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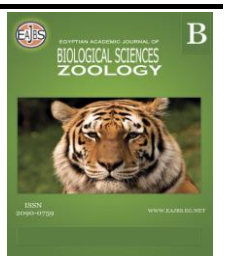

Illustrated Taxonomic Key of Terrestrial Spiders (Arachnida: Araneae) Inhabiting Assiut Governorate, Upper Egypt

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ABSTRACT

Spiders have strong effect on the density of insect populations and have been shown to limit insect pests in the agricultural environment. On reviewing literature that focused on the Egyptian spider's fauna, it could be concluded that the correct identification of many spider species is considered problematic due to complex variations in morphology and lack of systematic studies. Thus, the present study was aimed to design a key to facilitate identification of true spiders using their morphological characteristics and make a catalogue for different families and species inhabiting Assiut governorate; the central part of Upper Egypt (27º14' N and 31º11' E) and lies within the arid belt of North Africa. Samples of spiders were collected monthly during a period of one year (from December 2015 till November 2016) from six different sites covering Assiut governorate using hand picking method. Survey results revealed the occurrence of 3457 specimens belonging to 22 families that included 42 genera and 47 species. Out of these species, 40 species are considered as new locality records at Assiut Governorate.

INTRODUCTION

Spiders (order: Araneae) are air-breathing arthropods that have eight legs and chelicerae with fangs that inject venom. They are the largest order of (Class: Arachnida) and ranking seventh in global diversity after insect orders (Sebastian and Peter, 2009 and Mahalakshmi and Jeyaparvathi, 2014).

The evolution of spiders has been going on for at least 380 million years since the first true spiders (thin-waisted arachnids) evolved from crab-like chelicerate ancestors **(**Garrison *et al.*, 2016).Taxonomists recognized more than 48,300 spider species embracing 119 families described so far and many thousands of species still awaiting discovery and description (World Spider Catalog, 2019). In Egypt, there are 41 Families belong to 204 genera and 405 species (El Hennawy, 2017).

Spiders can be found in nearly all habitats and lifestyles; they can be found thriving in parks, blanketing bushes along city streets, in arid regions and wetlands, in lowlands and mountains, in cold tundra, in hot equatorial regions and everywhere. They are mostly terrestrial but include one aquatic species and a few inhabitants of tidal zones, in addition to

several species that visit water to hunt (Souza and Martins, 2005; El Hennawy, 2010 and Cardoso *et al*., 2011).

Anatomically, spiders differ from other arthropods in that they are easily characterized by two main body parts which are joined by a narrow stalk called the pedicel and unlike insects, they don't have antennae or wings. The front part of the body, called the cephalothorax (or prosoma), enclosed within a relatively hard (dorsal) shell of armor called the carapace and (ventral) shell called the sternum. The hind part called the abdomen (or opisthosoma) is soft and capable of expansion during feeding or egg development. Cephalothorax contains the brain, poison glands, stomach, eyes, chelicerae, mouthparts, legs and palps, and the abdomen contains spinnerets, genitalia, lungs and respiratory tracheae (Levi and Levi, 1990; Roberts, 1995; Dippenaar-Schoeman and Jocqué, 1997; Foelix, 2011 and Sen *et al.*, 2015).

knowledge of spider species composition and distribution in eastern Mediterranean ecosystems as well as in Egypt is very limited and reviewing literature that focused on the Egyptian spider fauna "especially in Upper Egypt" still scarce making taxonomical studies in this region very interesting.

MATERIALS AND METHODS

Spider samples were collected by hand pick up for one year of studying (from December 2015 to November 2016) from six different sites covering Assiut governorate (Fig.1). The examination was carried out with the aid of trinocular stereomicroscope. The collected specimens were individually preserved and counted according to (Quasin and Uniyal, 2010). The identification of specimens was carried out on the light of the available taxonomical knowledge. The collected specimens were identified to the species level whenever possible and others on genus or family level. Identification of the specimens was done by the help of the following keys, papers, catalogues, description and literature; Petrunkevitch (1939); Levi and Levi (1968); Kaston (1978); Tikader (1987); Coddington and Levi (1991); Roth (1993); Barrion and Litsinger (1995); Dippenaar_Schoeman and Jocque (1997) Levi *et al*. (2002); Sewlal and Cutler (2003); Ubick *et al*. (2005); Joccqué and Dippenaar_Schoeman (2006) and El Hennawy (2006 and 2010) and Hussien (2015). Finally, species identification was confirmed by Mr. H. K. El-Hennawy the experts in spider identification in Egypt, Middle East, and North Africa.

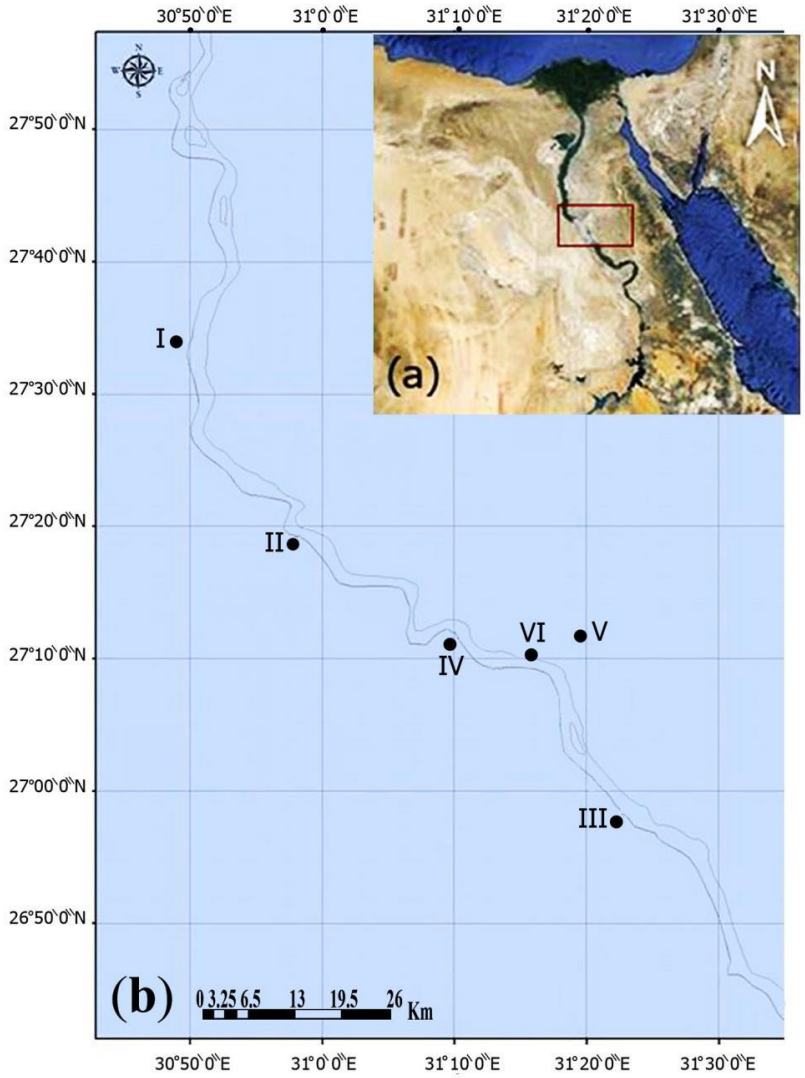


Fig (1): (a) Map of Egypt showing the location of Assiut governorate **(b)** Assiut governorate map showing sites of collection **I:** Dirot city, **II:** Manfalout city**, III:** Sidfa city, **IV:**The Ornamental farm of Assiut University**, V:** El-Wadi El-Assiuty, **VI:** El-Wasta village

RESULTS

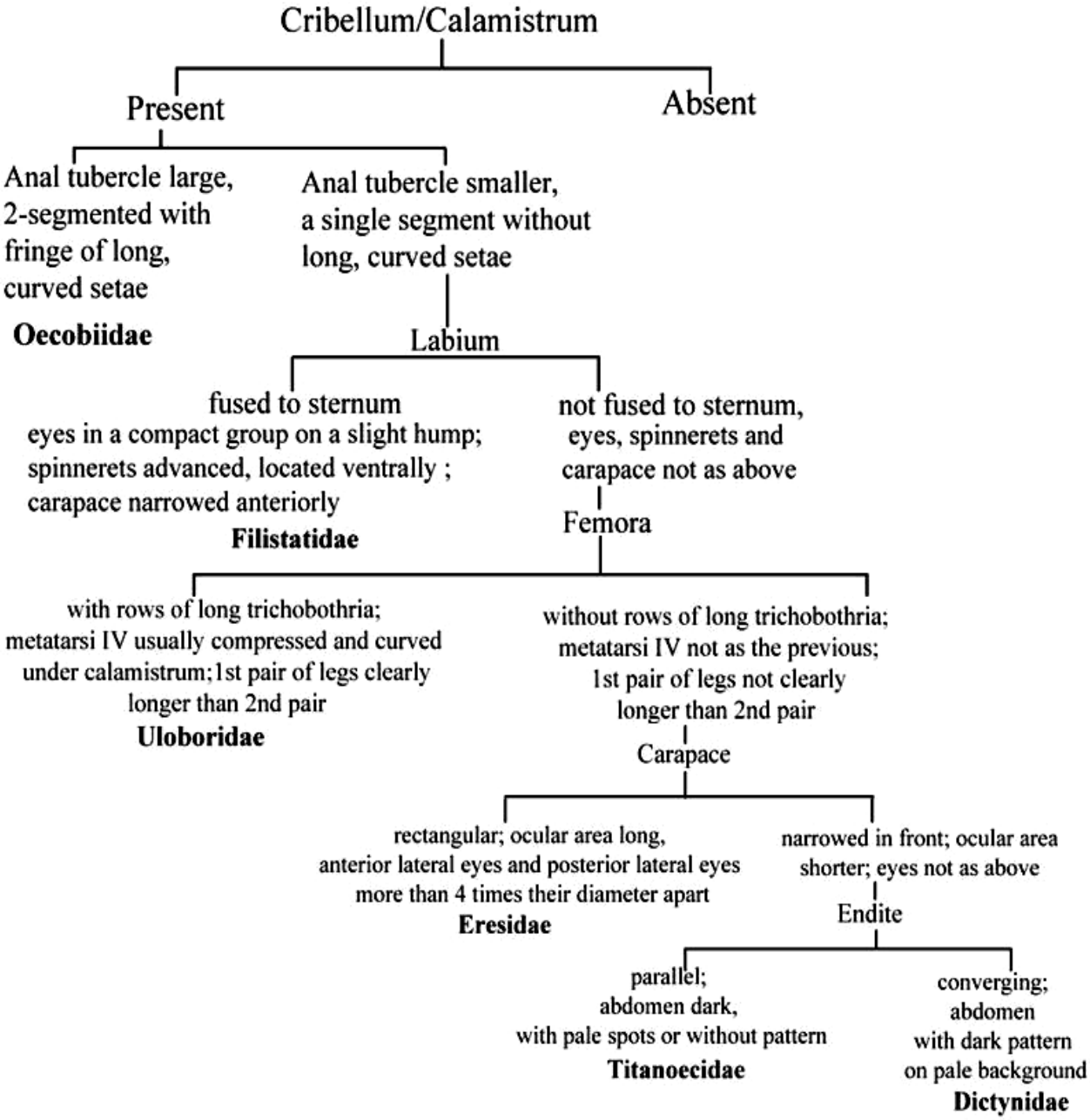
Results of the present study surveyed a total number of 3457 specimens which could be assigned in 42 genera and 47 species that fall in 22 families belong to order: Araneida. The 22 families recorded were: Agelenidae, Araneidae, Cheiracanthiidae, Dictynidae, Dysderidae, Eresidae, Filistatidae, Gnaphosidae, Linyphiidae, Liocranidae, Lycosidae, Oecobiidae, Philodromidae, Pholcidae, Pisauridae, Salticidae, Sicariidae, Sparassidae, Theridiidae, Thomisidae, Titanoecidae and Uloboridae (Table, 1). Assiut governorate minimally contains 54% of the families, 21% of the genera and 12% of spider species found in Egypt (El-Hennawy, 2017). Among these collected specimens, only 40 of 42 genera and 34 of 47 species were identified. Out of these species; 40 species are considered as new records in Assiut Governorate. Also, two unknown juvenile genera belong to family (Pisauridae and Dictynidae) and 10 unidentified species might be considered as new records in Egypt.

