Mus. Wien, coll. L. Koch] = *Icius hamatus*[?],

Euophrys altera Prószyński 1971 (Collections) : 405: Lon. – E. a., Hasarius a.; Par. E. a.

Remarks. Simon described male and female of this species on specimen from Spain, collected by L. Koch. Male shown on Fig. 17A1 is copied from Simon 1901 and is undoubtedly an *Euophrys*. Female (Fig. 17A2) is drawn from a specimen in NH Museum Wien, labeled "*E. altera* from Andalusia, ex coll. L. Koch" - which was identified as *Icius hamatus* by Prószyński (hence synonymy *E. altera* = *I. hamatus* - but that concerns only this female specimen, not male). Specimens of *E. altera* kept in Musea in Paris and London were not studied. *E. altera* could be considered true *Euophrys*, pending revision to establish its diagnostic characters. Synonymy of *E. altera* and *I. hamatus* is rejected.

Therefore:

Icius hamatus (C. L. Koch, 1846) (one of synonyms reinstated - male specimen) = *Euophrys altera* (Simon, 1868).

Euophrys monadnock Emerton, 1891 (Figs 12B-C)

A good species of Palaearctic origin. Logunov, Cutler & Marusik, (1993: 117), suggest its relationship with Siberian species *E. flavoatra*, which is possible but require additional research.

Euophrys nearctica Kaston, 1938 (Figs 12E, 32-33)

Euophrys nearctica Kaston, 1938c: 187, pl. 9, f. 25-26 (Df).

Euophrys monadnock Edwards, 1980: 12 (S).

E. nearctica is a valid species, for which Kaston has provided good description (facsimile Fig. 33) with good drawings of epigyne and general appearance (Fig. 12E), clearly different from that of *E. monadnock* (Fig. 12B-C). The type specimen of *E. nearctica*, kept in collection of the MCZ-Harvard, was revised by

Prószyński and compared with *E. monadnock*. An attempt to synonymize this species with *E. monadnock* in 1980 was merely one line opinion (see Peckhamia (1980) 2(1): 12) (Fig. 32) devoid of any documentation, incompetent and erroneous, so it seem strange that it was accepted by the Catalog. It would be interesting to check relationship of *E. nearctica* with its Palaearctic congeners (note similarity of epigyne in *E. pseudogambosa*), but the state of knowledge of relevant species does not permit that.

Therefore:

Euophrys monadnock Emerton, 1891 (one of synonyms reinstated) = *Euophrys nearctica* Kaston, 1938 (compare differences in epigyne - Figs 12B-C with E, as well as relevant facsimiles Figs 32-33).

***Euophrys petrensis* C. L. Koch, 1837** (Figs 3A-E, 4H, 6A, 7E)

Euophrys petrensis C. L. Koch, 1837b: 34 (Df).

Euophrys petrensis Miller, 1971: 140, pl. XX, f. 22 (f).

Euophrys petrensis Prószyński, 1976: 151, f. 118, 137 (mf).

Euophrys petrensis Flanczewska, 1981: 196, f. 21-24 (f).

Euophrys petrensis Prószyński. In: (eds) Heimer & Nentwig, 1991: 498, f. 1329 (mf).

Euophrys petrensis Logunov, 1992d: 76, f. 19-20, 30 (mf).

Euophrys petrensis Logunov, Cutler & Marusik, 1993: 120, f. 17A-E (mf; N.B.: T here per footnote on p. 119).

Talavera petrensis Żabka & Kupryjanowicz 1997: 170.

Talavera petrensis Żabka, 1997: 104, f. 405-410 (mf).

Euophrys petrensis Bellmann, 1997: 236, f. (f).

Talavera petrensis Logunov & Kronstedt, 2003: 1144, f. 1, 5, 7, 12, 17-18, 23, 45-46, 143-148 (mf).

Talavera petrensis Lecigne, 2016d: 24, f. 12D-F (mf).

Remarks. *Euophrys petrensis* has typical for *Euophrys* coil of embolus (Figs 3B-C, 7E), also typical frontal color pattern in males with high clypeus covered with red scales, red orbital scales around eyes I, black palps with striking brush of white setae across dorsal surface of cymbium, as well as intensively black legs I and II (compare Figs 4E with H, also Figs 6 and 7E). These differ from *Talavera*, which is unique among EUOPHRYINES by having embolus not curled into a coil (Fig. 3I). Smaller size is not a generic character, tibial apophysis is generally much reduced in *Euophrys*, difficult to distinguish from setae. Copulatory ducts in published drawings are extremely thin, but on excellent SEM photograph (Fig. 3E - provided by Logunov & Kronstedt, 2003: 1144, f. 46) they appear much broader, not much different from other *Euophrys*.

Therefore:

Talavera petrensis = *Euophrys petrensis* C. L. Koch, 1837 (reinstated original combination).

***Euophrys pseudogambosa* Strand, 1915** (Figs 4E, 11M-N, 18A-C)

Euophrys pseudogambosa Strand, 1915c: 168 (Dmf).

Euophrys pseudogambosa Logunov, 1996c: 55, f. 1-7 (mf).

Euophrys pseudogambosa Logunov, 1997a: 351, f. 39-41 (m).

Euophrys pseudogambosa Prószyński, 2003: 51, f. 171-173, 177-181, 186-189, 102-193 (mf).

Remarks. Color macrophotographs and drawings disclose diversity of Israeli *E. pseudogambosa*, indicating possibly separate species status. Live *E. pseudogambosa* A from Givat Ram, studied in 1988 by Prószyński (Figs 18A), had ventral surfaces of femora I-II red, abdomen dorsally blackish brown, characters changing^{8*} in alcohol speedily, in a few minutes, from black to light dotted black (Fig. 18A), beginning right from the moment of spider dying in alcohol. Photograph of *E. pseudogambosa* B (Fig. 18C) by Amir Weinstein of specimen observed in the Haifa area show femora I-II entirely black (which confirms drawing of leg I by Logunov (Fig. 18B)). The diversity in this species in Israel corroborates observations of diversity in many other species, being presumably result of rapid proliferation of Salticidae in warm climate of that geographical area. Unfortunately such observations are rarely documented, due to rarity, as yet, of macrophotographic documentation.

Euophrys semiglabrata (Simon, 1868) is studied in a parallel paper (Prószyński, Noordam, Oger & Schäfer (2018 – in press)) and transferred to a new genus of its own.

⁸ The first author watched unusually rapid change of dorsal pattern in *Euophrys pseudogambosa* immediately after submerging it in ethyl alcohol during preservation - there appeared streams of liquid, floating beneath transparent tegument, carrying a crowd of minute black globules, deposited later into different pattern of dots and lines, characteristic of *Euophrys* - but in fact artifacts. This is different from gradual bleaching of colors in other preserved Salticidae, a process lasting years.

***Euophrys vittata* Caporiacco, 1935** (Fig. 170)

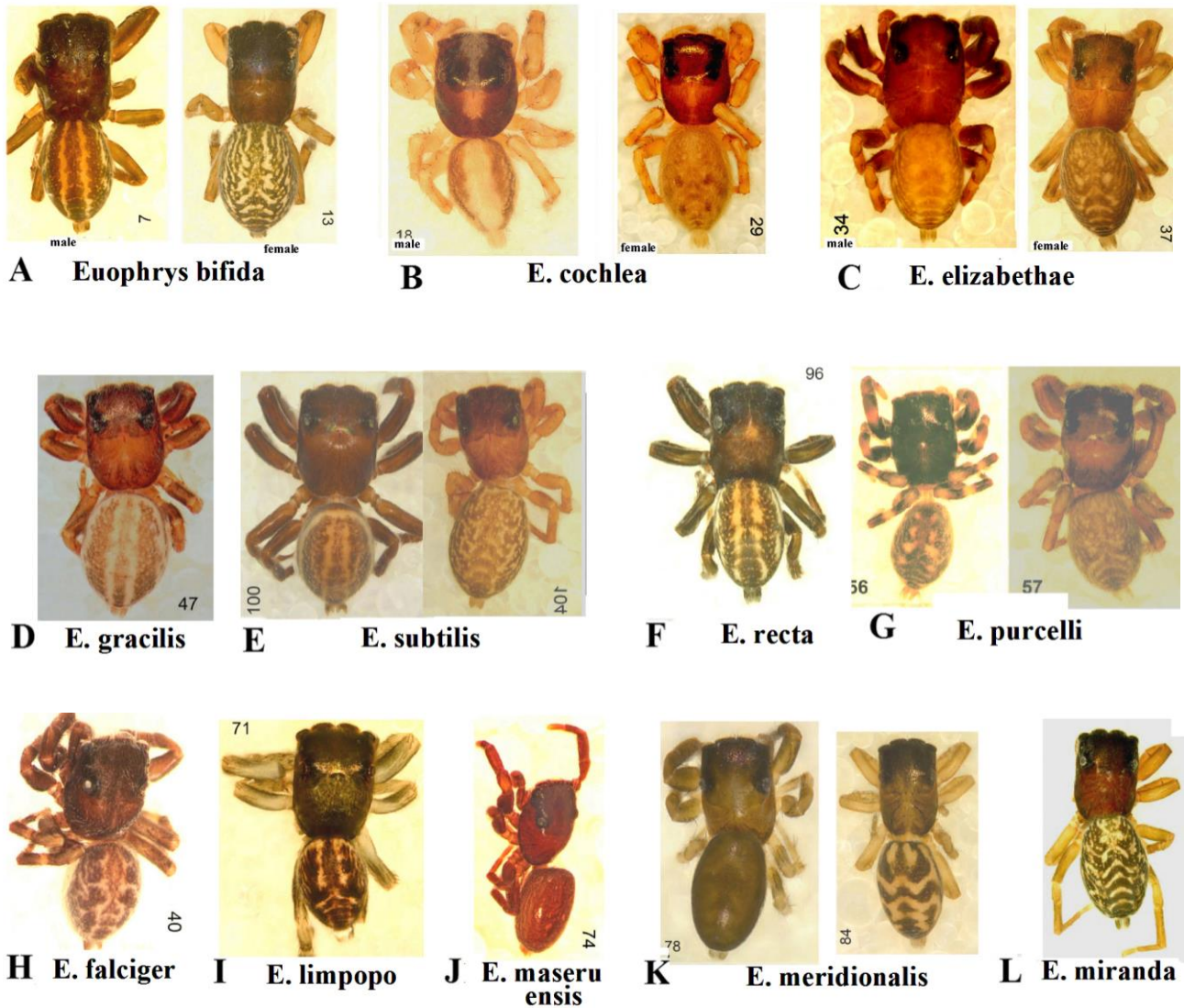
Euophrys vittata Caporiacco, 1935b: 202, pl. 5, f. 3 (j, Karakorum)

Wanless (1975: 132) called attention that status of this species, described on an immature specimen, is uncertain - which World Spider Catalog worded more categorically as "nomen dubium". However, the species has type specimen preserved in the Museo Civico di Storia Naturale, Milano, Italy (Prószyński 1971: 408), and Caporiacco provided an unmistakable diagnostic character in his drawing f. 3 (Fig. 170) - thin, white median line running along abdomen. Such line is not common among Salticidae of Central Asia - it can appear in genera *Phlegra*, *Pellenes*, *Attulus* or *Heliophanus* - recognizable by body shape and proportions, even in immature specimens. I am not sure whether dismissing the species off hand in such situation is appropriate. I would rather consider it as "pending revision".

Therefore:

Euophrys vittata Caporiacco, 1935 - reinstated from "nomen dubium" to "pending revision" status.

Change of color pattern in *Euophrys* preserved in alcohol



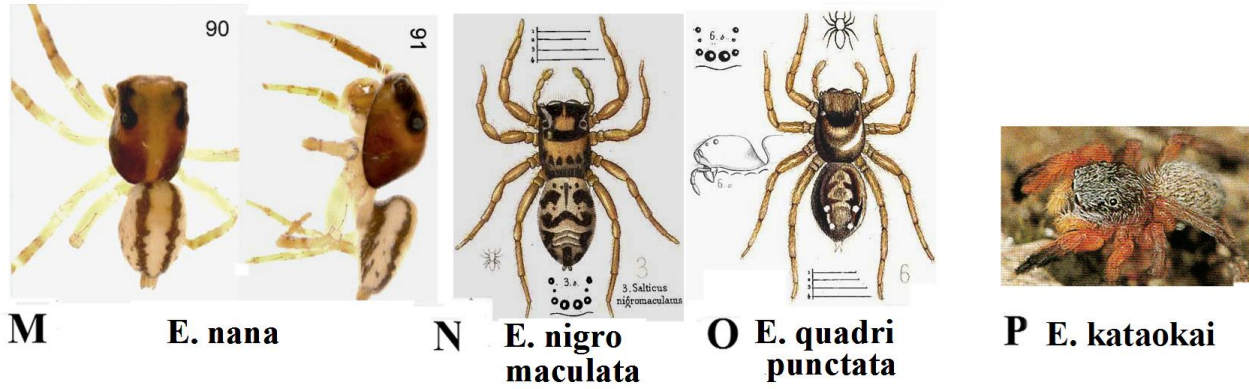
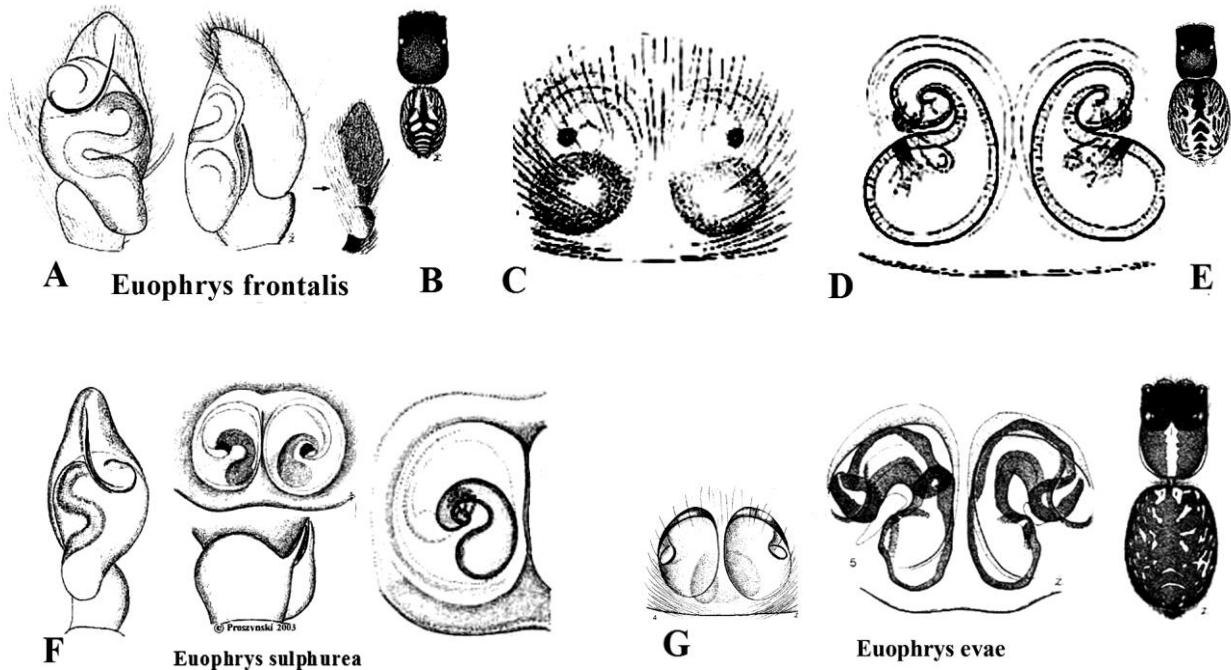


Figure 10. Habitus diversity in selected species of *Euophrys* (males and females, mainly African) changed by preservation and storage in collections (A-L, M - colors changed by preservation in alcohol, N-O - lithographs from Lucas (1846)). A - *Euophrys bifida*, B - *E. cochlea*, C - *E. elizabethae*, D - *E. gracilis*, E - *E. subtilis*, F - *E. recta*, G - *E. purcelli*, H - *E. falciger*, I - *E. limpopo*, J - *E. maseruensis*, K - *E. meridionalis*, L - *E. miranda*, M - *E. nana*, N - *E. nigromaculata*, O - *E. quadripunctata*, P - a photo of live *E. kataokai* (from Japan).