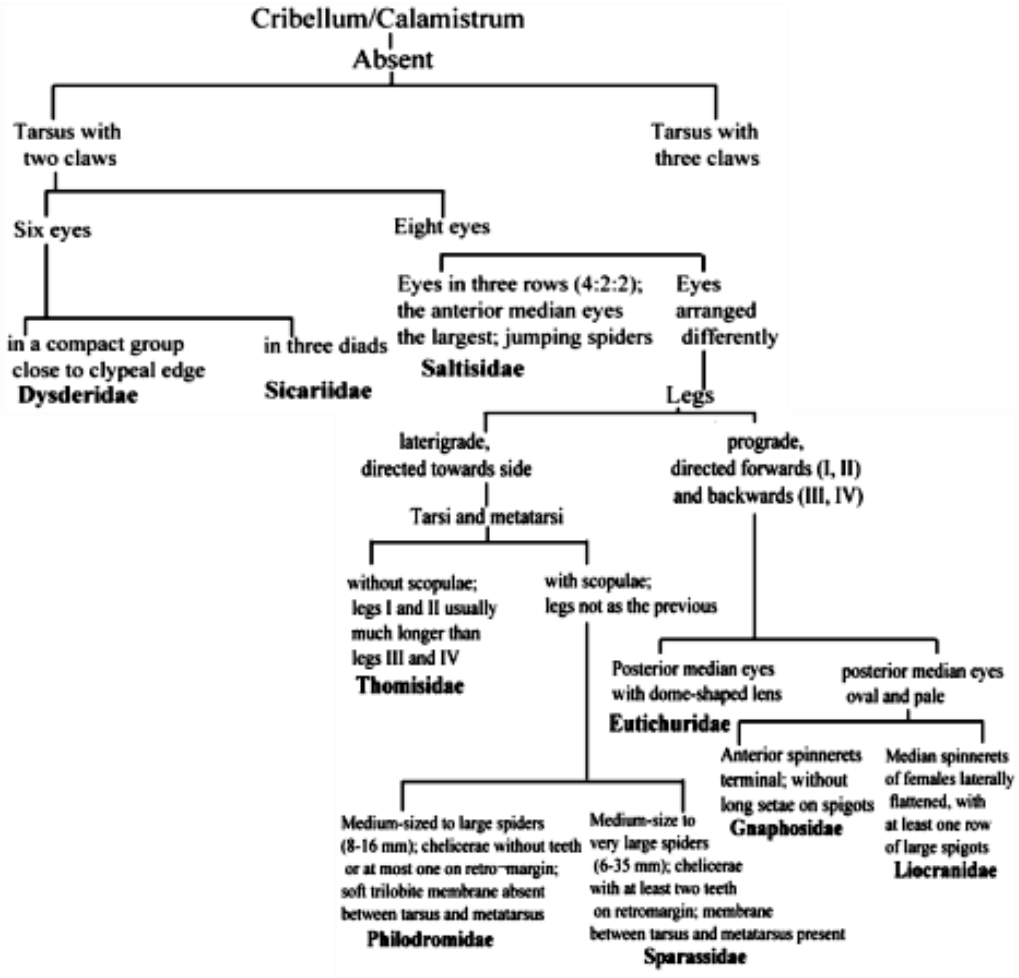
Table (1): The identified species at all sites during the period of investigation

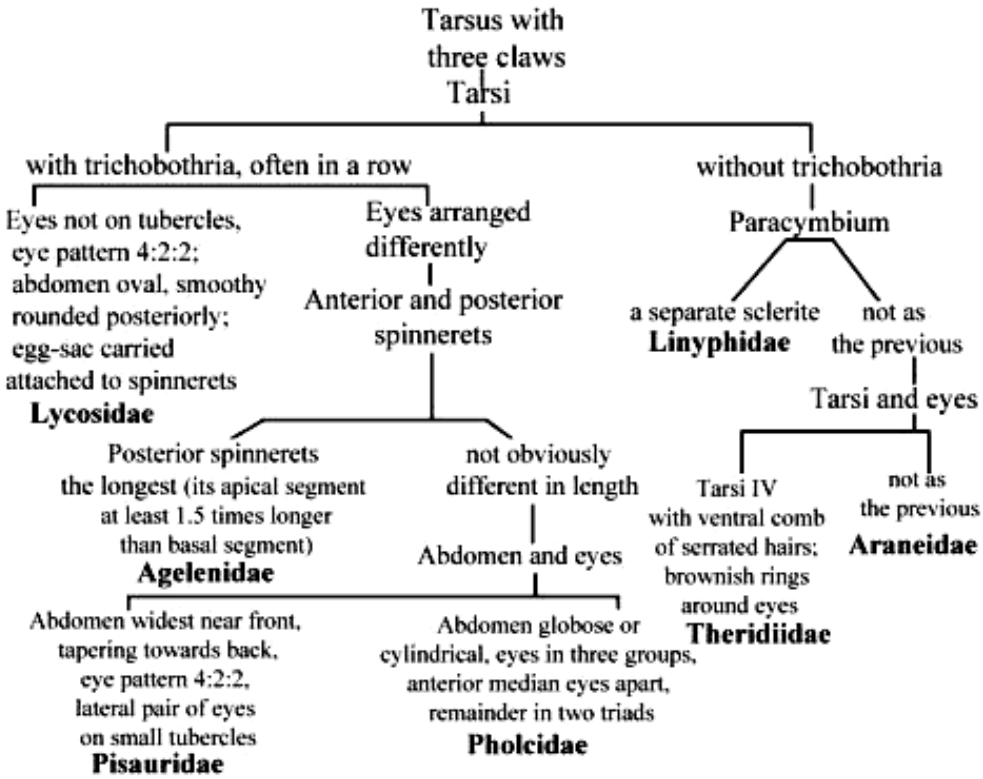
No.	Family	Species	No.	Family	Species
1	**Agelenidae** Koch, 1837	*Lycosoides coarctata*	24	**Oecobiidae** Blackwall, 1862	*Oecobius* sp.
			25		*Uroctea* sp.
2	**Araneidae** Simon, 1895	*Argiope* sp.	26	**Philodromidae** Thorell, 1870	*Philodromus glaucinus*
3		*Cyrtophora citricola*			
4		*Larinia* sp.	27	**Pholcidae** Koch, 1851	*Artema atlanta*
5	**Cheiracanthiidae** Wagner, 1887	*Cheiracanthium siwi*	28		*Nita elsaff*
6	**Dictynidae** Cambridge, 1871	Dictynidae species	29	**Pisauridae** Simon, 1890	Pisauridae species
7	**Dysderidae** Koch, 1837	*Dysdera crocota*	30	**Salticidae** Blackwall, 1841	*Heliophanillus* sp.
			31		*Phlegra* sp.
8	**Eresidae** Koch, 1851	*Stegodyphus dufouri*	32		*Plexippus clemens*
			33		*Plexippus paykulli*
9	**Filistatidae** Ausserer, 1867	*Filistata insidiatrix*	34		*Thyene imperialis*
			35	**Sicariidae** Keyserling, 1880	*Loxosceles rufescens*
10	**Gnaphosidae** Pocock, 1898	*Berlandina venatrix*			
11		*Setaphis subtilis*	36	**Sparassidae** Bertkau, 1872	*Eusparassus walckenaeri*
12		*Synaphosus* sp.	37		*Eusparassus* sp.
13		*Poecilochroa pugnax*	38	**Theridiidae** Sundevall, 1833	*Euryopis sp.*
14		*Trachyzelotes* sp.	39		*Paidiscura dromedaria*
15		*Zelotes lateus*	40		*Steatoda erigoniformis*
16		*Zelotes* sp.	41		*Theridion melanostictum*
17	**Linyphiidae** Blackwall, 1859	*Mermessus denticulatus*	42		*Theridion* sp.
18		*Prinerigone vagans*	43	**Thomisidae** Sundevall, 1833	*Thomisus spinifer*
19		*Sengletus extricatus*	44		*Xysticus tristrami*
20	**Liocranidae** Simon, 1897	*Mesiotelus tenuissimus*	45		*Xysticus* sp.
			46	**Titanoecidae** Lehtinen, 1967	*Nurscia albomaculata*
21	**Lycosidae** Sundevall, 1833	*Hogna ferox*			
22		*Pardosa* sp.	47	**Uloboridae** Thorell, 1869	*Uloborus walckenaerius*
23		*Wadicosa fidelis*			

Total:
22 Families
47genera
47species

KEY TO SPIDER FAMILIES PRESENTED BY THE SURVEY STUDY




Cribellum/Calamistrum
Absent
Tarsus with two claws
Tarsus with three claws
Six eyes
Eight eyes
in a compact group close to clypeal edge
Dysderidae
in three diads
Sicariidae
Eyes in three rows (4:2:2); the anterior median eyes the largest; jumping spiders
Saltisidae
Eyes arranged differently
Legs
laterigrade, directed towards side
prograde, directed forwards (I, II) and backwards (III, IV)
Tarsi and metatarsi
without scopulae; legs I and II usually much longer than legs III and IV
Thomisidae
with scopulae; legs not as the previous
Posterior median eyes with dome-shaped lens
Eutichuridae
posterior median eyes oval and pale
Anterior spinnerets terminal; without long setae on spigots
Gnaphosidae
Median spinnerets of females laterally flattened, with at least one row of large spigots
Liocranidae
Medium-sized to large spiders (8-16 mm); chelicerae without teeth or at most one on retro-margin; soft trilobite membrane absent between tarsus and metatarsus
Philodromidae
Medium-size to very large spiders (6-35 mm); chelicerae with at least two teeth on retromargin; membrane between tarsus and metatarsus present
Sparassidae


Tarsus with three claws
Tarsi
with trichobothria, often in a row
without trichobothria
Eyes not on tubercles, eye pattern 4:2:2; abdomen oval, smoothy rounded posteriorly; egg-sac carried attached to spinnerets
Lycosidae
Eyes arranged differently
Anterior and posterior spinnerets
Paracymbium
a separate sclerite
Linyphidae
not as the previous
Tarsi and eyes
Posterior spinnerets the longest (its apical segment at least 1.5 times longer than basal segment)
Agelenidae
not obviously different in length
Abdomen and eyes
Tarsi IV with ventral comb of serrated hairs; brownish rings around eyes
Theridiidae
not as the previous
Araneidae
Abdomen widest near front, tapering towards back, eye pattern 4:2:2, lateral pair of eyes on small tubercles
Pisauridae
Abdomen globose or cylindrical, eyes in three groups, anterior median eyes apart, remainder in two triads
Pholcidae

Key to Recorded Spider Genera of Different Families

Key to the recorded Genera of family Araneidae

1- Big abdomen, silver transverse lines and many spots on it …..... ***Argiope*** (Audouin, 1826)
2- Broad abdomen, all the abdomen with one colour, protrusions on it……***Cyrtophora*** (Simon, 1864)
3- Long and thin abdomen with one colour…….. ……..***Larinia*** (Simon, 1874)

Key to the recorded Genera and species of family Gnaphosidae

1- Patella IV with one retrolateral bristle, tibia of the male pedipalpus with a single retrolateral apophysis, ventrally sticking out without sclerotization, cymbium dorsally scopulate in the distal half, epigyne with central depression ….....…. ***Berlandina*** (Dalmas, 1922)
2- Compact spider, carapace maximal width more than 75% of length; posterior median eyes largest; both male palpal embolus and female insemination ducts long and coiled……. ***Setaphis*** (Simon, 1893)
3- No circular eye position…….. ***Synaphosus*** (Platnick and Shadab, 1980)
4- Cheliceral retromargin smooth ……...***Poecilochroa*** (Westring, 1874)
5- Chelicerae anteriorly with a conspicuous cluster of stiff (partly spine-shaped) bristles…….…….…***Trachyzelotes*** (Lohmander, 1944)
6- Elongate spider, often black, maximal width of carapace less than 75% of length, posterior median eyes not larger than other eyes, separated by their diameter or more; embolus and insemination ducts short ……..……***Zelotes*** (Gistel , 1848)
7- The coiled filamentous embolus and the apically extending median apophysis in the male palpus……...……..… ***Zelotes laetus*** (Cambridge, 1872)

Key to the recorded Genera of family Linyphiidae

1- Carapace orange-brown; sides of cephalic part darker, palp tibial apophysis pointed, epigyne with caudally protruding median plate……..… ***Mermessus*** (Cambridge, 1899)
2- Carapace red-brown, radial stripes darker. Palp with patellar apophysis, appressed to tibia, slightly bent, with a pointed end, male …….……..…… ***Prinerigone*** (Millidge, 1988)
3- Carapace pale brown, the median membrane in the male palp, the terminal apophysis and the lamella characteristics are totally reduced, the epigyne the proscape and the middle part of the scape are totally reduced …….……..…..***Sengletus*** (Tanasevitch, 2008).

Key to the recorded Genera of family Lycosidae

1. Body length ranges from 9 -25 mm. Carapace brownish with ochre median and lateral bands. Legs are yellowish-brown and darker distally. Palea of palpus with one sickle-shaped process; septal pedicel of epigyne long……...……***Hogna*** (Simon, 1885)
2. Body length ranges from 7-18 mm. The cephalic region with 2 dark parallel bars medially; AME > ALE; leg I in males often darkened……..…….…...***Trochosa*** (Koch, 1847)
3- Body length ranges from 5-7.5 mm. Legs brown-banded; white colour on pedipalps, epigyne with median septum tapering backward and with two separated fovea in anterior position ……...……....***Wadicosa*(** Zyuzin, 1985)

Key to Genera of family Oecobiidae

1- Body length < 3 mm; eyes; posterior median eyes kidney-shaped cribellum present……..……..***Oecobius*** (Lucas, 1846)
2- Body length > 5 mm; eyes; posterior median eyes circular-shaped cribellum absent…….……***Uroctea*** (Dufour, 1820)

Key to Genera of family Pholcidae

1- large size, total body length up to 10 mm. Opisthosoma higher than and long whitish, with dark irregular spots……..……***Artema*** (Walckenaer, 1837)

2- Small size, total body length 1.7mm .Opisthosoma monochromous grey……..…***Nita*** (Huber & El-Hennawy, 2007)

Key to Genera and species of family Salticidae

1- Prosoma and opisthosoma rusty brown with white hairs on black margin, head plate, and eye region wrinkled, glossy and black…….…….... ***Heliophanillus*** (Prószyński, 1989)

2- Dark prosoma and opisthosoma oval slightly pointed behind with three longitudinal white stripes……***Phlegra*** (Simon, 1876)

3- Medium size spiders with a white stripe on abdomen, carapace, and eye field, There is also a pair of black spots in thorax, or a pair of continuous dark streaks, running parallel until end of carapace, leaving between them light medial streak..... ***Plexippus*** (Koch, 1846)

4- Male with a dorsal white median band which is widened T-like, female opisthosoma with dorsal brown hairs, white equatorial band and white median stripe which is extended by two spots in the posterior third..... ***Plexippus paykulli*** (Audouin, 1825)

5- Male thoracic part with 2 large brown patches; opisthosoma dorsum with a thin yellow median line and 2 wide brown lateral lines, venter light with 2 brown lateral longitudinal stripes, female opisthosoma brownish, dorsum with a broad yellow median stripe and 2 pairs of light longitudinal marks in posterior half, venter light……..……..…***Plexippus clemens*** (Cambridge, 1872)

6- Brown colour, long setae near posterior median eyes.……***Thyene*** (Simon, 1885)

Key to Genera of family Theridiidae

1- Abdomen usually triangular pointed posteriorly, in dorsal view.....**Euryopis** (Menge, 1868)

2- Abdomen colouration bright yellow to bright brown, sometimes mottled, the anterior median eyes are larger than other eyes…. ……..…….***Paidiscura*** (Archer, 1950)

3- Abdomen purplish-black; dorsally with 4 light spots on anterior part, a longitudinal row of 2 or 3 smaller spots on posterior part, and 2 lateral spots near the spinnerets……..…***Steatoda*** (Sundevall, 1833)

4- Abdomen wider than long, rhomboidal in dorsal view, anterior median eyes are equal to or smaller than posterior part ……..……...…***Theridion*** (Walckenaer, 1805)

Key to Genera of family Thomisidae

1- Tubercles of lateral eyes large, connate and markedly projecting; opithosoma triangular, almost truncated and very broad posteriorly…….…...***Thomisus*** (Walckenaer, 1805)

2- Anterior-median eyes usually farther from each other than from posterior-lateral eyes; median quadrangle nearly square. Body covered with thin or thick pointed bristle……...……...…***Xysticus*** (Koch, 1835).

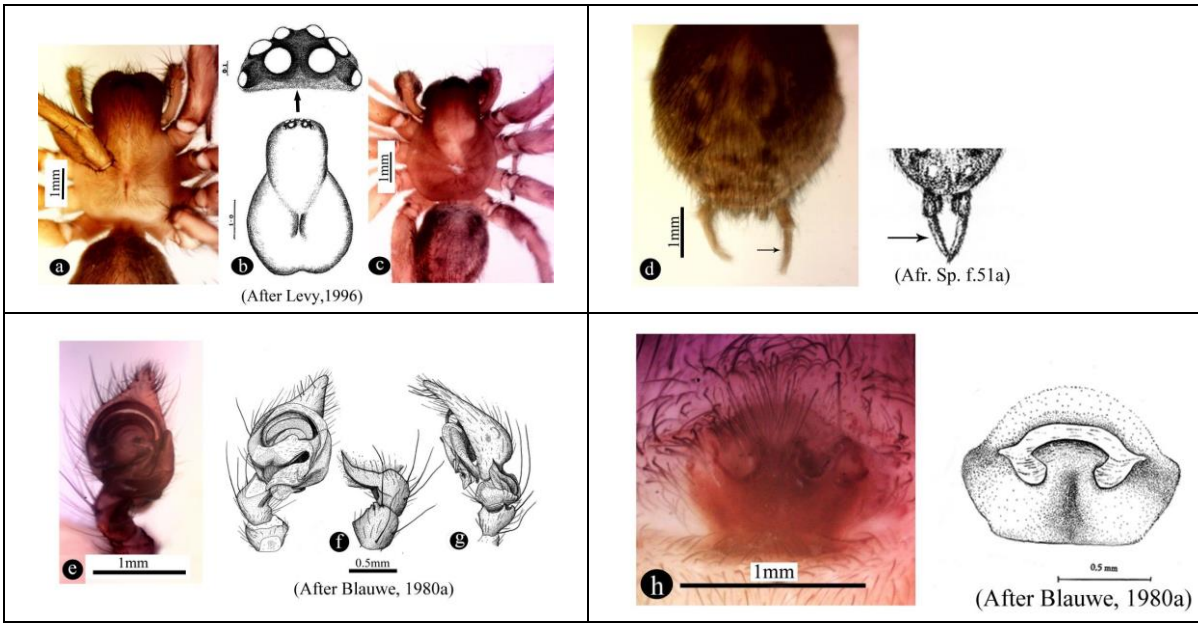


Plate (1): ***Lycosoides coarctata*** (Dufour, 1831)

a: female carapace dorsal view, **b:** carapace with eye arrangement, dorsal view, detail, **c:** male carapace dorsal view, **d:** apical segment of posterior spinnerets at least 1.5 times longer than basal segment, Male left pedipalp**; e:** ventral view, **f:** tibial apophysis, dorsal view, **g:** retrolateral view, **h:** Female epigyne, ventral view. Abbreviations used: Afr.Sp. = *African Spiders* (Dippenaar-Schoeman & Jocqué, 1997).