SOURCES: A-F, H-M - Wesolowska Azarkina, G. N. & Russell-Smith, 2014 *Zootaxa* 3789(1): 11, f. 7-17; 12, f. 18-33; 13, f. 34-39; 15, f. 40-46; 18, f. 47-54, 23, f. 71-73; 23, f. 74-77; 24, f. 78-86; 27, f. 87-89; 29, f. 96-99; 29, f. 100-106, © Magnolia Press, G - Wesolowska, (2012b) *African Entomology* 20: 325, f. 1-5, 56-57, N-O - Lucas (1846) *Histoire naturelle des animaux articulés*. In: *Exploration scientifique de l'Algérie ... Sciences physiques, Zoologie* 1, 177, pl. 9, f. 6; 182, pl. 10, f. 3, P - ©Ono, Ikeda, Kono. Tokai University Press, 2009: 583, pl 48-7. All ©copyrights are retained by the original authors and copyright holders, used by their courtesy.

Species diversity in *Euophrys* – 1



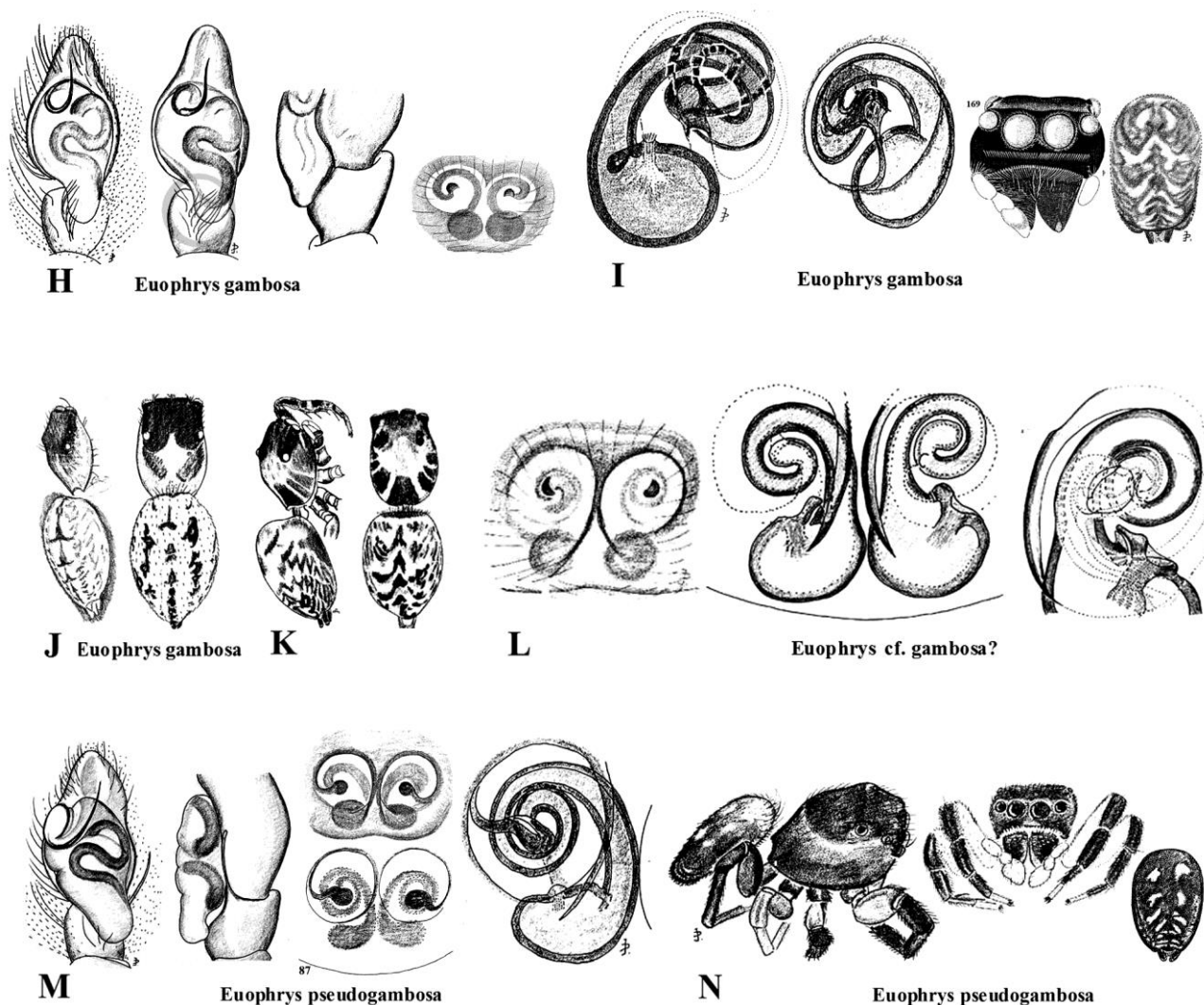
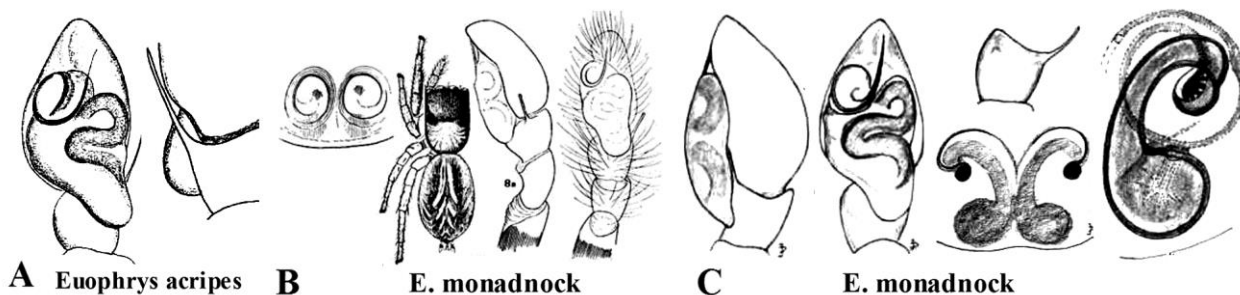


Figure 11. Diversity of diagnostic characters in *Euophrys* (part II). **A-E** - *Euophrys frontalis*, **F** - *E. sulphurea*, **G** - *E. evae*, **H-J** - *E. gambosa*, **K-L** - *E. cf. gambosa*, **M-N** - *E. pseudogambosa*.
 SOURCES: **A-E** - Żabka M. 1997: 46, f. 89-98, **F** - Prószyński J. 2003b: Internet, **G** - Żabka M. (1981a). *Senckenbergiana Biologica* 61: 61 (5/6): 409-410, f. 4-6, **H-N** - Prószyński (2003) 49-51, f. 163-195. All copyrights are retained by the original authors and copyright holders, used by their courtesy.

Species diversity in *Euophrys* – 2



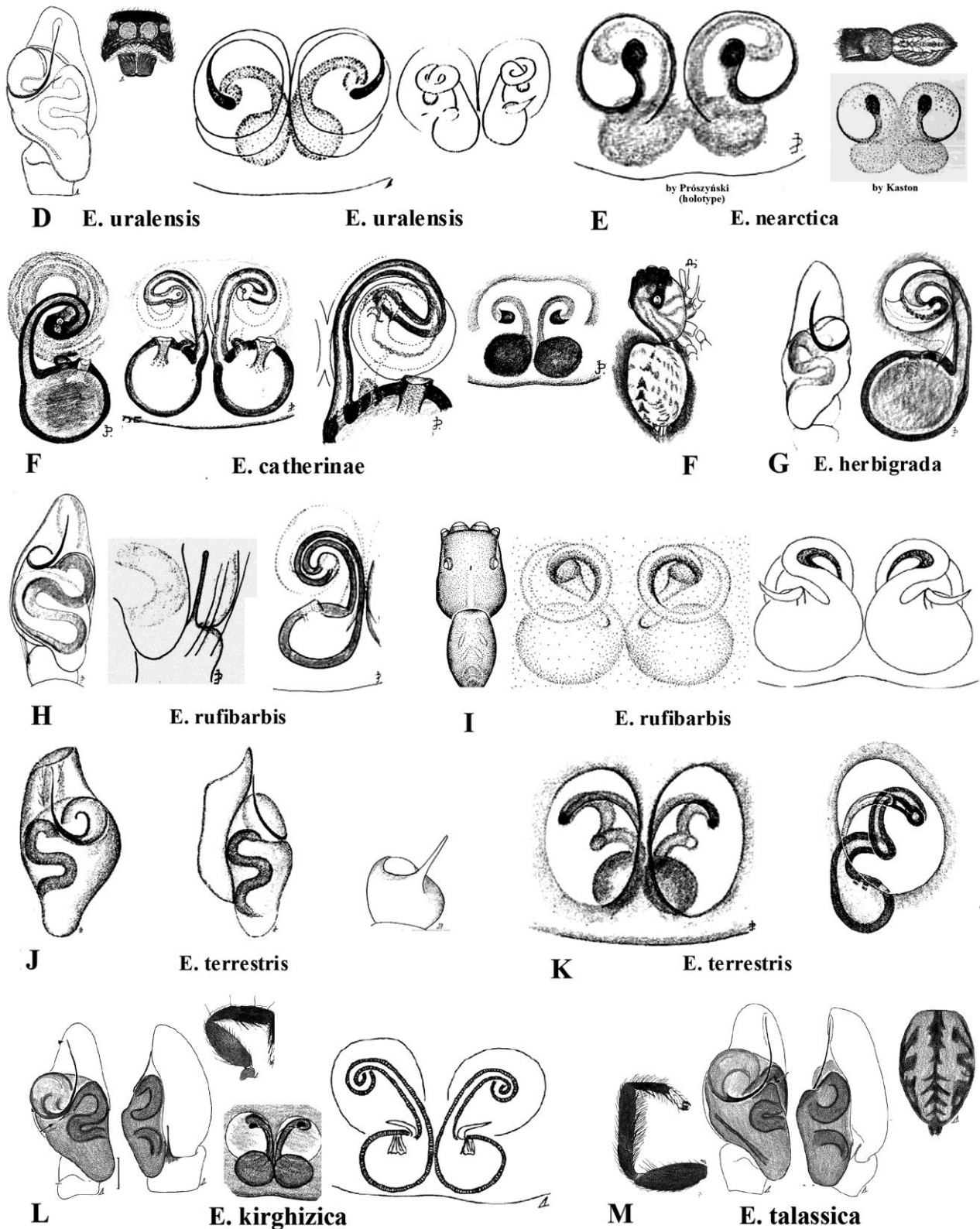


Figure 12. Diversity of diagnostic characters in *Euophrys* (part II). **A** - *Euophrys acripes*, **B-C** - *E. monadnock*, **D** - *E. uralensis*, **E** - *E. nearctica*, **F** - *E. catherinae*, **G** - *E. herbigrada*, **H-I** - *E. rufibarbis*, **J-K** - *E. terrestris*, **L** - *E. kirghizica*, **M** - *E. talassica*.

SOURCES: **A, C, G-H, J-K** -- Prószyński, Internet, **B** - Peckham & Peckham (1909): 16 (1): 515, pl. 43, f. 8, **I** - Yin et al., (2012) *Araneae in Hunan, China.*: 1356, f. 734a-e, **E** - Prószyński - Internet and Kaston, B. J. (1938c). *Bulletin of the Brooklyn Entomological Society* 33: 187, pl. 9, f. 25-26, **F** - Prószyński, 2003: 48, f. 158-162, **L** - Logunov, Cutler & Marusik (1993) *Annales Zoologici Fennici* 30: 117, f. 6B, 7B, 15A-E, **M** - Logunov (1997). *Bulletin of the British Arachnological Society* 10: 347, f. 18-22; 348, f. 23-26. All copyrights are retained by the original authors and copyright holders, used by their courtesy.

Species diversity in *Euophrys* – 3

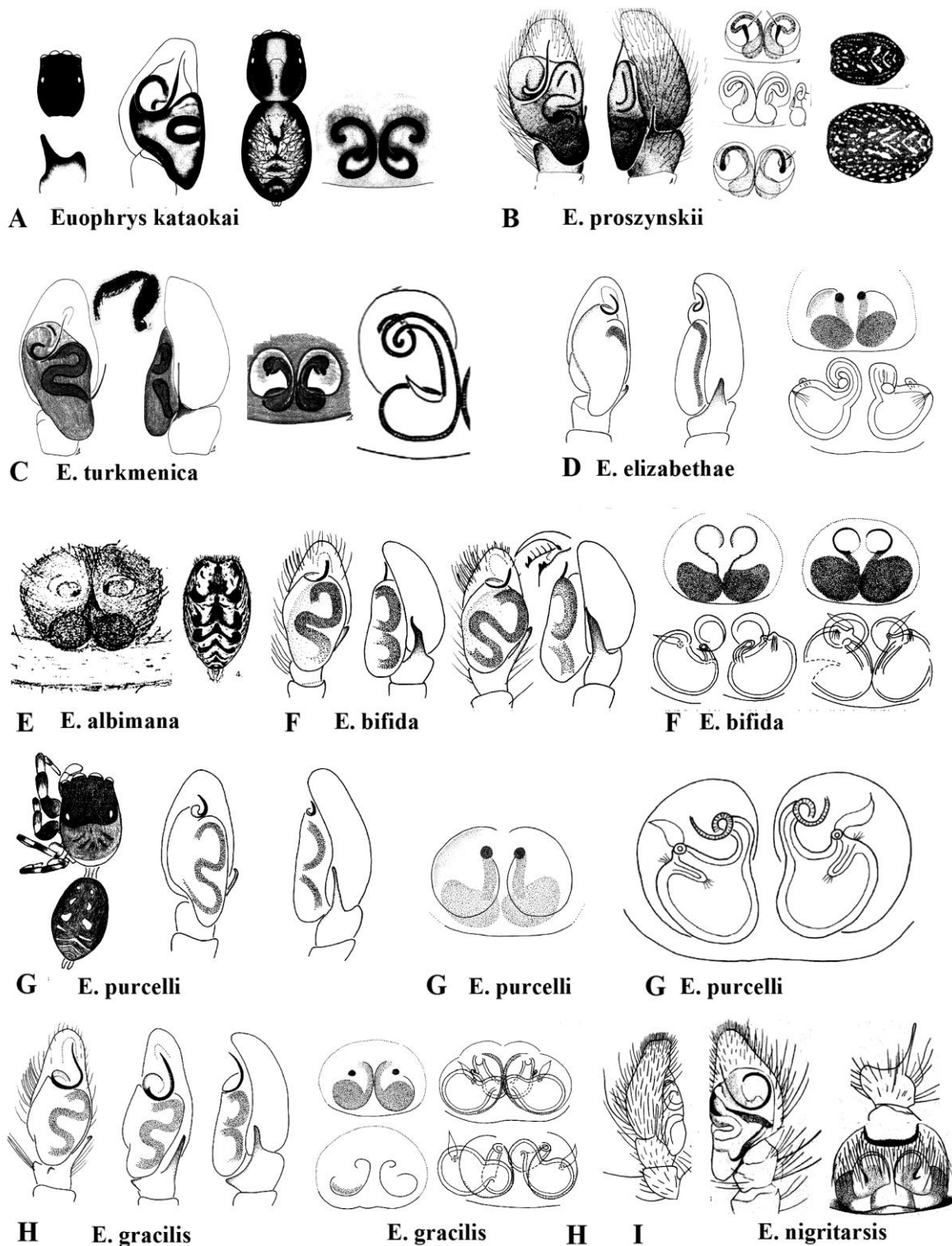


Figure 13. Diversity of diagnostic characters in *Euophrys* (part III). Diversity of diagnostic characters in *Euophrys* (part III). **A** - *Euophrys kataokai*, **B** - *E. proszynskii*, **C** - *E. turkmenica*, **D** - *E. elizabethae*, **E** - *E. albimana*, **F** - *E. bifida*, **G** - *E. purcelli*, **H** - *E. gracilis*, **I** - *E. nigratarsis*.