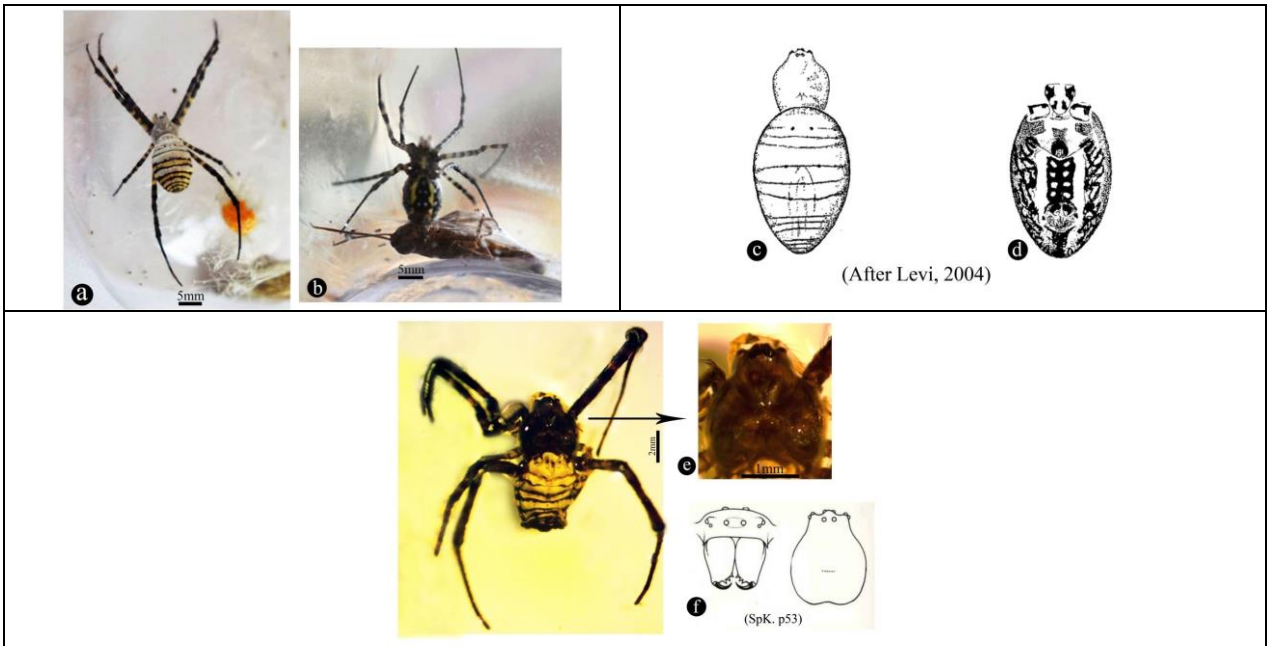


Plate (2): ***Argiope trifasciata*** (Forskål, 1775) Female habitus

a: dorsal view, **b:** ventral view, **c:** abdomen dorsal view, **d:** abdomen ventral view. **e:** female carapace with eye distribution, **f:** carapace in anterior view and dorsal view showing eye pattern, Abbreviations used: SpK = *Spiders and their Kin* (Levi & Levi, 1968).**f:** carapace in anterior

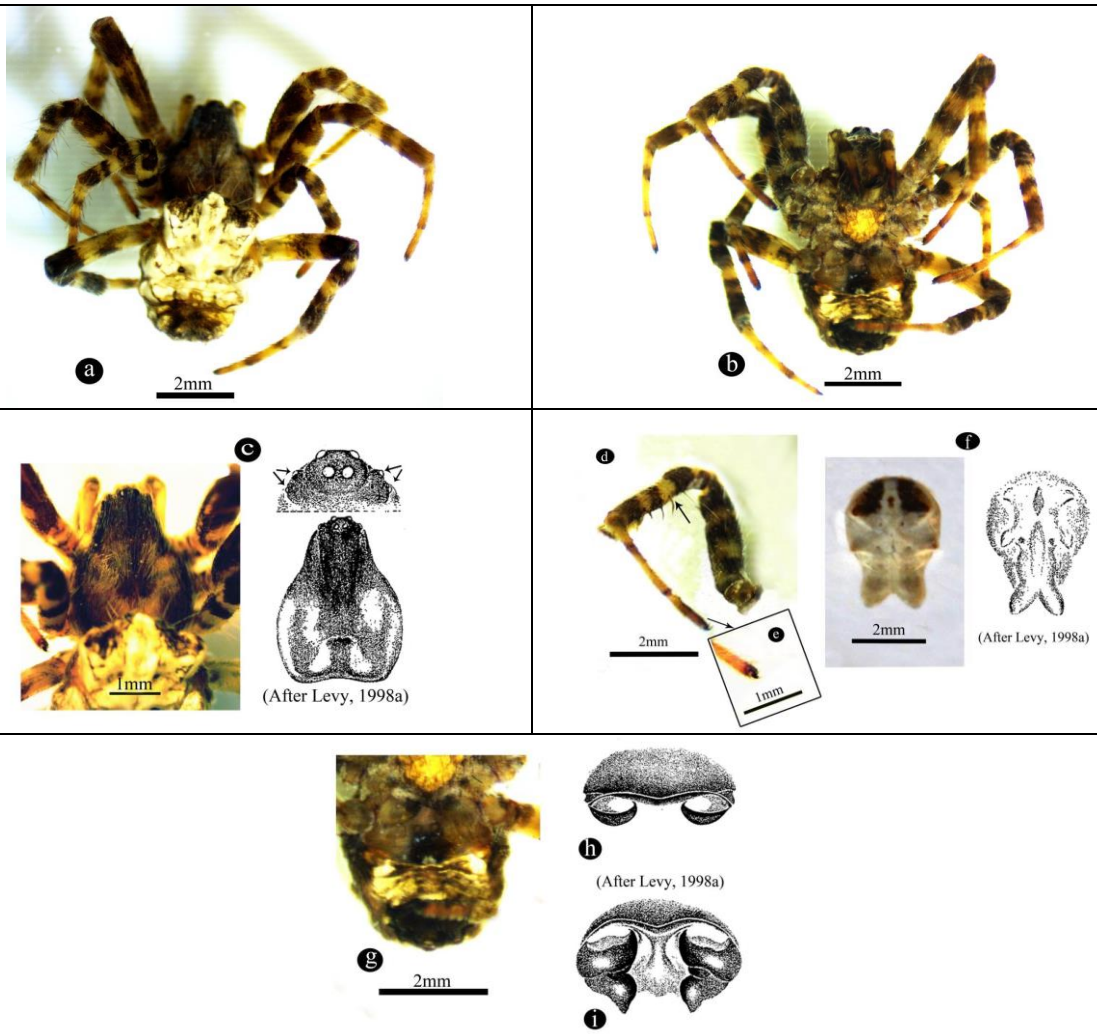


Plate (3): ***Cyrtophora citricola*** (Forskål, 1775)
a: dorsal view, **b:** ventral view, **c:** carapace, dorsal view showing arrangement of eyes. **d:** legs with relatively short, strongly spine, **e:** tarsus with 3 claws **, f:** abdomen, dorsal view, **g, h:** Epigyne, ventral view, **i:** epigyne, posterior view.

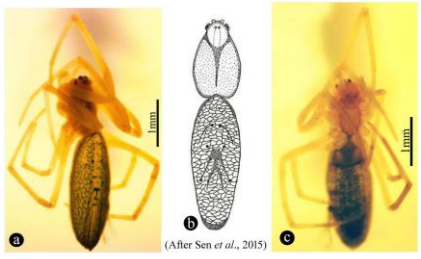


Plate (4): ***Larinia*** **sp.**
a: lateral view, **b:** dorsal view showing carapace with eye distribution and elongated abdomen, **c:** Ventral view.

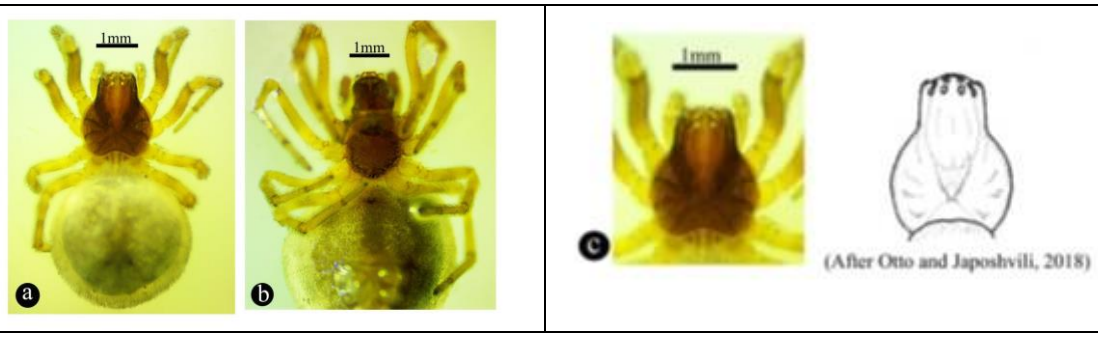


Plate (5): Dictynidae juvenile
a: dorsal view, **b:** ventral view, **c:** dorsal view showing carapace with eye distribution

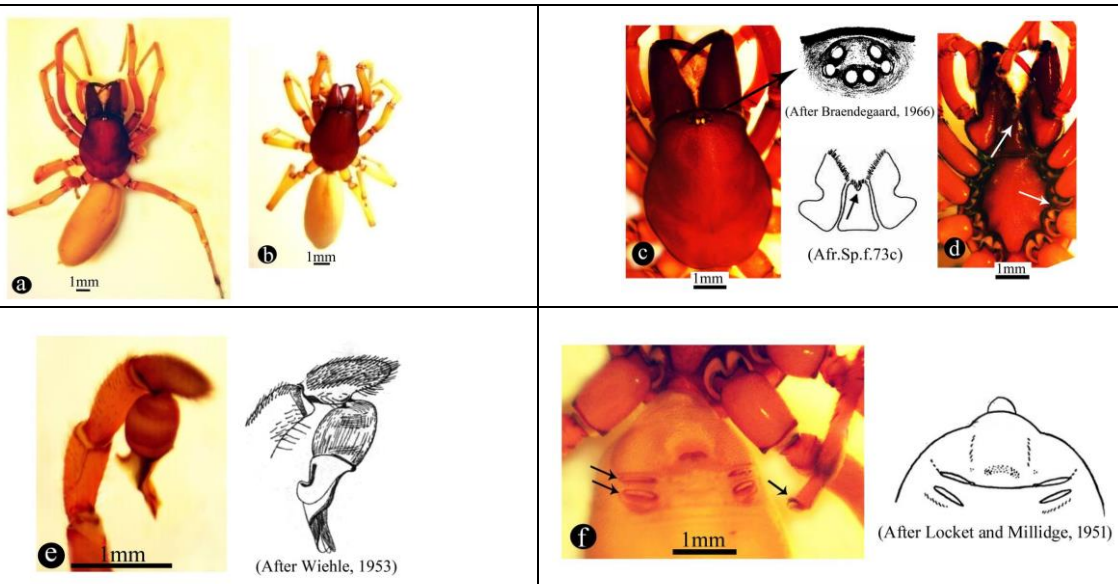


Plate (6): ***Dysdera crocata*** (Koch, 1838)
a: female dorsal view, **b:** male dorsal view **c:** carapace with eye distribution and elongated abdomen, **d:** ventral view of mouth parts with labium showing deep notch at anterior edge, sternum showing intercoxal sclerites. **e:** pedipalp of male lateral view, **f:** anterior part of abdomen in ventral view, showing paired anterior tracheal spiracles (2 arrows), tarsus with 2 claw (right arrow).

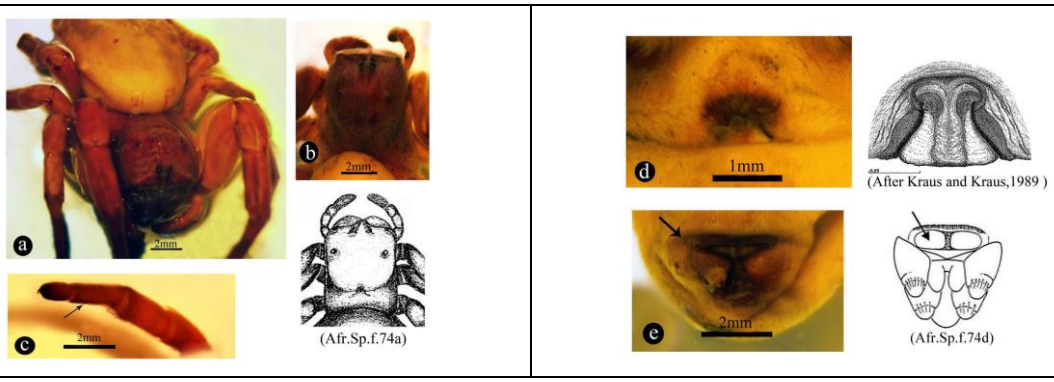


Plate (7): ***Stegodyphus dufouri*** (Audouin, 1825)
a: female anterior view, **b:** carapace in dorsal view, showing eye pattern **c:** metatarsus IV, showing calamistrum. **d:** epigyne ventral view, **e:** spinnerets ventral view, showing 2-partite cribellum.

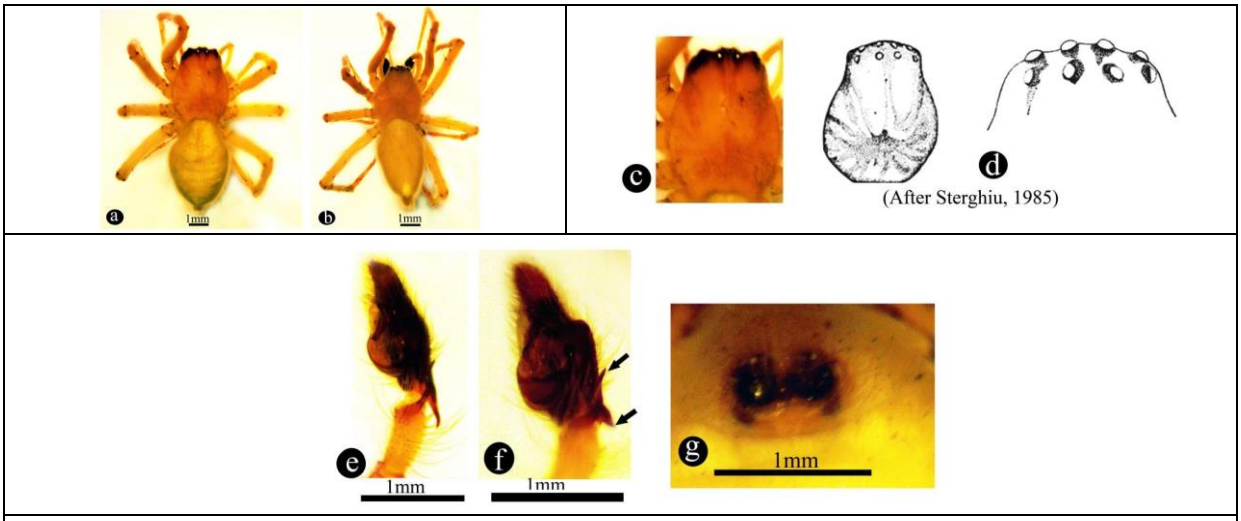


Plate (8): ***Cheiracanthium isiacum*** (Cambridge, 1874)
a: female dorsal view, **b:** male dorsal view, **c:** carapace with eye distribution, **d:** eyes, dorsal view, **e, f:** pedipalp, ventral view with 2 equally long tibial apophyses, **g:** female, epigyne.

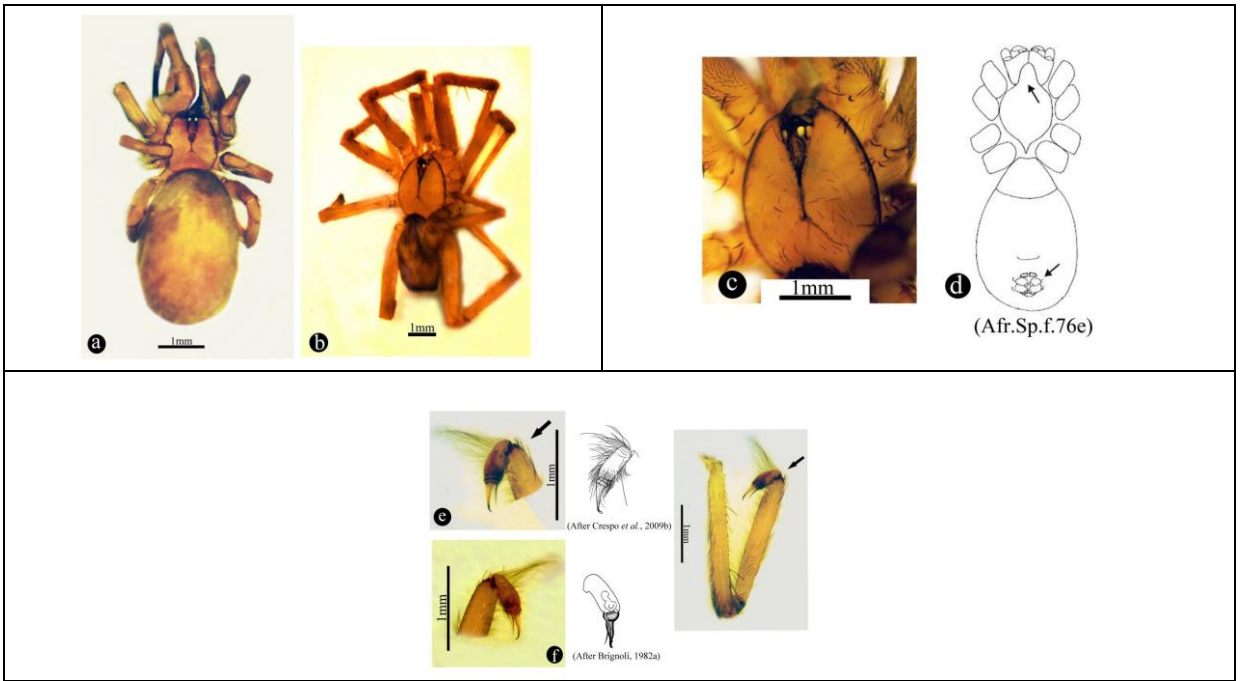


Plate (9): ***Filistata insidiatrix*** (Forskål, 1775)
a: female dorsal view, **b:** male dorsal view, **c:** carapace with eyes in a compact group, **d:** ventral view of body, showing fused sternum and position of spinnerets, **e:** pedipalp, retrolateral view, **f:** pedipalp lateral view.