SOURCES: **A** - Ono, Ikeda, Kono. Tokai University Press (2009) 583, pl 48-7, **B** - Logunov, Cutler & Marusik (1993) 113, f. 5C, 12A-E, 13A-C, **C** - Logunov, (1997a) *Bulletin of the British Arachnological Society* 10: 349, f. 27-32, **D, F, H** - Wesolowska, Azarkina & Russell-Smith, (2014) *Zootaxa* 3789(1) 13, f. 34-39 13, f. 34-39; 11, f. 7-17; 18, f. 47-54 - ©Magnolia Press, **E** - Denis, (1937b) *Proceedings of the Zoological Society of London* (1936) 1054, pl. 5, f. 4-5, **G** - Wesolowska, (2012b) *African Entomology* 20: 325, f. 1-5, 56-57, **I** - Denis, (1952a) *Bulletin de la Société d'Histoire Naturelle de Toulouse* 87: 60, f. 2-5. All ©copyrights are retained by the original authors and copyright holders, used by their courtesy.

Species diversity in *Euophrys* – 4

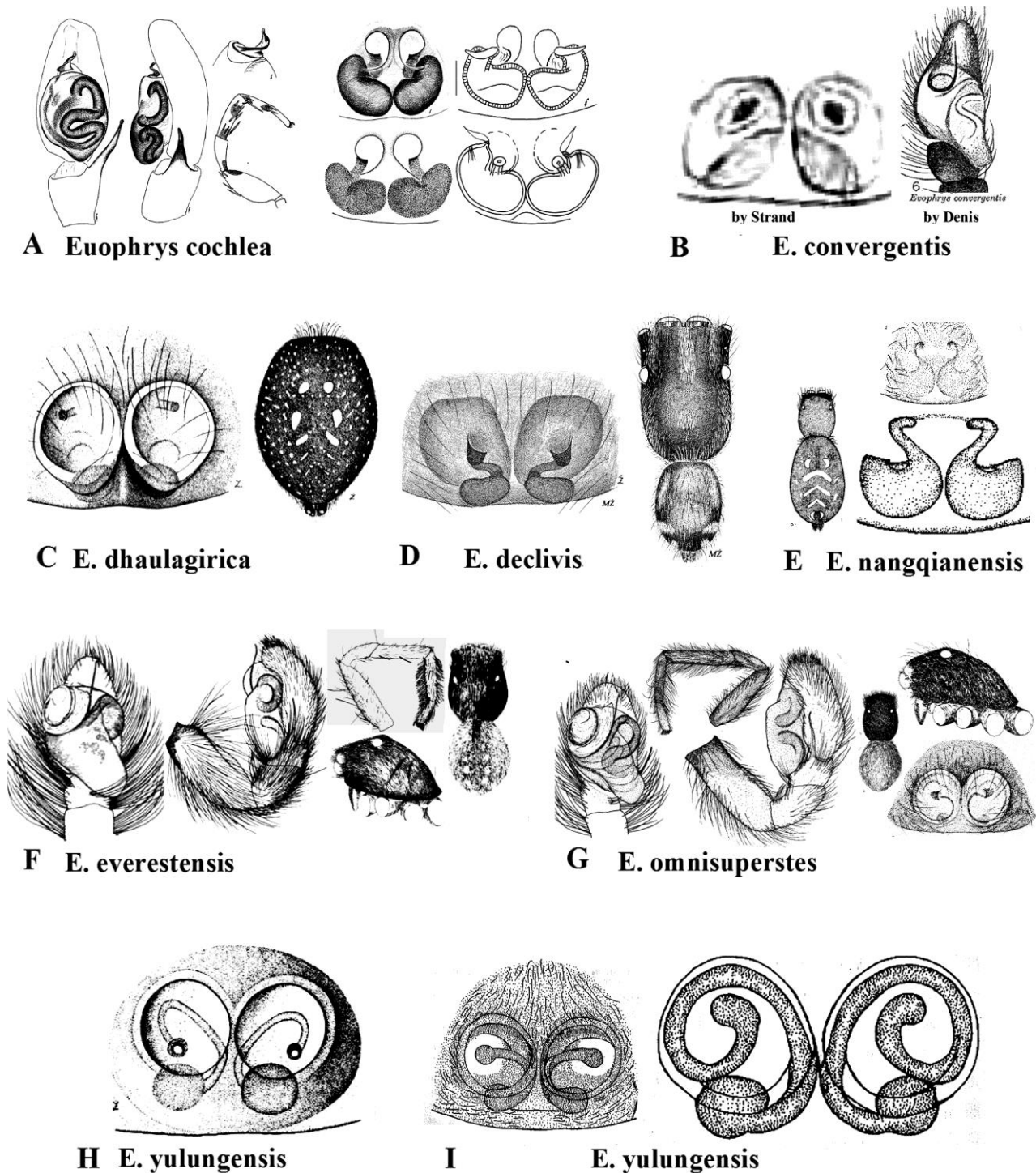


Figure 14. Diversity of diagnostic characters in *Euophrys* (part IV). **A** - *Euophrys cochlea*, **B** - *E. convergentis*, **C** - *E. dhaulagirica*, **D** - *E. declivis*, **E** - *E. nangqianensis*, **F** - *E. everestensis*, **G** - *E. omnisuperstes*, **H-I** - *E. yulungensis*.
SOURCES: **A** - Wesolowska, Azarkina & Russell-Smith (2014) *Zootaxa* 3789(1) 12, f. 18-33 , **B** - Denis (1937b) *Proceedings of the Zoological Society of London* 1936:: 1054, pl. 5, f. 6 , **C, H, I** - Żabka (1980b) *Senckenbergiana Biologica* 60 365, f. 13-14; 363, f. 12, **D** - Prószyński (2009b) *Arthropoda Selecta* 18: 160, f. 32-33 , **E** - Hu (2001) Henan Science and Technology Publishing House 383, f. 239.1-3 , **F-G** -Wanless (1975) *Bulletin of the British Arachnological Society* 3(5) 134, f. 4-5, 9-11; 132, f. 1-3, 6-8. All copyrights are retained by the original authors and copyright holders, used by their courtesy.

Species diversity in *Euophrys* – 5

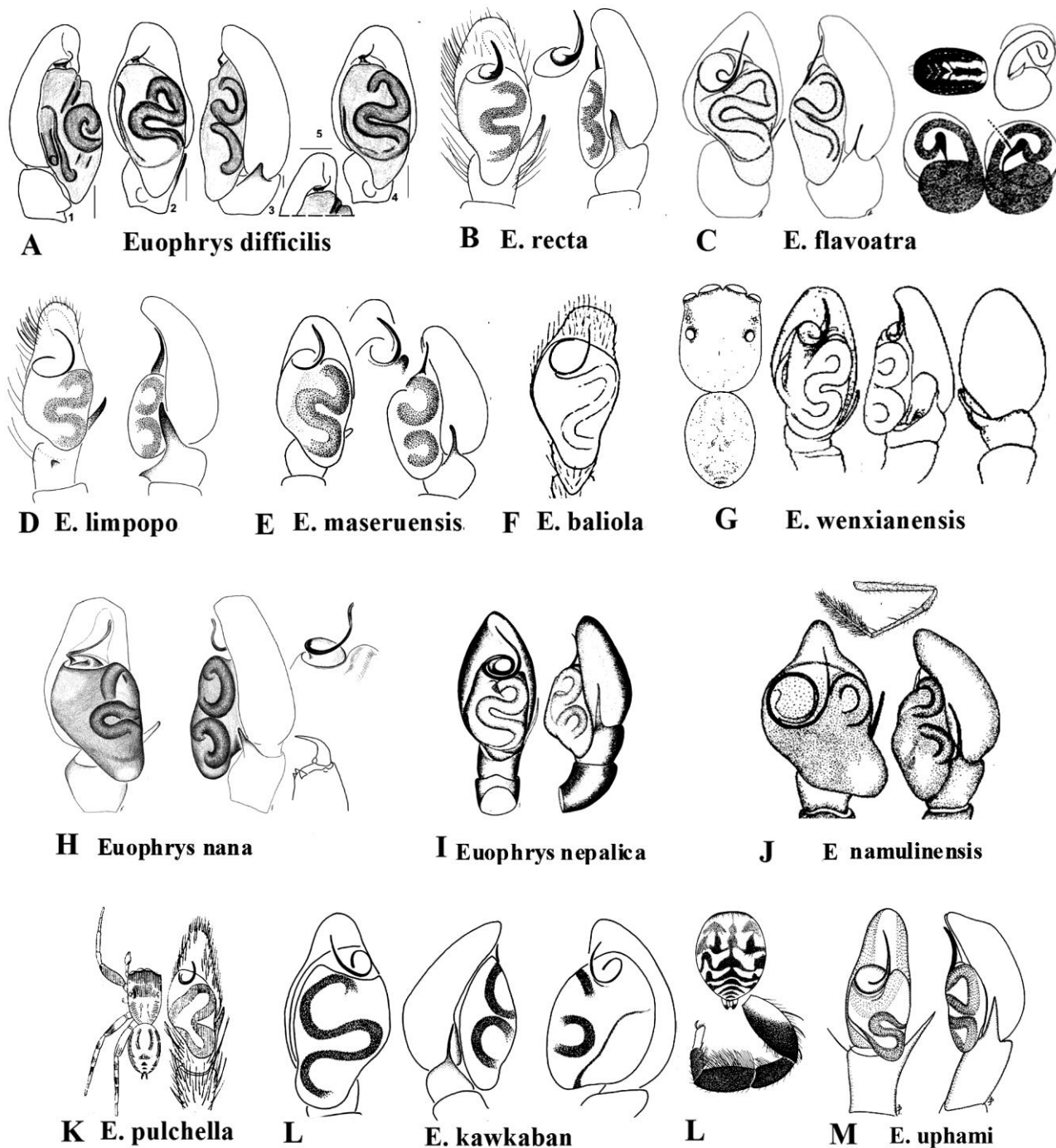


Figure 15. Diversity of diagnostic characters in *Euophrys* (part V). **A** - *Euophrys difficilis* (syn. *E. recta*), **B** - *E. recta*, **C** - *E. flavoatra*, **D** - *E. limpopo*, **E** - *E. maseruensis*, **F** - *E. baliola*, **G** - *E. wenxianensis*, **H** - *E. nana*, **I** - *E. nepalica*, **J** - *E. [?, Saitis?] namulinensis*, **K** - *E. pulchella*, **L** - *E. kawkaban*, **M** - *Euophrys uphami*.

SOURCES: **A** - Logunov (2005) *Newsletter of the British Arachnological Society* 102: 14, f. 1-5, **B**, **D-E**, **H** - Wesolowska, Azarkina & Russell-Smith (2014) *Zootaxa* 3789(1): 29, f. 96-99; 23, f. 71-73; 23, f. 74-77; 28, f. 90-95, **C** - Logunov, Cutler, & Marusik (1993) *Annales Zoologici Fennici* 30: 108, f. 5b, 6a, 7a, 8a-d, 9a-c, **F** - Simon (1937) *Les arachnides de France*. VI. 5 : 1172, 1251, f. 1340, **G** - Yang & Tang (1997) *Journal of Lanzhou University Natural Sciences* 33: 93, f. 1-5, **I** - Žabka (1980b) *Senckenbergiana Biologica* 60: 363, f. 10-11, **J** - Hu (2001) Henan Science and Technology Publishing House, 382, f. 239.1-3, **K** - Peckham & Peckham (1894b) *Proceedings of the Zoological Society of London* 61(4, 699, pl. 62, f. 7, 699, pl. 62, f. 7, **L** - Wesolowska & van Harten (2007) *Fauna of Arabia* 23: 194, f. 12-16, **M** - Prószyński, 1987: *Atlas ... Zeszyty Naukowe WSRP*, Siedlce, 101. All copyrights are retained by the original authors and copyright holders, used by their courtesy.

Species diversity in *Euophrys* – 6

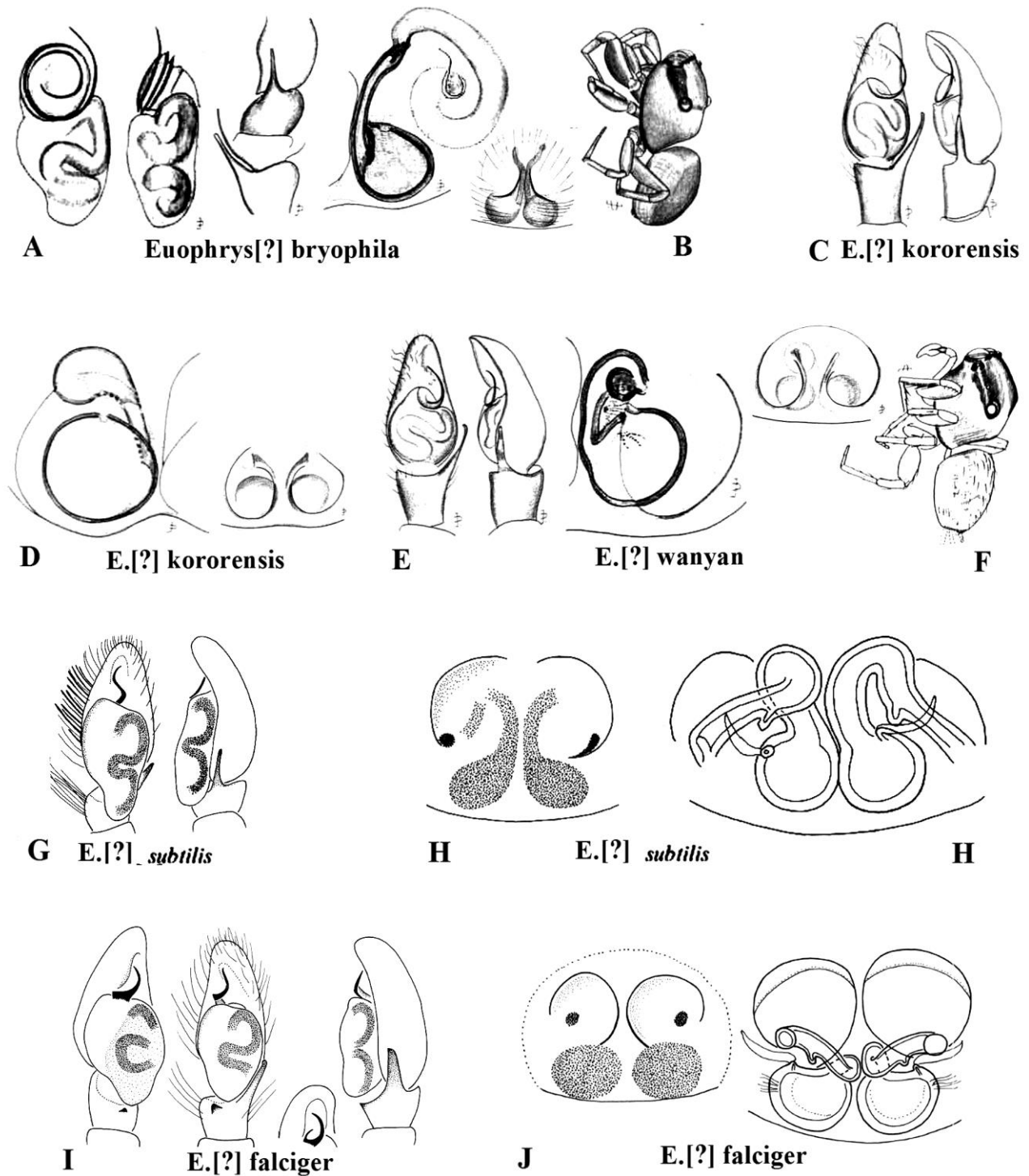
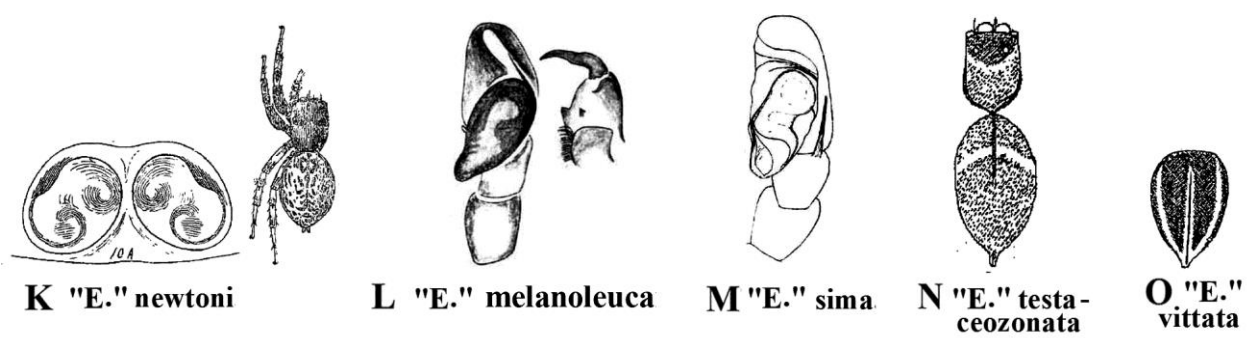
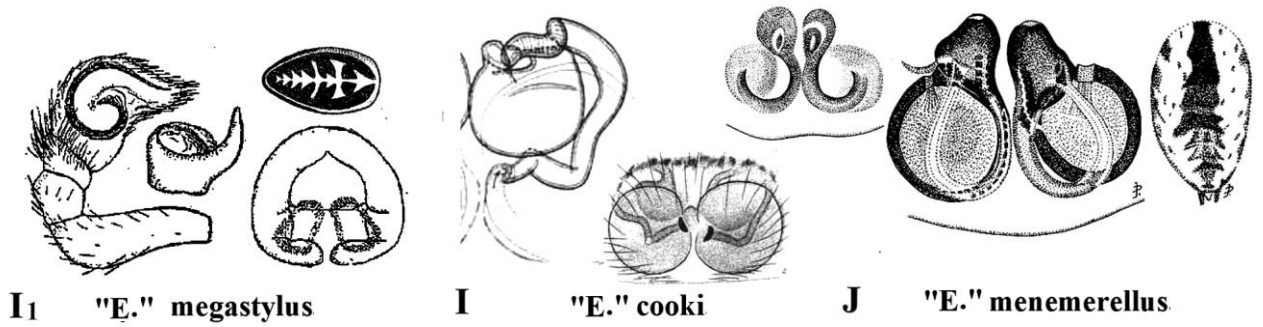
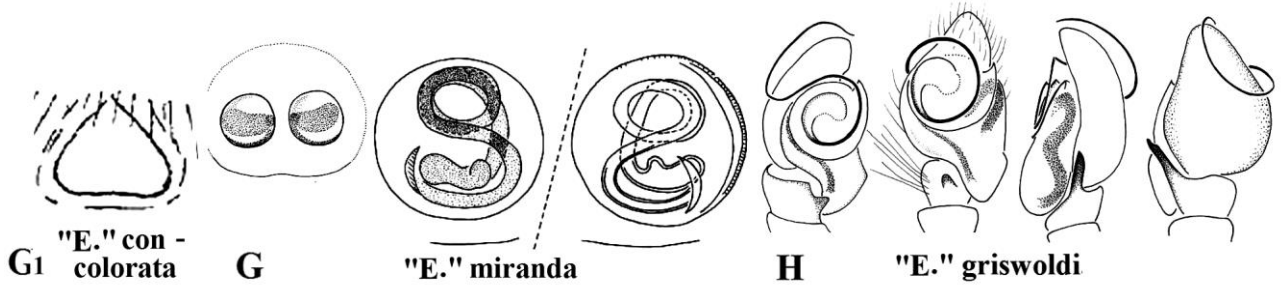
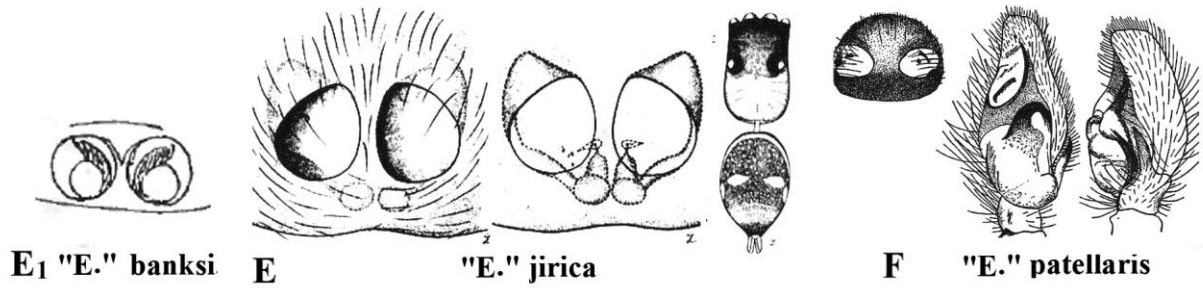
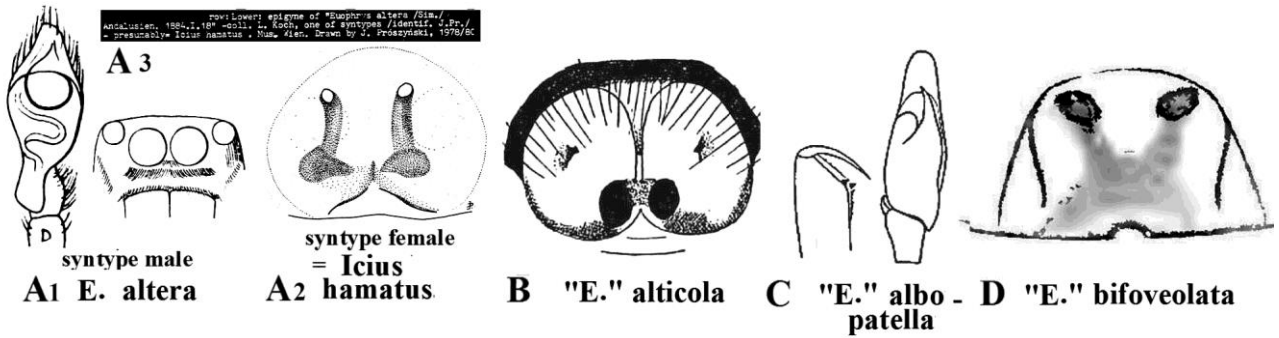
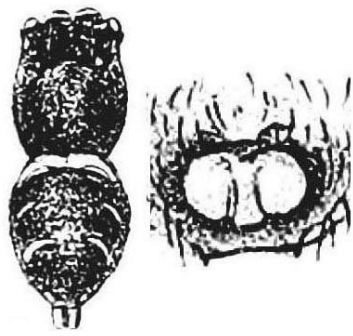


Figure 16. Diversity of diagnostic characters in *Euophrys* (part VI). **A-B** - *Euophrys[?] bryophila*, **C -D** - *E. [?] kororensis*, **E, F** - *E. [?] wanyan*, **G-H** - *E. subtilis*, **I-J** - *E. falciger*.

SOURCES: **A-F** - Berry, Beatty & Prószyński, (1996) *Journal of Arachnology* 24: 230, f. 54-58; 323, f. 63-69; 232, f. 59-62, **G-H** - Wesolowska, Azarkina & Russell-Smith (2014) *Zootaxa* 3789(1): 15, f. 40-46. All copyrights are retained by the original authors and copyright holders, used by their courtesy.

Species pending reclassification

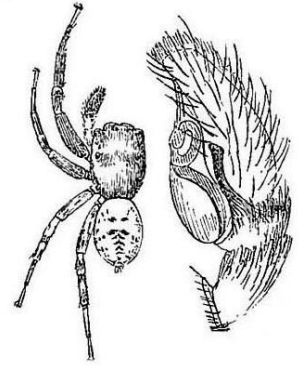




P "E." valens



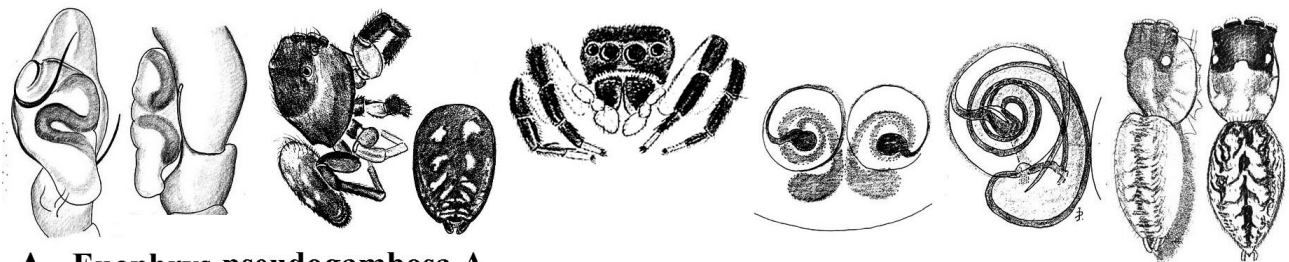
Q „E.” alabardata



R "E." ysobolii

Figure 17. Diagnostic characters of "*Euophrys*" pending reclassification (part II). **A1** -- *Euophrys altera* - syntype male, **A2** - syntype female = *Icius hamatus*, **A3** - facsimile of caption of the latter, **B** - "*E.*" *alticola*, **C** - "*E.*" *albopatella*, **D** - "*E.*" *bifoveolata*, **E1** - "*E.*" *banksi*, **E** - "*E.*" *jirica*, **F** - "*E.*" *patellaris*, **G** - "*E.*" *miranda*, **G1** - "*E.*" *concolorata*, **H** - "*E.*" *griswoldi*, **I1** - "*E.*" *megastyla*, **I** - "*E.*" *cooki*, **J** - "*E.*" *menemerellus*, **K** - "*E.*" *newtoni*, **L** - "*E.*" *melanoleucus*, **M** - "*E.*" *sima*, **N** - "*E.*" *testaceozonata*, **O** - "*E.*" *vittata*, **P** - "*E.*" *valens*, **Q** - "*E.*" *alabardata*, **R** - "*E.*" *ysobolii*.

SOURCES: **A1** - Simon (1901a) 568, f. 685, 687, **A2-A3** - Prószyński (1984) *Atlas ... Zeszyty Naukowe WSRP, Siedlce*: 41, **B, F** - Denis (1957b) *Sitzungsberichte der Österreichischen Akademie der Wissenschaften (I)* 166: 285, f. 7-9; 287, f. 10, **C** - Petrunkevitch (1914a) *Annals of the Entomological Society of America* 7: 173, pl. 26, f. 12-13, **D** - Tullgren (1905) *Arkiv för Zoologi* 2(19): 73, pl. 9, f. 38, **E1** - Banks (1898b) *Proceedings of the California Academy of Sciences* (3) 1: 286, pl. 17, f. 14, **E** - Żabka (1980b) *Senckenbergiana Biologica* 60: 368, f. 15-20, **G-H** - Wesolowska, Azarkina & Russell-Smith (2014: *Zootaxa* 3789(1) 18, f. 55-60; 27, f. 87-89, **G1** - Caporiacco (1935b) *Memorie della Società Entomologica Italiana, Genova* 13: 205, pl. 6, f. 3, **I1** - Caporiacco (1949a) *Commentationes Pontificia Academia Scientiarum* 13 480, f. 93a-d, **I** - Żabka (1985) *Annales Zoologici*, 39: 219, f. 149-150, **J** - Prószyński (1987) *Atlas ... Zeszyty Naukowe WSRP, Siedlce*, 24, **K, R** - Peckham & Peckham (1896) *Occasional Papers of the Natural History Society of Wisconsin* 3: 64, pl. 5, f. 10; **L** - Galiano (1962d) *Physis*, (C) 23 172, pl. II, f. 12-13, **M** - Chamberlin (1916) *Bulletin of the Museum of Comparative Zoology at Harvard College* 60: 298, pl. 25, f. 1, **N** - Caporiacco (1922) *Memorie della Società Entomologica Italiana, Genova* 1: 101, f. 5, **O** - Caporiacco (1935b) 202, pl. 5, f. 3 (j, Karakorum), **P** - Bösenberg & Lenz (1895) *Jahrbuch der Hamburgischen Wissenschaftlichen Anstalten* 12(2): 31, pl. 1, f. 6, **Q** - Caporiacco (1947d) *Annales Historico-Naturales Musei Nationalis Hungarici* 40: 236, pl. 2, f. 69. All ©copyrights are retained by the original authors and copyright holders, used by their courtesy.



A *Euophrys pseudogambosa* A



B *Euophrys pseudogambosa* B



Figure 18. Separation of similar forms: **A** - *Euophrys pseudogambosa* A and **B-C** - *E. pseudogambosa* B, occurring in close geographical areas, is hampered by differences in style of diagnostic documentation and different preservation of specimens, photographs of live specimens helps in authentication of diagnostic drawings.

SOURCES: **A** - Prószyński (2003) *Annales zoologici* 53: 51, f. 171-193, **B** - Logunov (1996c): *Arthropoda Selecta* 5(1/2): 55-61, 55, f. 1-7, **C** - ©Photo by Amir Weinstein. All ©copyrights are retained by the original authors and copyright holders, used by their courtesy.

Gen. *Euochin* gen. n. - Prószyński, 2018

Figures 19-20

Type species *Euophrys atrata* Song & Chai, 1992.

Documentation studied: original diagnostic photos and drawing (Figs 19 & 20).

Etymology: name coined of parts of words *Euo*[-phrys] and *Chin*[-a] related to the genus these species were originally placed in, and the country of their occurrence.

Remarks. Excellent color macrophotographs and drawings, provided by the original authors (Figs 19-20), perfectly illustrate features of species transferred here to the newly delimited genus *Euochin*, as well as their differences with rich diversity of all recognizable species of *Euophrys* (Figs 1-18) and type species of related genera. Original descriptions of these China living species provides additional help to taxonomist able to read Chinese descriptions.

Diagnosis. Main diagnostic character of this genus are oval shape of spermathecae, elongate along their longitudinal axes, and shape and position of their short and straight ducts, arising antero-medially from spermathecae (Figs 19C, G), their features reflects on superficial appearance of their epigyne. Palps confront to genera type of these parts in EUOPHRYINES, with coil of embolus somewhat wider than in *Euophrys* and their center somewhat deeper. There is a dense layer of longer white setae in proximal half of dorsal surface of cymbium and distal edge of palpal tibia (Figs 19B, F, 20A-C). General appearance of body - with average proportions and cryptic coloration does not display any particular diagnostic characters (Figs 19A, E), frontal view of males is not documented. Placement of *E. poloi* in this genus requires more consideration.

Composition. Type species: *Euochin atrata* (Song & Chai, 1992) comb. n. (Figs 19A-D, 20A, D). Other species: *Euochin albopalpalis* (Bao & Peng, 2002) comb. n. (Figs 19C), *E. bulbis* (Bao & Peng, 2002) comb. n., (Figs 19E-H, 20B, E), *E. poloi* (Zabka, 1985) comb. n. (Figs 20F-I).

Species pending placement confirmation: *Euophrys longyangensis* Lei & Peng, 2012: 2, f. 1a-b, 5a-e and *E. robusta* Lei & Peng, 2012: 4, f. 2, 6a-c, both described from China in *Oriental Insects*.

Euochin gen. n.