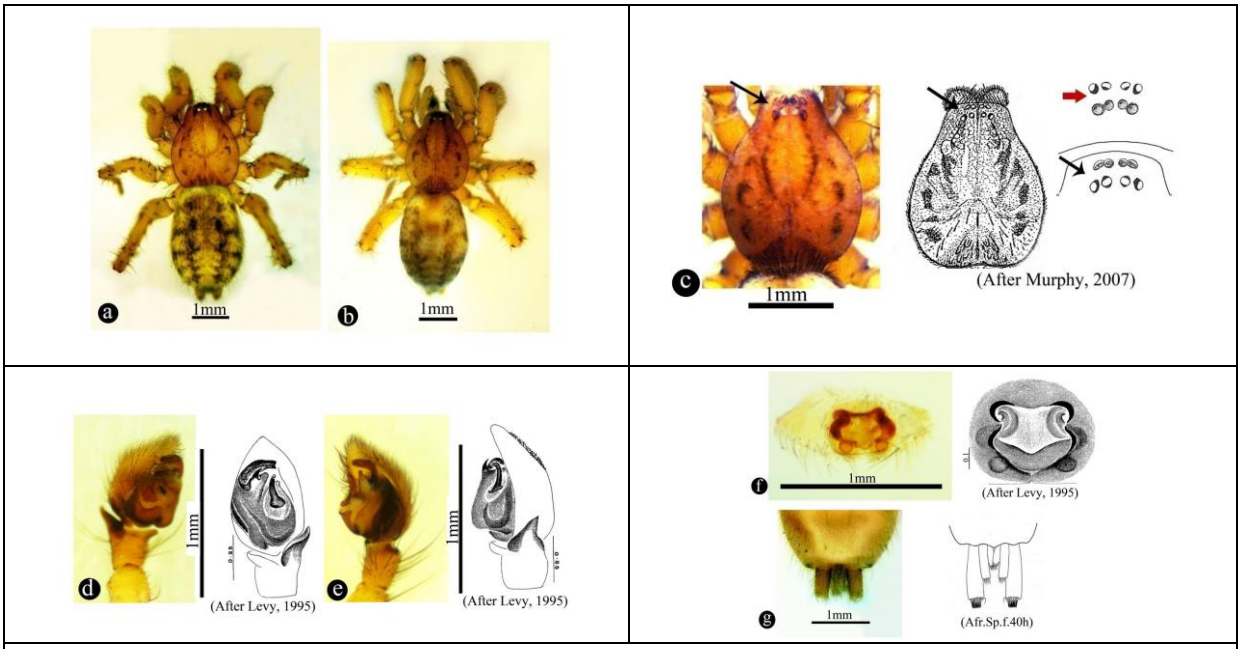


Plate (10): ***Berlandina venatrix*** (Cambridge, 1874)
a: female dorsal view, **b:** male dorsal view, **c:** carapace with eye distribution , (black arrow) showing eyes in dorsal view and (red arrow) eyes in frontal view, **d:** pedipalp ventral view, **e:** pedipalp retrolateralview, **f:** female epigyne, **g:** spinnerets, ventral view.

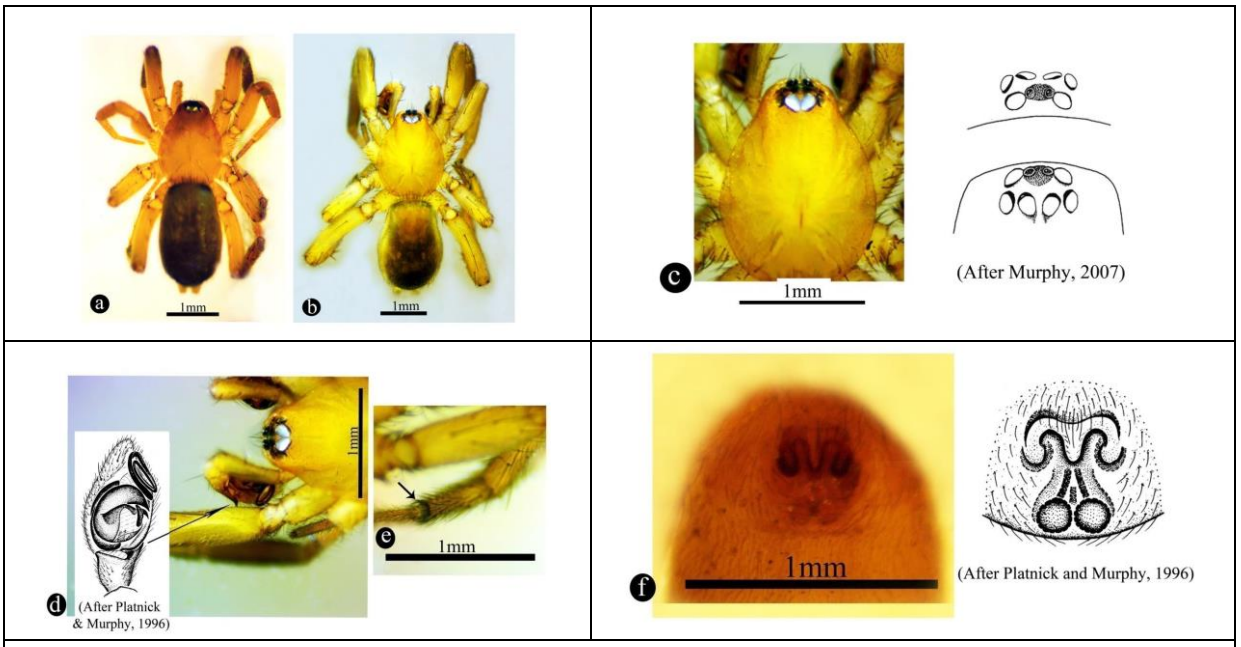


Plate (11): ***Setaphis subtilis*** (Simon, 1897)
a: female dorsal view, **b:** male dorsal view, **c:** carapace with eye distribution, **d:** Left pedipalp ventral view, **e:** metatarsus III, preening comb (transverse row of stiff setae at ventral tip of posterior metatarsus)**, f:** female epigyne.

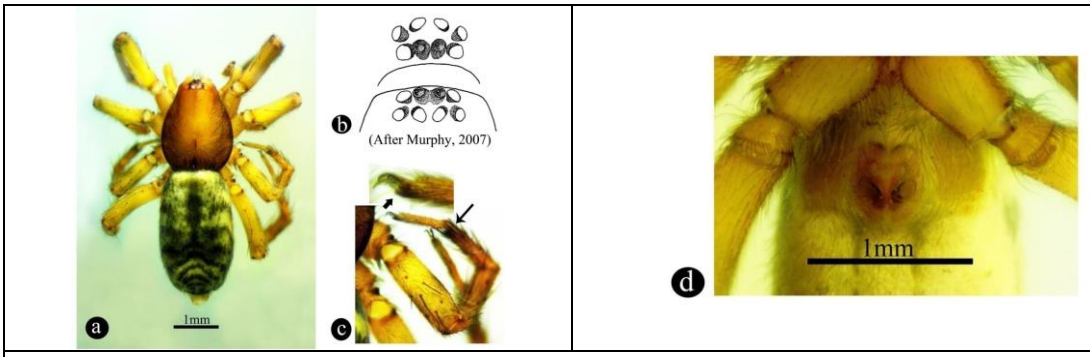


Plate (12): *Synaphosus* sp.

a: female dorsal view, **b:** carapace with eye distribution in frontal and in dorsal view, **c:** the longest arrow preeing brush near ventral tip of posterior metatarsus III, the smallest arrow (tarsal claws with single row of four teeth, without claw tufts), **d:** female epigyne.

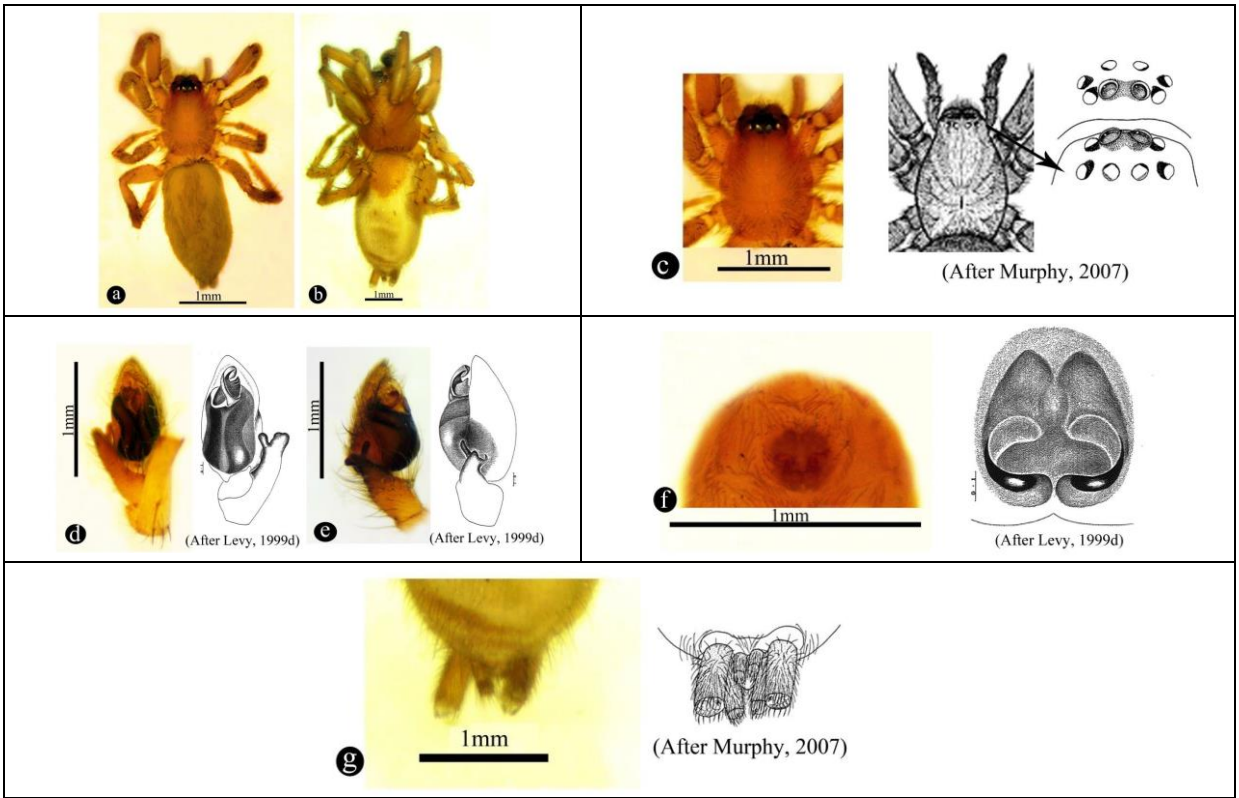


Plate (13): *Poecilochroa pugnax* (Cambridge, 1874)

a: female dorsal view, **b:** male dorsal view, **c:** carapace with eye distribution, **d:** pedipalp ventral view, **e:** pedipalp retrolateral view, **f:** female epigyne **g:** spinnerets.