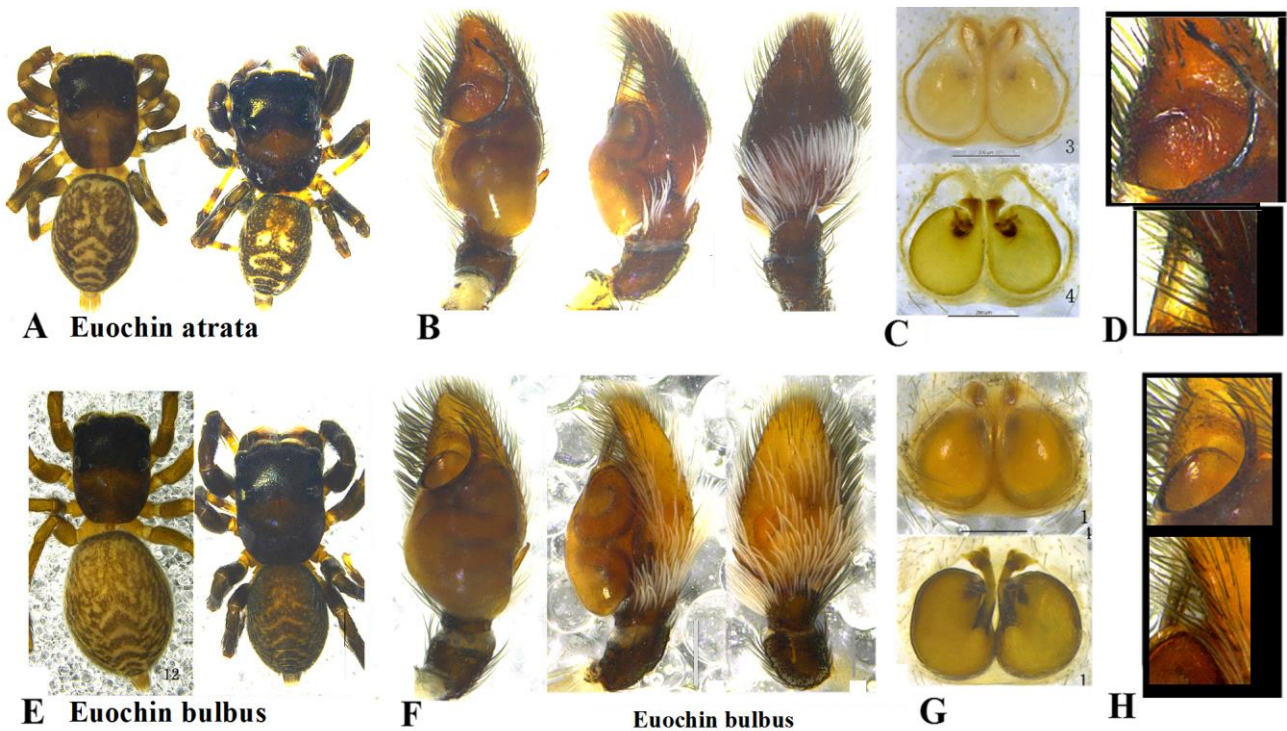
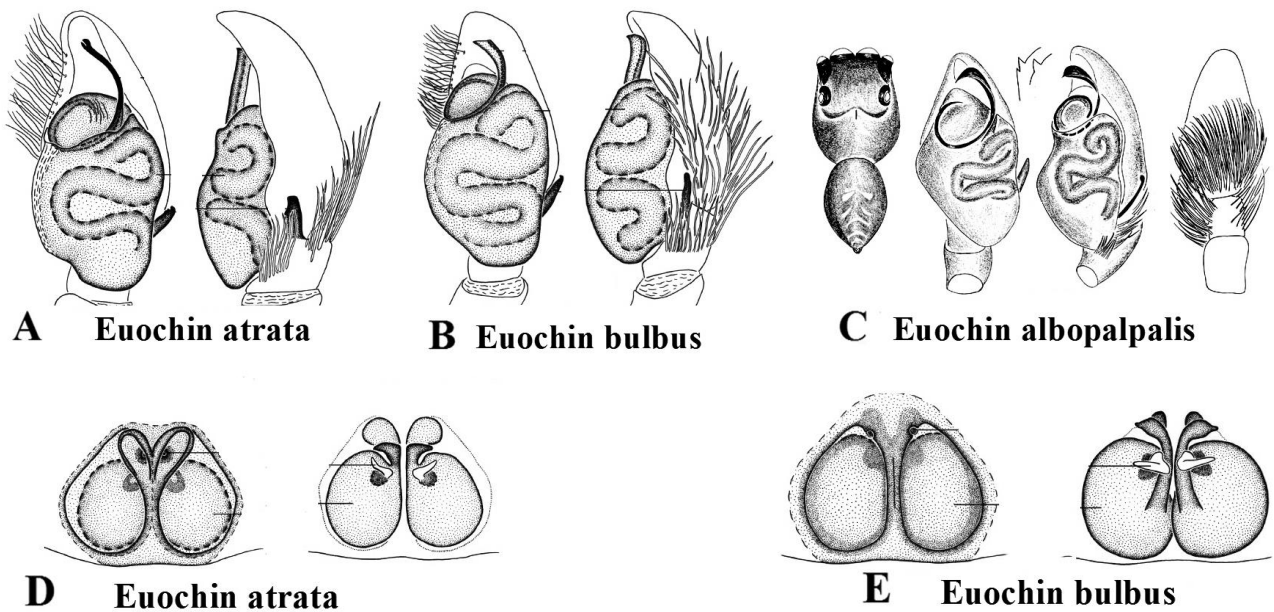


Figure 19. Habitus diversity in *Euochin gen. n.* **A-D** - *Euochin atrata*, **E-H** - *Euochin bulbos* (**A** - habitus, male - female, **B, F** - palps, **C, G** - epigyne and spermathecae, **D, H** -- coil of embolus, note minute traces of composite structure).

SOURCES: All photos by Zha, S., Jin, C. & Zhang, F. (2014). *Zootaxa* 3779(3): 369, 371, f. 1-22, ©Magnolia Press. All copyrights are retained by the original authors and copyright holders, used by their courtesy.

Euochin gen. n.



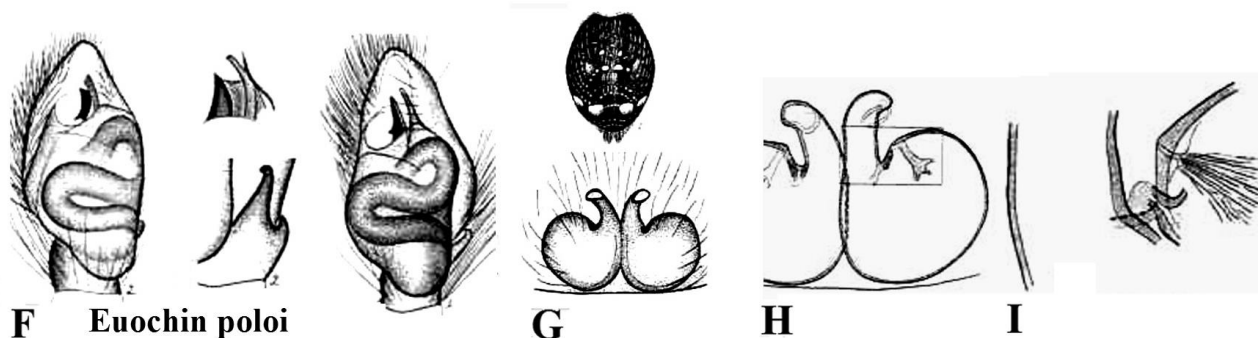


Figure 20. Diversity of diagnostic characters in *Euochin* gen. n. **A, D** - *Euochin atrata*, **B, E** - *Euochin bulbus*, **C** - *Euochin albopalpalis*, **F-I** - *Euochin poloi* (A-I - palp, epigyne, spermatheca, details of spermatheca).

SOURCES: **A-B, D-E** -Zha, S., Jin, C. & Zhang, F. (2014). *Zootaxa* **3779**(3): 369, 371, f. 1-22, ©Magnolia Press., **C** - ©Bao & Peng, 2002. *Zoological Studies* 41: 405, f. 6-10, **F-H** -©Žabka, (1985) *Annales Zoologici*, 39: 219, f. 151-160. All ©copyrights are retained by the original authors and copyright holders, used by their courtesy.

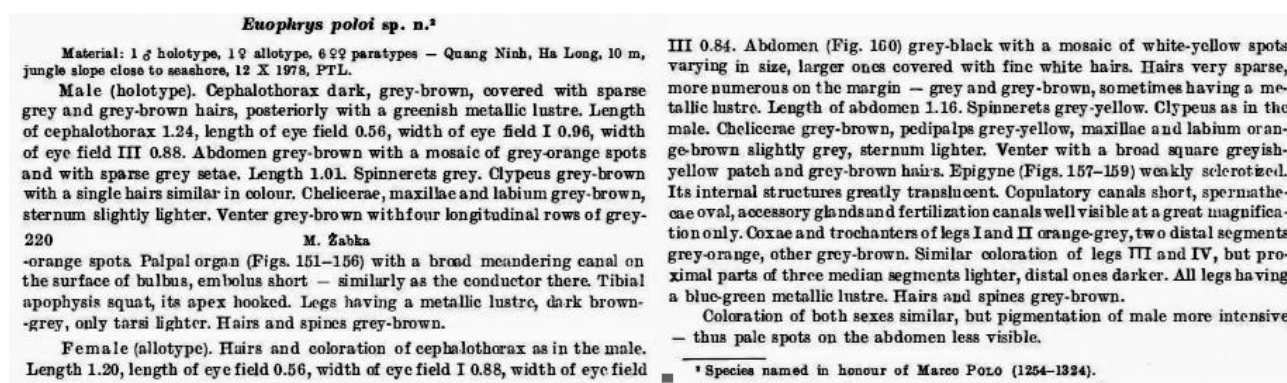


Figure 21. Facsimile of the original description of *Euochin poloi* (Žabka, 1985).

SOURCE: Žabka (1985). *Annales Zoologici*, 39: 219. All ©copyrights are retained by the original authors and copyright holders, used by their courtesy.

Placement of *Pseudeuophrys* and *Talavera*

Revival of informal subgroup of genera SAITEAE* (see Prószyński, Noordam, Oger & Schäfer (2018 – in press) prompted search for an opposite subgroup and that led to delimitation of a subgroup named EUOPHRYDEAE⁹ (see below), consisting now, at beginning, of genera *Euophrys* and *Euochin*. Since both *Pseudeuophrys* and *Talavera* were classified as *Euophrys* until the mid XXth century, due to similarities in appearance and environment, there arise question whether both genera could not be included to EUOPHRYDEAE too. The documentation relevant to that question is shown in Fig. 22, for more complete documentation of both genera see Figs 23-29, illustrations for genus *Euophrys* can be consulted on Figs 4-17. Comparison of characters shown on above mentioned plates does not give unequivocal answer to that question, there are similarities and at the same time there are differences, their interpretation is unclear..

Spermathecae are ball shaped in *Euophrys* and *Talavera*, with ducts running ahead, towards the center of each "window" (Figs 22A-B), these of *Euophrys* being broader and more robust. However in *Pseudeuophrys* spermathecae are oval, with some partial constriction and are variously oriented: longitudinally, transversally or obliquely, ducts runs transversally, along the rim of windows, with opening located at the rim, in two species ducts are running longitudinally (Figs 22C).

Palps in *Euophrys* and *Pseudeuophrys* are comparable, although basal coil of embolus is either hidden in the groove in bulbus or behind it (Figs 22D, F).

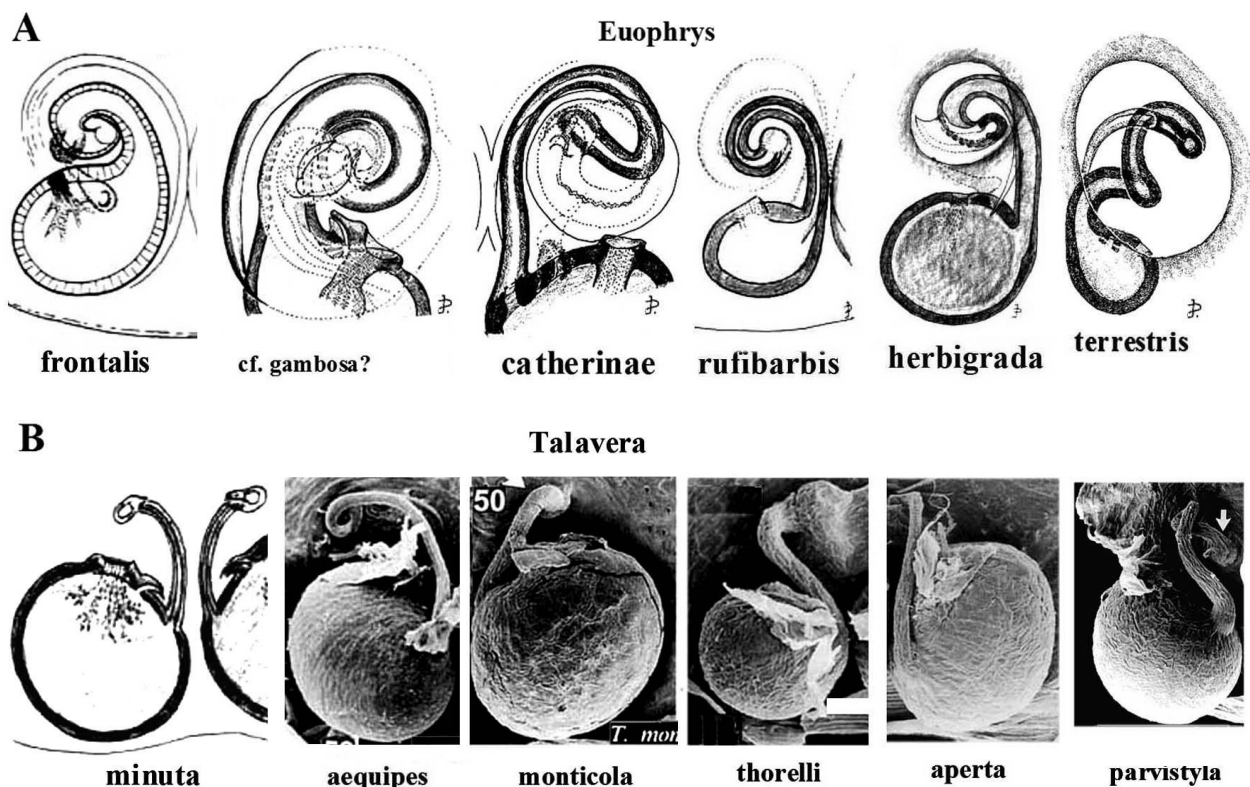
⁹ Names of both groups were first used by Simon (1901-1903) and contents of included genera is comparable in part (see also more comments below).

Palps in *Talavera* are surprising by lack of meandering spermophor and not coiled embolus (Figs 22E, also 27-29), as such they do not fit EUOPHRYINES and should be placed elsewhere in other Salticidae (by typical arrangement of eyes). But where? Of the other hand there is possibility that they lost these typical character states at the later stage of evolution - but how to confirm that? Cork-screw driver like embolus in *T. aequipes* and *T. trivittata* (Fig. 27G, J) could be interpreted as vestige of the coil-like state. And, on other-hand, spermathecae and ducts in *Talavera* nicely resemble *Euophrys*. Disentangling these doubts and hypotheses require apparently more research.

General appearance. All three genera are small size jumping spiders (body length 2-5, rarely 7 mm) on average, body shape is proportional, dorsal coloration cryptic and dull. Anterior surfaces of male legs I are intensively black and serve, apparently, as recognition character during courtship performance in *Euophrys* (Figs 1C-C2) and some *Pseudeuophrys*. Striking recognition characters are color scales on frontal views of the body in *Euophrys* and in some *Pseudeuophrys*, including clypeal stripes, orbital scales (around eyes) and on dorsal surface of cymbium, as well as bunches of long white setae on palps. *Pseudeuophrys* has some dorsal pattern of white or light scales on abdomen and carapace (Figs 23, 24). *Talavera* has uniform light, sparse scales on dark background (Figs 26), with slightly different orbital scales, it seems that its clypeus is lower and there are no clypeal color stripes, but the number of photographed species is too small (3 only!) to generalize color pattern.

The results of the above comparisons are inconclusive and accordingly classification should be delayed, until results of further comparative studies, including more genera, will become available. So the answer to the question whether *Pseudeuophrys* and *Talavera* could be included into subgroup EUOPHRYDEAE, together with *Euophrys*, is provisionally negative.