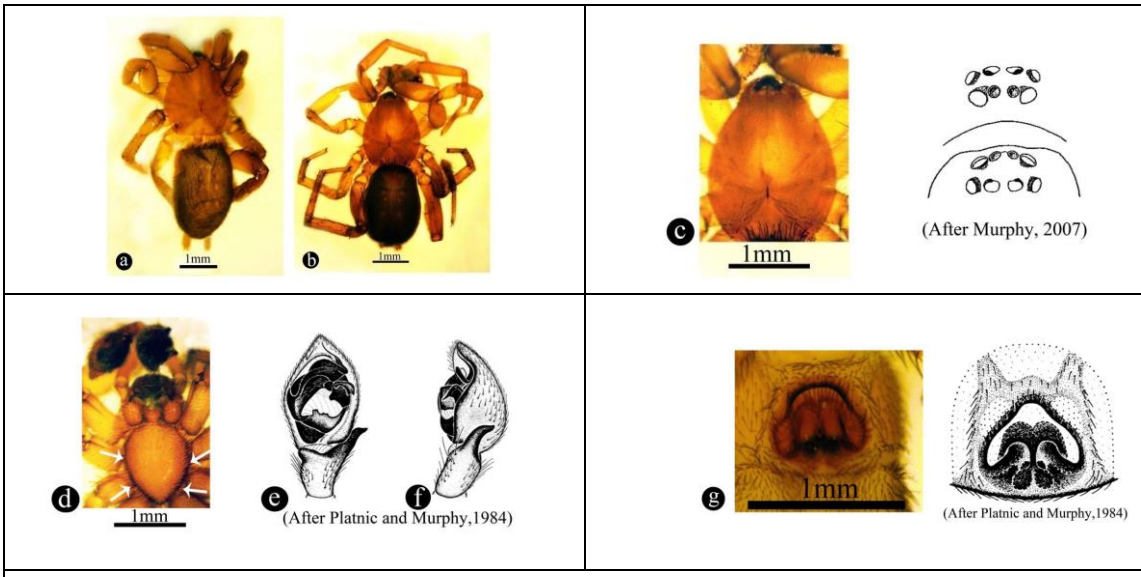


Plate (14): ***Trachyzelotes lyonneti*** (Audouin, 1825)
a: female dorsal view, **b:** male dorsal view, **c:** carapace with eye distribution, **d:** sternum of male rebordered with uniformly short setae, **e:** pedipalp ventral view, **f:** pedipalp retrolateral view, **g:** female epigyne

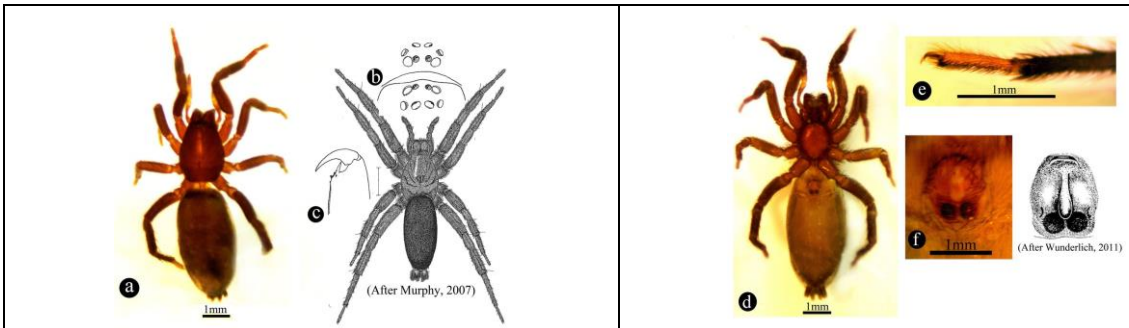


Plate (15): ***Zelotes laetus*** (Cambridge, 1872)
a: female dorsal view, **b:** carapace with eye distribution in frontal and in dorsal view, **c:** Chelicerae with one denticle and three teeth on promargin and one denticle and one tooth on retromargin, **d:** female ventral view, **e:** tarsi with two dentate claws and weak claw tufts; metatarsi IV with preening comb; distal segments with two rows of long trichobothria, **f:** female epigyne.

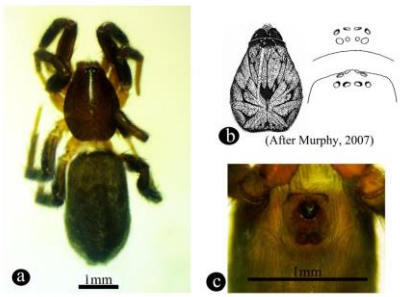


Plate (16): ***Zelotes*** **sp.**
a: female dorsal view, **b:** carapace with eye distribution in frontal and in dorsal view, **c:** female epigyne.

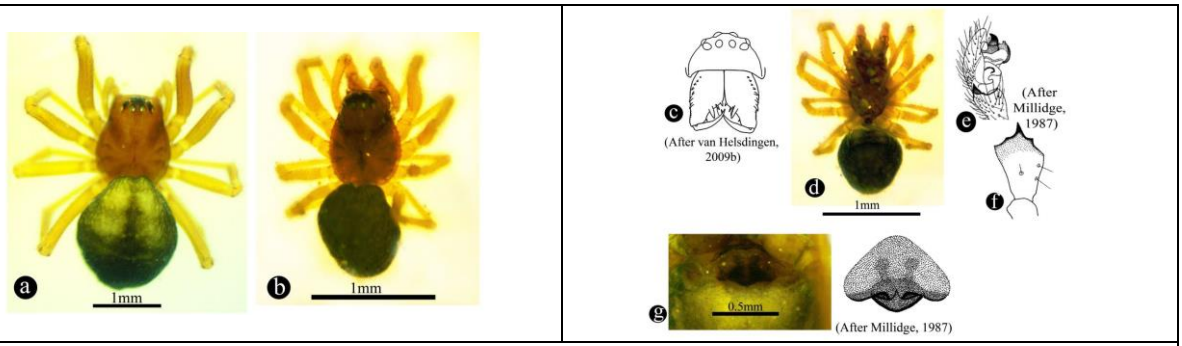


Plate (17): ***Mermessus denticulatus*** (Banks, 1898)
a: female, dorsal view, **b:** male, dorsal view, **c:** eyes and chelicera, frontal view, **d:** male ,ventral view, **e:** pedipalp,lateral view ,**f:** tibial apophysis, lateral view, **g:** female epigyne.

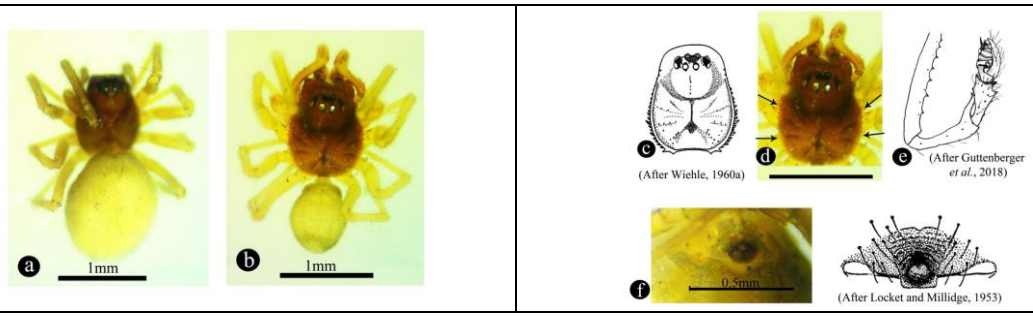


Plate (18): ***Prinerigone vagans*** (Savigny, 1825)
a: female, dorsal view, **b:** male, dorsal view, **c:** carapace,dorsal view with eyes pattern **d:** carapace, male dorsal view showing teeth , **e:**pedipalp, with tibia and femur, retrolateral view ,**f:** female epigyne

Plate (19): ***Sengletus extricates*** (Cambridge, 1876)
a: male, dorsal view, **b:** male, ventral view, **c:** carapace,dorsal view with eyes pattern **d:** right pedipalp, prolateral , **e:** right pedipalp, retrolateral view, **f:** female epigyne.

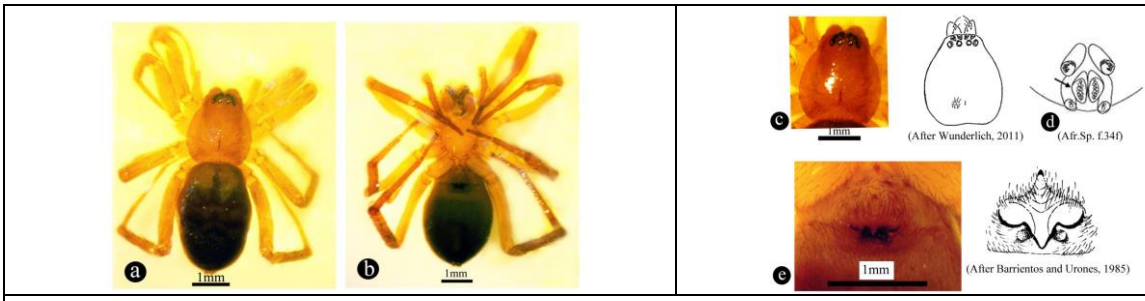


Plate (20): ***Mesiotelus tenuissimus*** (Koch, 1866)
a: male, dorsal view, **b:** female, dorsal view, **c:** carapace,dorsal view with eyes pattern, **d:** spinnerets in dorsal view, showing laterally flattened median spinnerets and **e:**female epigyne.