Diversity of diagnostic characters



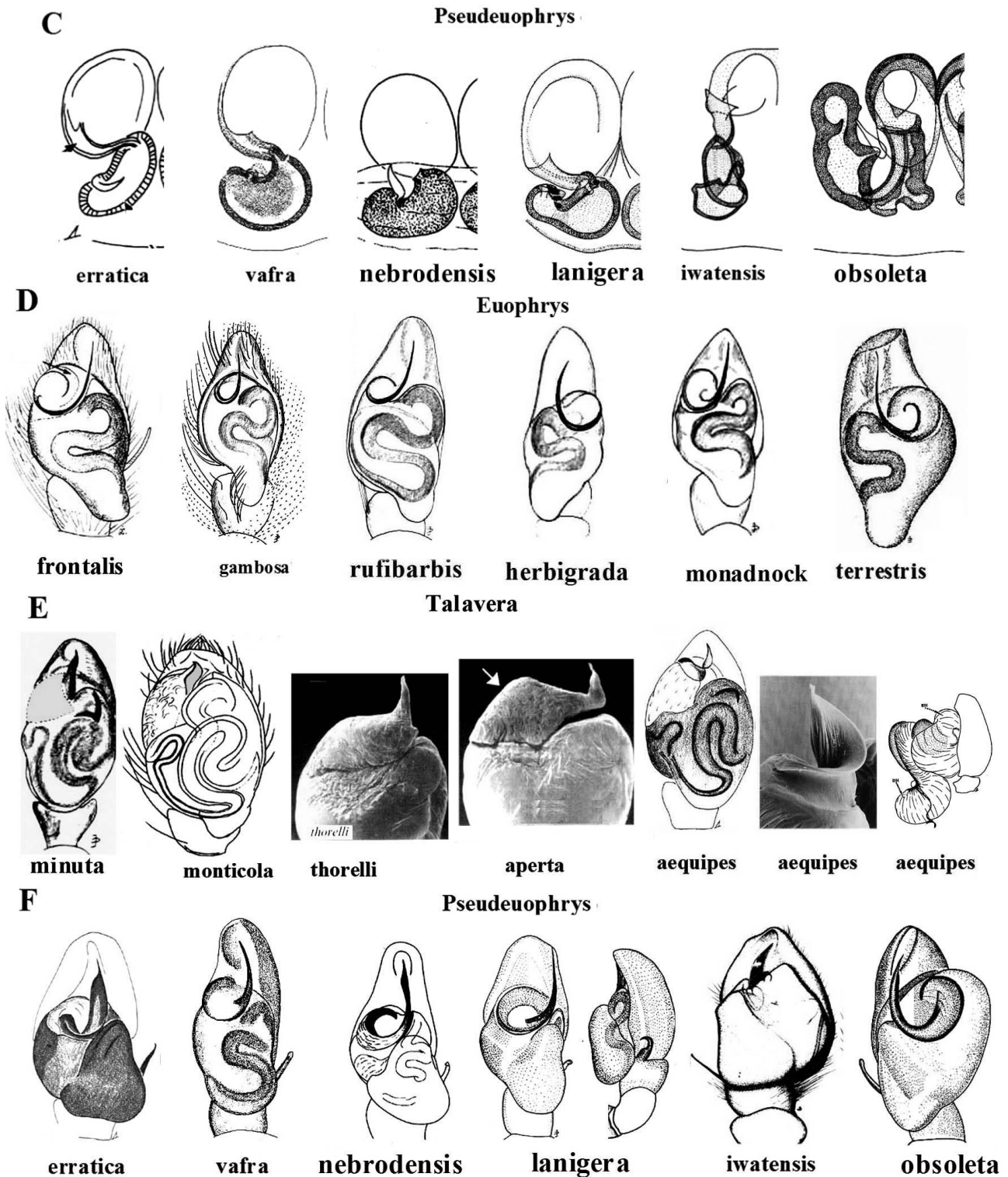


Figure 22. Diversity of main diagnostic characters in three genera: *Euophrys*, *Talavera* and *Pseudeuophrys*. **A** - *Euophrys* spp. spermathecae, **B** - *Talavera* spp. spermathecae, **C** - *Pseudeuophrys* spp. spermathecae, **D** - *Euophrys* spp. palps, **E** - *Talavera* spp. palps, **F** - *Pseudeuophrys* spp. palps.

SOURCES: **A** - Žabka, Prószyński, **B** - Prószyński, Logunov, **C** - Logunov, Prószyński, Cantarella & Alicata, Prószyński., **D** - Prószyński, **E** - Prószyński, Chvatalova & Buchar, Logunov & Kronestedt, **F** - Logunov, Prószyński, Cantarella & Alicata, Prószyński. All copyrights are retained by the original authors and copyright holders, used by their courtesy.

Gen. *Pseudeuophrys* Dahl, 1912

Figures 23-25

Type species. *Pseudeuophrys erratica* (Walckenaer, 1826).**Documentation studied.** Literature data, especially diagnostic drawing, and macrophotographs, preliminarily collected in Prószyński (2016a) - <http://www.peckhamia.com/salticidae/q10-Pseudeuo.html>), complemented by the newest data.**Diagnosis.** Resembling *Euophrys* (see above), from which differs by coil of embolus hidden behind anterior edge of bulbus, with only tip of embolus protruding, or by higher anterior part of the embolus coil, which makes central space, inside of embolus coil, looking depressed within coil of embolus (Figs 22F, 25). Spermathecae elongate oval, or bean shaped, often slightly constricted, with copulatory ducts relatively broad, running transversally, but in *P. iwatensis* anterior-ward (Figs 25B1) (in *Euophrys* and *Talavera* spermathecae are ball shaped, with ducts distinctly thinner, running anteriorly (Figs 22C1, 27B, H, L, 28, 29).**Description.** Small spiders of average body shape, recognizable by coloration (Figs 23-24), by palps and internal structure of epigyne (Figs 22, 25, see also - <http://www.peckhamia.com/salticidae/q10-Pseudeuo.html>). In difference to *Euophrys*, dorsal color pattern in males is richer and consists of white scales contrasting with background of brown or blackish scales (with reddish or golden hue). White scales on abdomen may be either concentrated into pairs of small spots, or discrete short white lines dorso-marginally (Figs 23A-D), they may also form less dense white assemblages along median abdominal streak (consisting of diamonds and bars), on eye field and on dorsal surface of thorax (Figs 23E-H). Comparable patterns occur in females (Fig. 24). After color scales are rub off, bald, black, tegument is left. Frontal color pattern is comparable with *Euophrys*, but less flamboyant (compare Figs 23 with those on Fig. 4G-J), in females even more subdued (Fig. 24).**Composition.** Type species: *Pseudeuophrys erratica* (Walckenaer, 1826) (Figs 22C, F, 23A-B, 24A, 25A-A1). Other species included are: *P. iwatensis* (Bohdanowicz & Prószyński, 1987) (Figs 22C, F, 25B-B1), *P. lanigera* (Simon, 1871) (Figs 22C, F, 23H, 24B, 25E), *P. nebrodensis* Alicata & Cantarella, 2000 (Figs 25H), *P. obsoleta* (Simon, 1868) (Figs 22C, F, 23C-D, 24C, 25C), *P. pascualis* (O. Pickard-Cambridge, 1872) (Fig. 25D), *P. perdifumo* van Helsdingen, 2015 (Figs 25I-K, N-P), *P. talassica* (Logunov, 1997) - comb. n., (Fig. 25F), *P. vafra* (Blackwall, 1867) (Figs 22C, F, 23E-F, 24D, 25G, L-M). 9 species.Catalogue of *Pseudeuophrys* (as *Euophrys*) specimens kept in major collection of the world is given by Prószyński (1971: 404-408).**Distribution.** Palaearctic Region. The genus *Pseudeuophrys* contains 9 recognizable species.**Species deserving some comments*****Pseudeuophrys talassica* (Logunov, 1997) (comb. n.)***Pseudeuophrys talassica* (Logunov, 1997) - embolar region and a shape of bulbus, as well as dorsal pattern differs significantly from that in *Euophrys*, resembling closely *Pseudeuophrys* (Figs 25F with 25E), therefore it seems reasonable to change that placement. That conclusion will be confirmed when macrophotographs of live male become available, and when internal structure of epigyne will be known, after collecting of matching female.**Therefore:***Euophrys talassica* Logunov, 1997 = *Pseudeuophrys talassica* (Logunov, 1997) (comb. n.) (compare Figs 25F with 25E).

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A *Pseudeuophrys erratica*



©Photo M. Schäfer **B**



C *Pseudeuophrys obsolete*



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D *Pseudeuophrys obsolete*



E *Pseudeuophrys vafra*



F *Pseudeuophrys vafra*



©Photo M. Schäfer



E1 *vafra*



H *Pseudeuophrys lanigera*

Figure 23. Habitus and other diagnostic characters of diversity in males of *Pseudeuophrys*. **A-B** - *Pseudeuophrys erratica*, **C-D** - *Pseudeuophrys obsolete*, **E-F** - *Pseudeuophrys vafra*, **H** *Pseudeuophrys lanigera*.

SOURCES: **A**, **B**, **C**, **F** - ©Photo by Michael Schäfer <https://kleinesganzgross.de/gallery.php>., **D**, **E**, **H** - ©Photo by Jørgen Lissner. All ©copyrights are retained by the original authors and copyright holders, used by their courtesy.

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A *Pseudeuophrys erratica* female

©Photo M. Schäfer



A1 *Pseudeuophrys erratica*

B1 *lanigera* female



B *Pseudeuophrys lanigera* female

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C *Pseudeuophrys obsoleta* female

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D *Pseudeuophrys vafra* female

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D1 *Pseudeuophrys vafra*

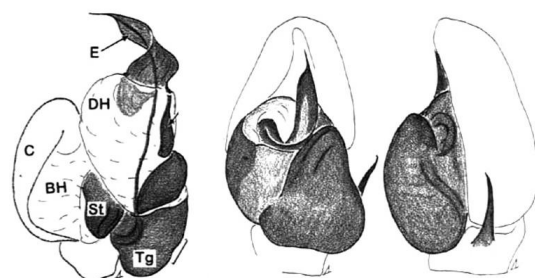


D1 *Pseudeuophrys vafra*

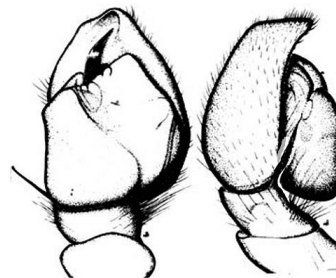
Figure 24. Habitus and other diagnostic characters of diversity in females of *Pseudeuophrys*. **A** - *Pseudeuophrys erratica*, **B** - *Pseudeuophrys lanigera*, **C** - *Pseudeuophrys obsoleta*, **D** - *Pseudeuophrys vafra*.

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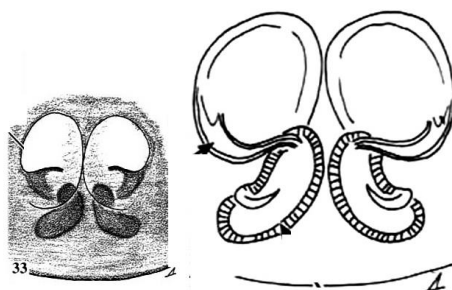
Species diversity in *Pseudeuophrys*



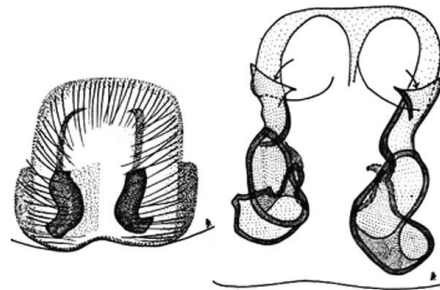
A *Pseudeuophrys erratica*



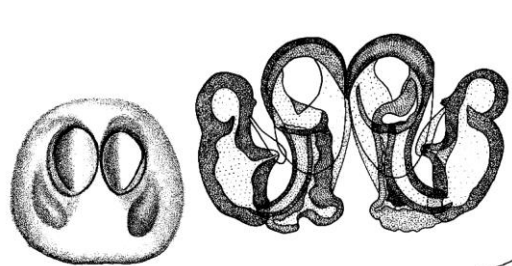
B *Pseudeuophrys iwatensis*



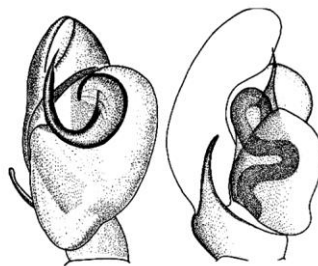
A1 *Pseudeuophrys erratica*



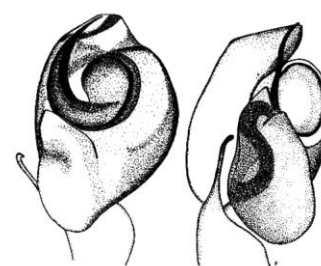
B1 *P. iwatensis*



C *P. obsoleta*



C *P. obsoleta*



D *P. pascualis*

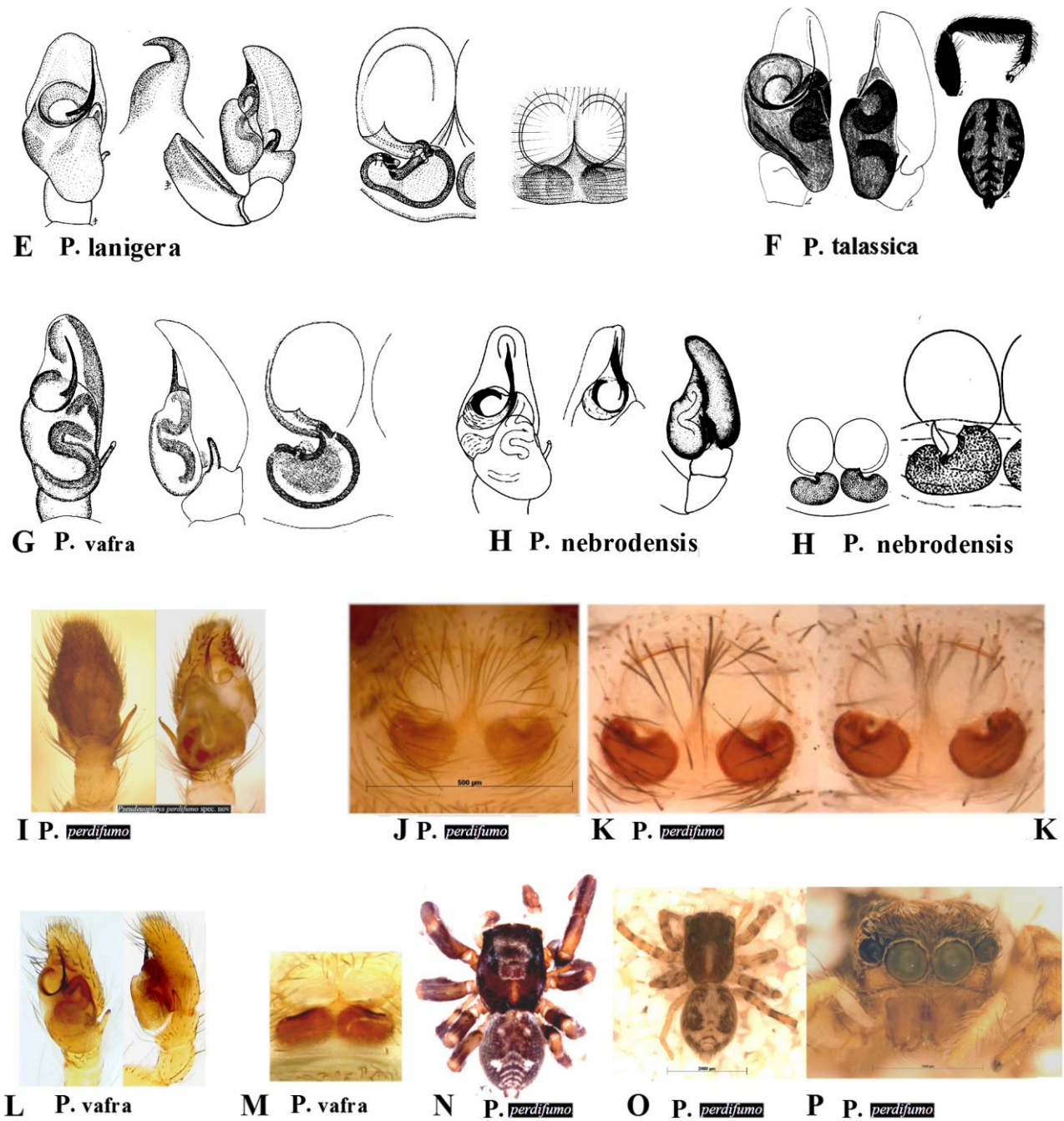


Figure 25. Diagnostic characters diversity in *Pseudeuophrys*. **A-A1** - *Pseudeuophrys erratica*, **B-B1** - *Pseudeuophrys iwatensis*, **C** - *Pseudeuophrys obsoleta*, **D** - *Pseudeuophrys pascualis*, **E** - *Pseudeuophrys lanigera*, **F** - *Pseudeuophrys talassica* (Logunov, 1997) - comb. n., **G, L-M** - *Pseudeuophrys vafra*, **H** - *Pseudeuophrys nebrodensis*, **I-K, N-P** - *Pseudeuophrys perdifumo*.

SOURCES: A -A1, F -Logunov (1997). *Bulletin of the British Arachnological Society* 10: 348, f. 23-26, , B -B1, C-E , G - J. Prószyński., H - Alicata P., Cantarella T. 2000. *Mem. Soc. entomol. ital.* 78 (2): 491-492, f 1-6., I-K, N-P - ©P. J. van Helsdingen (2015) *Nieuwsbrief SPINED* 35: 11-13- , L -M -- ©Photo J. Lissner. All ©copyrights are retained by the original authors and copyright holders, used by their courtesy.

Gen. *Talavera* Peckham & Peckham, 1909

Figures 26-29

Type species. *Icius minutus* Banks, 1895 [= *Talavera minuta* (Banks, 1895)].

Documentation studied. Literature data, especially diagnostic drawings, and macrophotographs, preliminarily collected in Prószyński (2016a) - <http://www.peckhamia.com/salticidae/q10-Tala.html>), complemented by the newest data.

Diagnosis. Resembling *Euophrys* (see above), from which differs by not coiled embolus (Figs 22C, 27-29). Spermathecae ball shaped, with extremely thin, thread like copulatory ducts running anterior-ward (Figs 27-29). Body squat (Fig. 26) and very small (about 2-3 mm), color pattern uniform with spaced and thin light scales sitting on uniform dark tegument.

Remarks. Technically *Talavera* disagrees with the most important, cornerstone character of the group of genera EUOPHRYINES - that is have no coiled embolus, instead it has almost straight embolus (often strongly reduced in size - see series of SEM photographs by Logunov and Kronestedt, 2003, shown here at Figs 27, 28, 29). Because other diagnostic characters agree (ball shaped spermathecae with delicate ducts, membranous "windows" in epigyne) and embolus is sitting atop inflatable haematodocha (Figs 29N-P) *Talavera* is considered atypical EUOPHRYINES with modified embolus.

Description. Very small spiders (about 2-3 mm) of average body shape, shown on Fig. 26, palps and internal structure of epigyne shown on Figs 27-29. Color pattern is unique and consist of uniform, spaced small scales distributed uniformly over dark body (Fig. 26).

Remarks. Whereabouts of specimens of *Talavera* specimens kept in major collection of the world is given by Prószyński (1971: 404-408) (labeled as *Euophrys*)¹⁰.

Distribution. Palaearctic Region, with single species in North America.

Composition. Type species: *Talavera minuta* (Banks, 1895) (Figs 22B, E, 26D-E, 27A-E). Other following species included: *T. aequipes* (O. Pickard-Cambridge, 1871) (Figs 3-K, 22B, 27F-H), *T. aperta* (Miller, 1971) (Figs 22B, E, 28C-E), *T. esyunini* Logunov, 1992 (Figs 29E-F), *T. ikedai* Logunov & Kronestedt, 2003 (Figs 29H-I), *T. inopinata* Wunderlich, 1993 (Fig. 27M-P), *T. krocha* Logunov & Kronestedt, 2003 (Fig. 28I-J), *T. logunovi* Kovblyuk & Kastrygina, 2015 (Figs 28F-H), *T. milleri* (Brignoli, 1983). (Figs 229K-L), *T. monticola* (Kulczyński, 1884) (Figs 29A-D), *T. parvistyla* Logunov & Kronestedt, 2003 (Figs 22B, 28J-M), *T. thorelli* (Kulczyński, 1891) (Figs 22B, E, 28A-B), *T. trivittata* (Schenkel, 1963), (Figs 27I-L), *T. tuvensis* Logunov & Kronestedt, 2003 (Figs 29J). 14 species.



A *Talavera aequipes* **male**



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¹⁰ "*Talavera*" *petrensis* (C. L. Koch, 1837) is already transferred to the genus *Euophrys* (see above Figs 3A-E, 4H, 6A, 7E).



B *Talavera aequipes* female

©Photo Rudolf Macek



C *Talavera aperta*

©Photo M. Schäfer



D *Talavera minuta* male ©Photo J. Rosenfeld

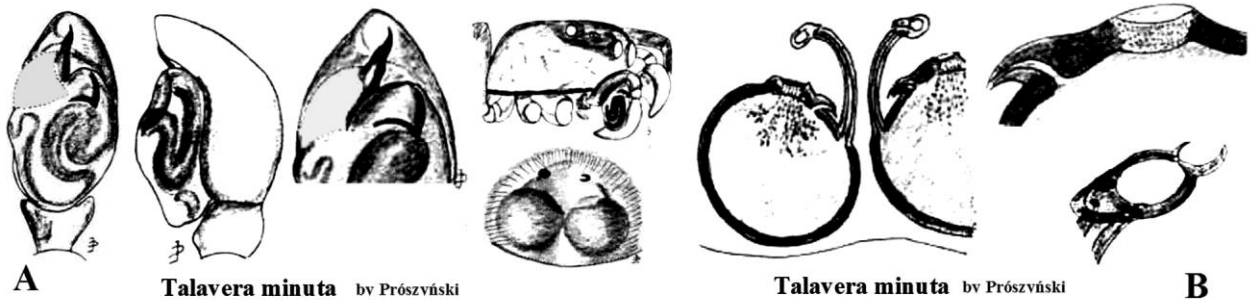
E female

©Photo by D. Walton

Figure 26. Habitus diversity in *Talavera*. **A** -*Talavera aequipes* - male, **B** - *Talavera aequipes* - female, **C** - *Talavera aperta*, **D** - *Talavera minuta* - male, **E** - *Talavera minuta* - female.

SOURCES: A, C -- ©Photo by M. Schäfer <https://kleinesganzgross.de/gallery.php>, B - ©Photo by Rudolf Macek <https://arachnology.cz/druh/talavera-aequipes-686.html?jazyk=en>, D - ©Photo by John Rosenfeld <https://bugguide.net/user/view/64126>, E - ©Photo by D. Walton, Natural History Services <http://www.tkwalton.com>. All ©copyrights are retained by the original authors and copyright holders, used by their courtesy.

Species diversity in *Talavera* - 1



A

Talavera minuta by Prószyński

Talavera minuta by Prószyński

B

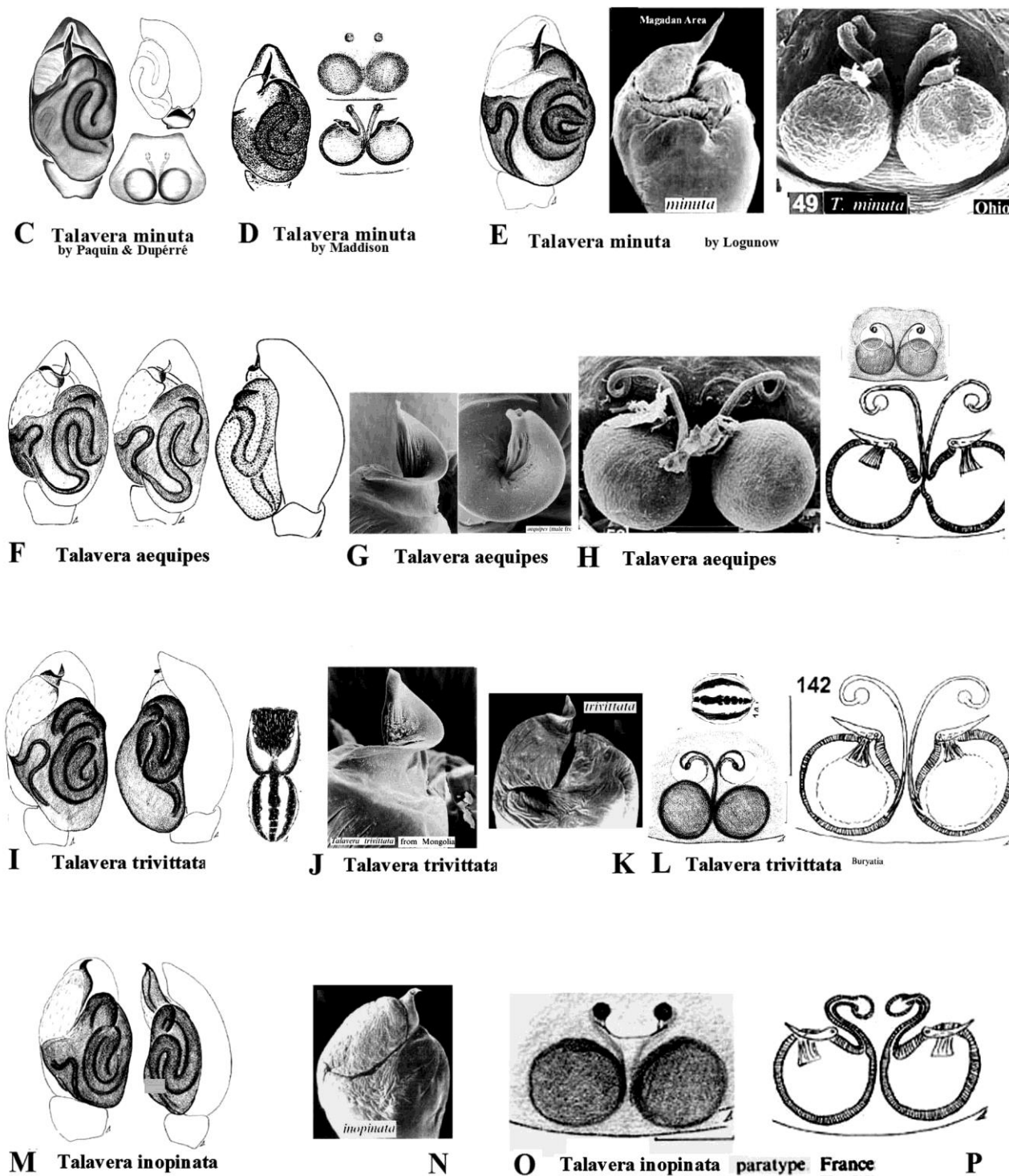


Figure 27. Diagnostic characters diversity in *Talavera* (part I). **A-E** - *Talavera minuta*, **F-H** - *Talavera aequipes*, **I-L** - *Talavera trivittata*, **M-P** - *Talavera inopinata*.

SOURCES: **A-B** - Prószyński (1990p). Private preprint. **C** - Paquin P., Duperré N. 2003. Faberies, Suppl. 11: 203, f 2270-2272. , **D** - drawings by W. P. Maddison., **E** - Logunov Kronstedt 2003. J. Natural History, 2003, **F-P** - Logunov & Kronstedt 2003. J. Natural History (2003). All copyrights are retained by the original authors and copyright holders, used by their courtesy.

Species diversity in *Talavera* - 2

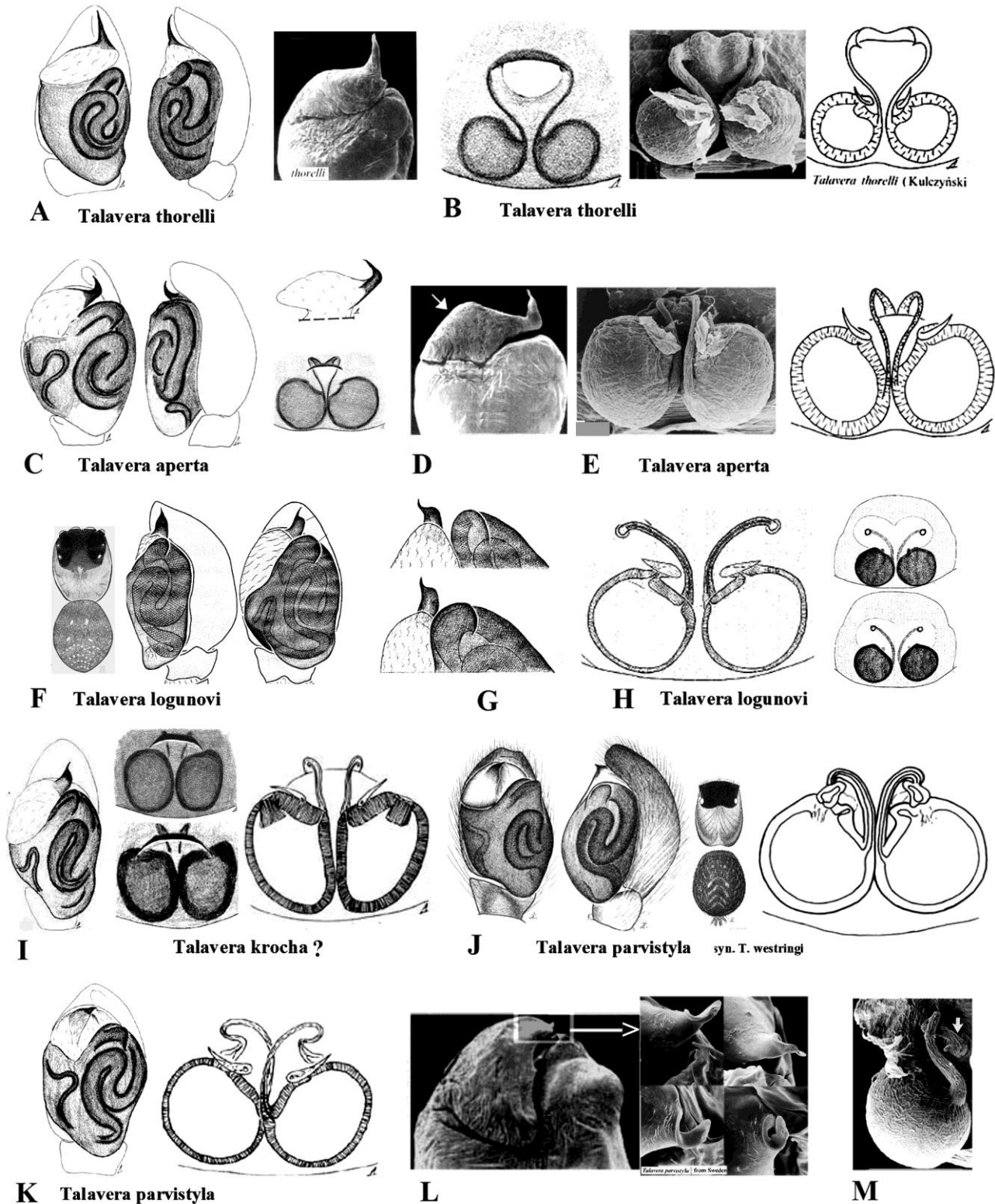


Figure 28. Diagnostic characters diversity in *Talavera* (part II). **A-B** - *Talavera thorelli*, **C-E** - *Talavera aperta*, **F-H** - *Talavera logunovi*, **I** -- *Talavera krocha* (male?) , **J-M** - *Talavera parvistyla* (**J** - same by Žabka, **K-M** - same by Logunov et al., **L-M** - deeper analysis by SEM, **M** - fine details of embolar region, **M** - spermatheca - dorsal view).

SOURCES: **A-E, I, J** - Logunov & Kronstedt (2003). J. Natural History, 2003, **F-H** - Kovblyuk & Kastrygina (2015) *Arthropoda Selecta* 24(2): 201-205 , **I, J** - Logunov & Kronstedt (2003), Žabka (1997), **K-M** - Logunov & Kronstedt (2003). J. Natural History, 2003. All ©copyrights are retained by the original authors and copyright holders, used by their courtesy.

Species diversity in *Talavera* - 3

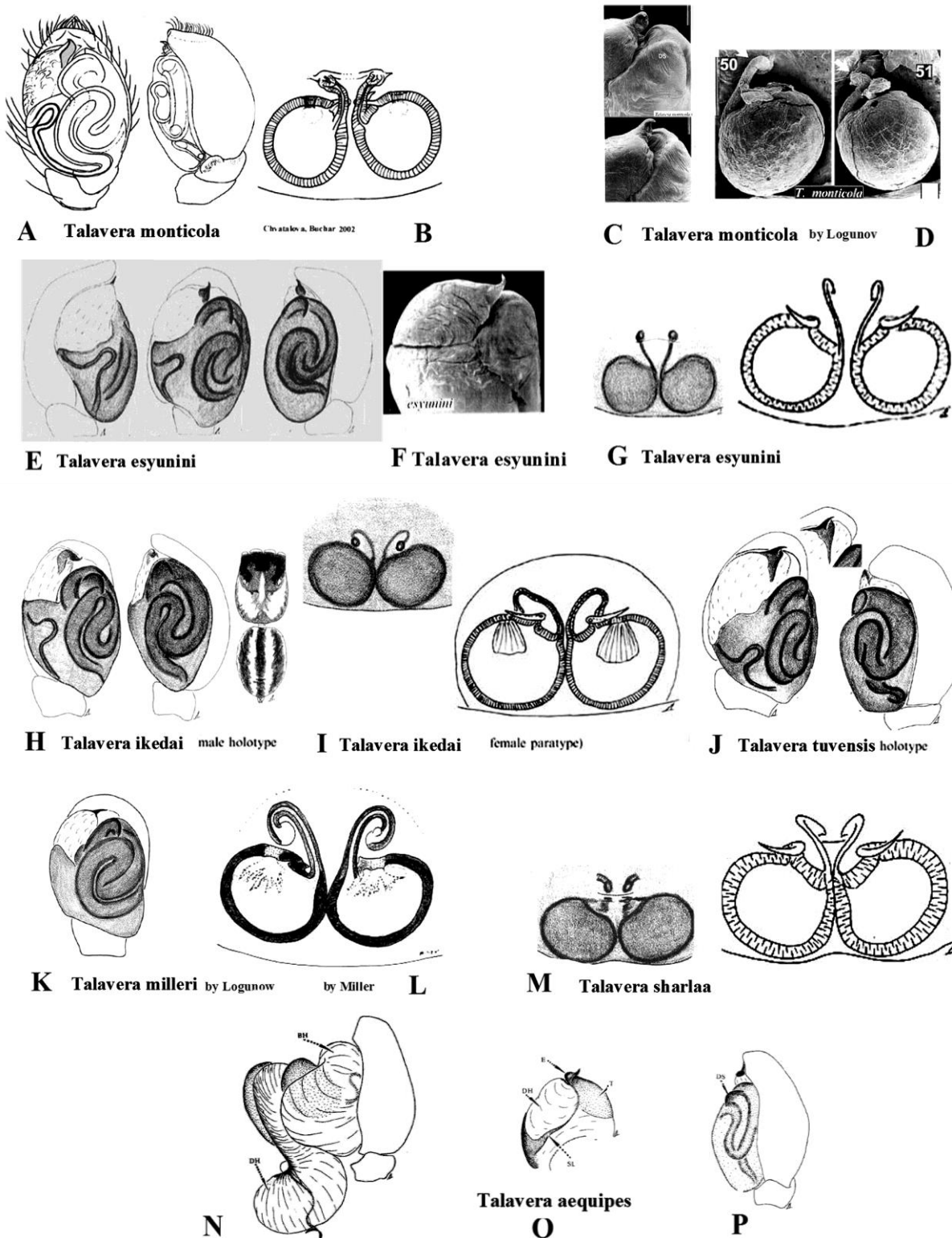


Figure 29. Diagnostic characters diversity in *Talavera* (part III). **A-D** - *Talavera monticola*, **E-G** - *Talavera esyunini*, **H-I** - *Talavera ikedai*, **J** - *Talavera tuvensis*, **K-L** - *Talavera milleri*, **M** - *Talavera sharlaa*, **N-P** - palp structure in *Talavera aequipes* (**N** - expanded palp, **O** - tip of distal haematodocha, **P** - translucent spermophor loop - lateral view [DH - distal haematodocha, BS - basal haematodocha, E - embolus]).

SOURCES: **A-B** - Chvátalová & Buchar (2002). *Acta Societatis Zoologicae Bohemicae* 66: 3-11, **C-P** - Logunov & Kronstedt (2003). *J. Natural History*, 2003. All copyrights are retained by the original authors and copyright holders, used by their courtesy.

Appendix - overdue nomenclatorial correction

***Ballognatha typica* Caporiacco, 1935**
 (as well as gen. *Ballognatha* Caporiacco, 1935
 and group Ballognatheae (= Ballognathinae))
 Figures 22-23

Ballognatha typica Caporiacco, 1935: 215, pl. 6, f. 1 (Dj).

Material studied. *Ballognatha typica* Caporiacco, 1935 - type specimen, coll. Museo Civico di Storia Naturale, Milano, Italy.

Comments: Described on single immature specimen, in poor state of preservation, devoid of any significant diagnostic character. Original classification wrong because the only tangible structure - cheliceral dentition (Fig. 20 A) is rather "fissidentati" than "pluridentati" type, besides taxonomic significance of bicuspid cheliceral tooth lost diagnostic value originally assigned to it by Simon (1901-1903). The original description (see below, Fig. 31) does not contain any clue to eventual placement of the genus, and suggested therein partial similarities with genera *Ballus*, *Euophrys*, *Pseudicius*, *Sobasina* and *Thiodina* cannot be taken seriously. Quality of many other diagnostic drawings by di Caporiacco (Figs 17G1, II, N, O, Q) do not increase confidence in his identifications.

After study of the type specimen I am positive that *Ballognatha typica* Caporiacco, 1935 is a *nomen dubium*. Since genus *Ballognatha* Caporiacco, 1935 was described as monotypic and the group Ballognatheae (= Ballognathine) Caporiacco, 1935 contained single genus anchored on species being *nomen dubium*, all these names should be considered *nomina dubia*.

Therefore:

Ballognatha typica Caporiacco, 1935 - *nomen dubium*,
Ballognatha Caporiacco, 1935 - *nomen dubium*,
 Ballognatheae (= Ballognathine) Caporiacco, 1935 - *nomen dubium*.

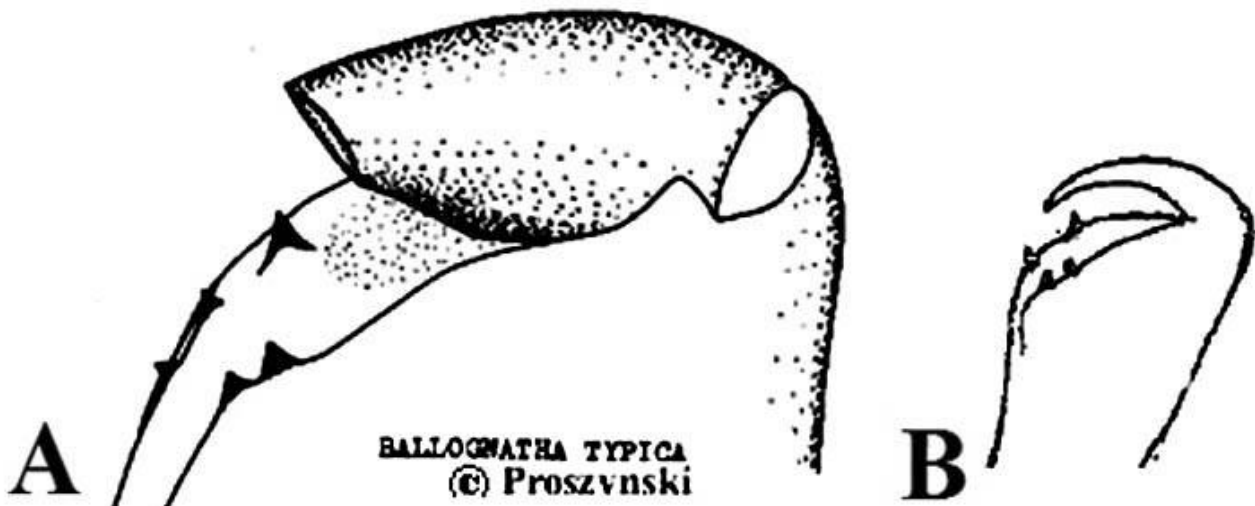


Figure 30. A "Ballus-like chelicera" of the *Ballognatha typica* Caporiacco, 1935 - the only tangible structure of the immature type specimen.

SOURCES: A - Prószyński, unpublished, B - Caporiacco (1935) *Memorie della Società Entomologica Italiana*, 13: 214- 215, pl. 6, f. 1.

Credo necessario istituire questo nuovo gruppo per il nuovo genere *Ballognatha*, che non rientra in nessuno dei gruppi finora a me noti; i caratteri del gruppo son quelli dell'unico genere *Ballognatha*.

Gen. *Ballognatha* gen. novum.

Cephaloth. sat *altus*, parte cephalica parte thoracica valde brevior, declivis; sulcus thoracicus transversus. Oculi antichi in serie recta; quadrangulus ocularis multo latior q. amplior, postice angustior. Clypeus angustissimus. Chelae subtus dentibus binis parvis apud partem sulci distalem sitis; desuper dentibus binis paullo maioribus, a se remotioribus armatae. Pedes, maxime postici, aculeis multis validis armati.

Facie genus hoc Pseudicio et Evophridi est simile; ab iis dentibus, binis marginis inferioris sulci chelarum differt; pedibus posticis valde

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215
aculeatis a generibus Ballo similibus distinguitur; pilis bulbosis carentibus a Thiodineis; forma cephalothoracis parallela, apud oculos 3ae seriei non dilatata, ab Haterio; corpore non myrmicaeformi a Sobasineis; sulco chelarum subtus tantum dentibus binis armato ab aliis generibus Salticidarum Pluridentatarum differt.

130) *Ballognatha typica* sp. nova.

♂ iuv. Corporis totius long. mm. 4.1; cephaloth. mm. 2; abdom. mm. 2.2; pedum 1i paris mm. 4.1; 2i mm. 3.75; 3i mm. 3.6; 4i mm. 4.75; palporum mm. 1.5.

Cephaloth. sat *elongatus et altus*, rufus, area oculari nigra. Oculi

antici in serie recta: mediorum diametrum saltem dimidio maius q. diametrum oculorum lateraliū: oculi inter se fere conniventes. Oculi 3ae seriei lateraliū anticis aequales, inter se spatio eorum diametro quadruplo, a lateraliū anticis spatio eorum diametro paullo plus. q. duplo remoti; oculi 2ae seriei longe ante medium siti. Area ocularis saltem tertia parte amplior q. longior, antice evidenter latior, parte thoracica saltem dimidio brevior. Area ocularis declivis, ita ut pars altissima cephalothoracis apud oculos 3ae seriei sit sita. Latera cephalothoracis oculos 3ae seriei evidenter superantia. Pars thoracica sulco transverso sat visibili. Cilia alba. Clypeus angustissimus. Chelicera rufa, sat longa, ungue brevi, curva, sat robusta, sulco desuper et subtus dentibus binis minimis, desuper in media parte marginis sitis et inter se non valde appropinquatis, subtus in parte distali marginis sitis, et inter se valde appropinquatis. Sternum brunneum, ovale, angustum, antice attenuatum. Pedes sat longi et graciles, femoribus cunctis et tibiis anticis brunneis; tibiis parium posteriorum et metatarsis et tarsis omnibus fulvis. Femur 1i et 2i paris aculeis 3 sat longis superioribus; femur 3i paris serie superiore 4 aculeorum; femur 4i paris serie superiore posteriore 5 aculeorum et aculeo subapicali superiore antico; aculei omnes sat longi et robusti. Patellae utrinque aculeo armatae. Tibiae 1i et 2i paris duabus seriebus inferioribus aculeorum 3; metatarsi 1i et 2i paris duabus seriebus inferioribus binorum aculeorum. Tibiae 3i et 4i pari serie superiore media binorum aculeorum et utrinque serie laterali binorum aculeorum, et serie inferiore, quae 3^o pari ac. binis, 4^o autem ac. 3 constat. Metatarsi 3i et 4i paris utrinque serie laterali superiore binorum aculeorum, serie laterali 3 aculeorum et serie laterali inferiore binorum aculeorum. Pedes fere glabri, pilis paucis. Palpi (non adhuc adulti) breves, nigri, tibia et patella aequae longis, tibia, apicem versus, valde

Figure 31. Facsimile of description of genus *Ballognatha* and species *Ballognatha typica* Caporiano, 1935. SOURCE: Caporiano, 1935 *Memorie della Società Entomologica Italiana*, Genova 13: 214-215.

Euophrys nearctica Kaston, 1938

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JUMPING SPIDERS OF THE UNITED STATES AND CANADA: CHANGES IN THE KEY AND LIST (4). G. B. Edwards
NEW SYNONYMIES and NEW COMBINATIONS are based on examination of types.

30. *Euophrys nearctica* Kaston 1938 = *Euophrys monadnock* Emerton 1891. NEW SYNONYMY. Delete 30.

Figure 32. Facsimile [darkened] of complete documentation to synonymy of *Euophrys monadnock* with *E. nearctica*, dated 1980, accepted by World Spider Catalog (ver. 19.0, accessed on April 26th, 2018) without comments. See diagnostic drawings of both species (Figs 12B-C and E). SOURCE: Edwards (1980) *Peckhamia* 2(1): 12

***Euophrys nearctica* n. sp.** (Figures 25 and 26.)

Female. Total length 3.6 mm. Carapace 1.7 mm. long, widest between 2nd and 3rd coxae, where it is 1.22 mm., and with a maximum height of .9 mm at dorsal eyes. Pars cephalica black and shining. Pars thoracica brown suffused with black. Thoracic groove imperceptible. There are a few hairs scattered about on sides and dorsum, longer around front row of eyes.

Ocular quadrangle slightly less than half the length of carapace. First row of eyes 1.11 mm. long, slightly recurved. Ratio of medians to laterals 25:15, practically contiguous. Second row midway between first and third. Third row 1.14 mm. long, the eyes almost as large as anterior laterals (13/15).

Height of clypeus 8/25 diameter of AME. Chelicerae vertical, grayish except near fang grooves where they are brown. Fang long and evenly curved. Promargin with two teeth, of which the distal is the larger. Retromargin with one tooth as large as the distal on promargin. Maxillary endites somewhat indented on lateral face, slightly wider distally than at base, and with a thick scopula. Labium broader than long (20:15) extending not quite to middle of maxillae. Sternum oval, longer than wide (52:40), broadly truncate in front, with first coxae much farther apart than the width of labium. Like the labium and endites in color, brown suffused with grey. Hind coxae almost contiguous. All coxae yellow.

Legs 4312. Legs II, III and IV mostly yellow to light brown, somewhat darker above than below, covered with fine black hairs. Leg I not much heavier than the others, but darker brown to black, especially the tibia and metatarsus. Trichobothria on tibiae, metatarsi and tarsi.

	Femur.	Patella + Tibia.	Meta- tarsus.	Tarsus.	Total.
Leg I...	.93	1.11	.41	.39	2.84 mm.
Leg II...	.75	.95	.42	.31	2.43 mm.
Leg III...	.97	1.05	.54	.42	2.98 mm.
Leg IV...	1.19	1.40	.93	.49	4.01 mm.

Tibial index of leg I is 19.7, of leg IV, 14.6.

Spines as follows: Leg I, femur dorsal 1-1-1; tibia ventral 2-2-2; metatarsus ventral 2-2. Leg II same as I, except tibia ventral 0-1-2. Leg III, femur dorsal 1-1-1, prolateral 1 distal; tibia dorsal 2, ventral 0-1-1, retrolateral 1; metatarsus dorsal 2-2, ventral 2-2. Leg IV, femur dorsal 1-1-1, retrolateral 1 distal; tibia ventral 0-1p-2, prolateral 0-1-1, retrolateral 1-1-1; metatarsus ventral 1p-2, prolateral 2-2, retrolateral 1-1-2.

Abdomen oval, ground color yellow to brown like the legs, with a pattern of gray as shown in figure 25. Venter with three broad gray longitudinal bands irregularly edged. Epigynum, figure 24.

This species resembles *monadnock* Emerton, but can be distinguished from the latter by its smaller size, somewhat thinner legs, different abdominal pattern, and in the possession of a retromarginal cheliceral tooth. Moreover, upon comparing the epigyna one finds that in *monadnock* the ducts run from the anterior border posteriad to the receptacula, while in *nearctica* they run anteriad, as figured.

If one uses the key to genera in the Peckhams' revision of the Attidae of North America (1909, Trans. Wisconsin Acad. Sci., XVI), it will be found that *nearctica* fits almost entirely the characters given for *Sidusa*, p. 378, as *Euophrys* is taken out on the basis of the retromargin of the chelicera lacking a tooth. This of course is misleading, for the numerous European species of this genus, as described for example in the works of Simon, Roewer, and Dahl, all have the single conical tooth. Moreover, *Sidusa* differs from

189

Euophrys in a number of important characters not mentioned by the Peckhams in their key.

Holotype female collected at Old Orchard, Maine, by D. S. Riggs, Aug. 26, 1937.

Figure 33. Facsimile of description of *Euophrys nearctica* Kaston, 1938.

SOURCE: Kaston, B. J. (1938c). *Bulletin of the Brooklyn Entomological Society* 33: 187, pl. 9, f. 25-26

References**NOTICE**

Permissions of illustrations used in this paper are displayed in the Internet "Monograph of Salticidae (Araneae) of the World 1995-2016" Prószyński (2016a, b) <http://www.peckhamia.com/salticidae/permission.php>. Taxonomic references copied from the World Spider Catalog ver. 19.0. By courtesy.

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