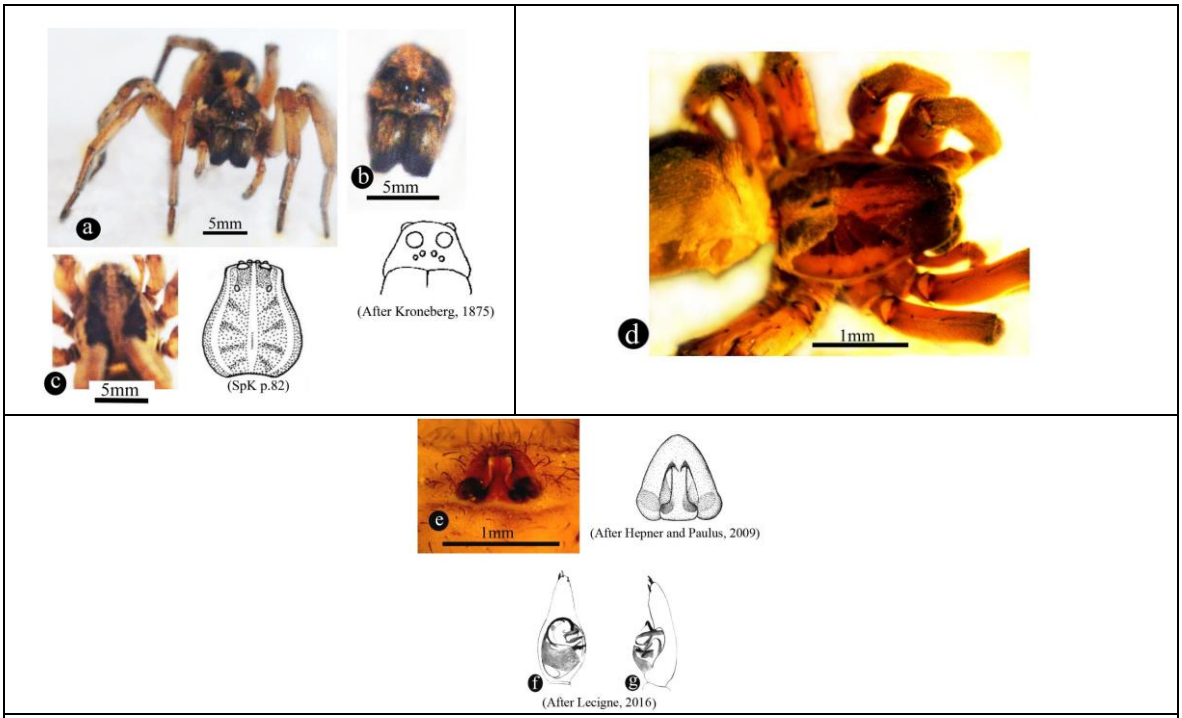


Plate (21): ***Hogna ferox*** (Lucas, 1838)
a: female frontal view, **b:** eye pattern, in frontal view, **c:** carapace with eye in dorsal view .
d: female dorsal view, **e:** epigyne **f:** pedipalp, ventral view **g:**pedipalp, retrolateral view

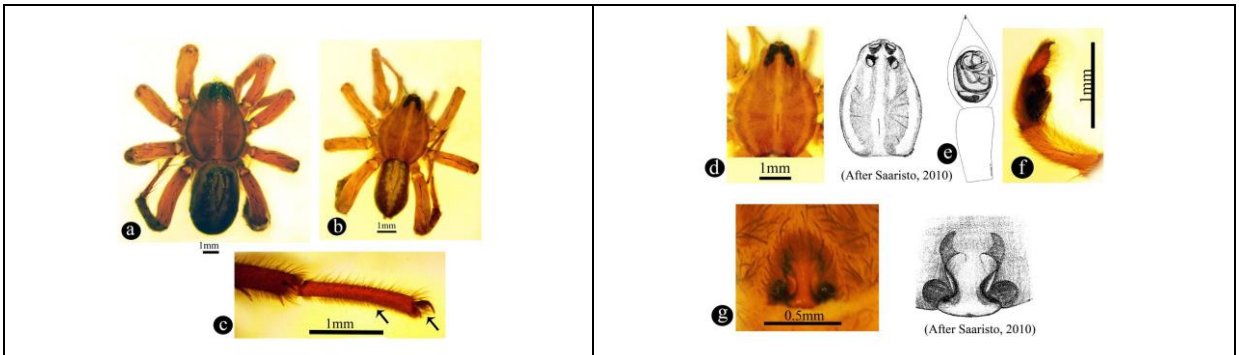


Plate (22): ***Trochosa urbana*** (Cambridge, 1876)
a: female, dorsal view, **b:** male, dorsal view, **c:** tarsus I, lateral view, three clawed with a scopula (a brush of hairs on the ventral side). **d:** carapace with eye in dorsal view, **e:** right pedipalp, ventral view, **f:** right pedipalp, lateral view, **g:** female epigyne

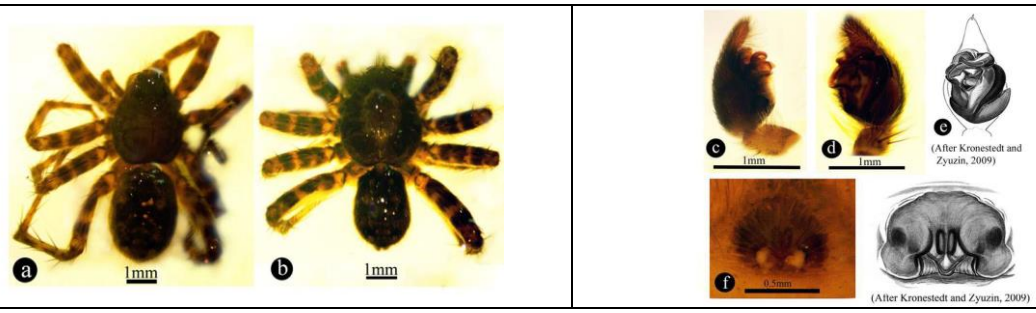


Plate (23): ***Wadicosa fidelis*** (Cambridge, 1872)
a: female, dorsal view, **b:** male,dorsal view, **c:** left pedipalp, lateral view,
d: left pedipalp,ventral view, **e:** right pedipalp, ventral view, **f:** female epigyne.

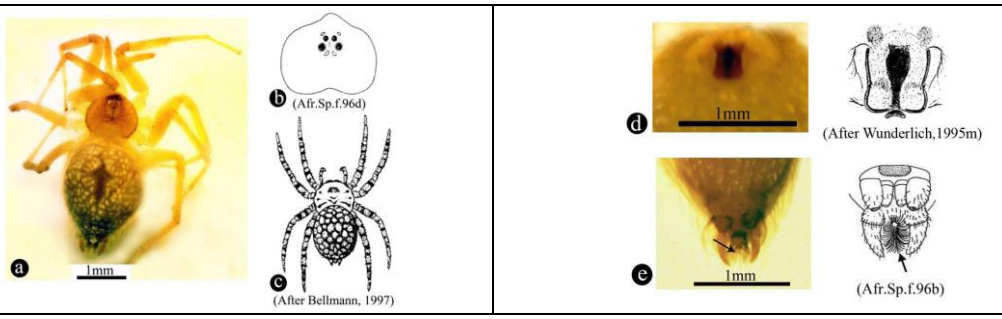


Plate (24): ***Oecobius putus*** (Cambridge, 1876)
a: female dorsal view, **b:** carapace with eye distribution **c:** female habitus **d:** female epigyne**, e:** spinnerets, ventral view, showing anal tubercle with a fringe of long hairs.

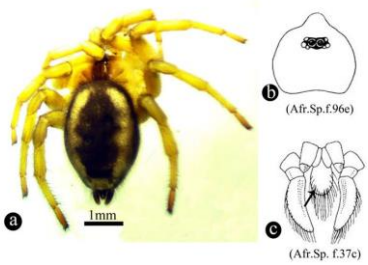


Plate (25): ***Uroctea*** **sp.**
a: dorsal view, **b:** carapace with eye distribution**, c:** spinnerets, ventral view, showing anal tubercle .

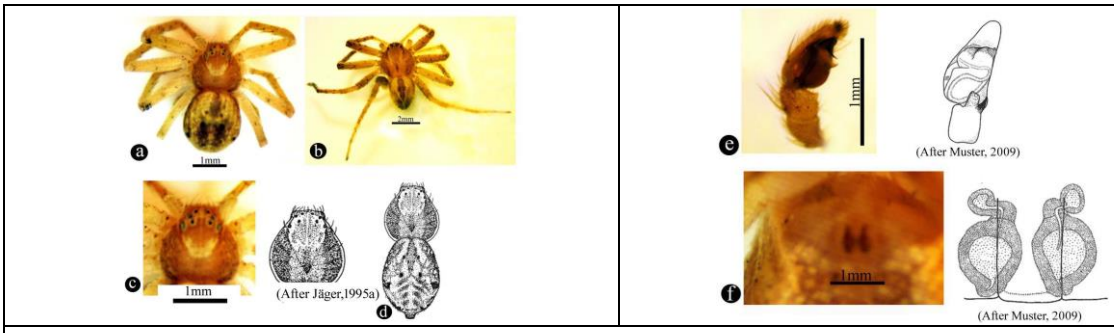


Plate (26): ***Pulchellodromus glaucinus*** (Simon, 1870)
a: female dorsal view, **b:** male dorsal view,**c:** carapace with eye distribution **d:** female habitus, **e:** pedipalp, ventral view**, f:** female epigyne.

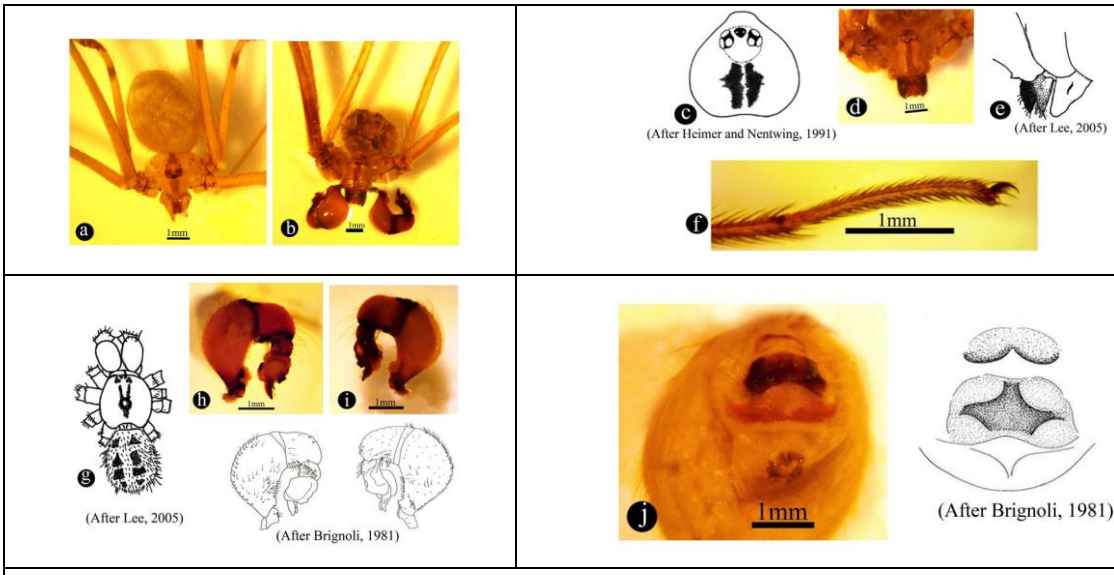


Plate (27): ***Artema atlanta*** (Walckenaer, 1837)
a: female dorsal view, **b:** male dorsal view **c:** carapace with eye distribution **d:** chelicerae, frontal view, **e:** chelicerae, lateral view, **f:** tarsi long and flexible. **g:** male habitus, **h:** pedipalp, prolateral view, **i:** pedipalp, retrolateral view **j:**epigyne, ventral view

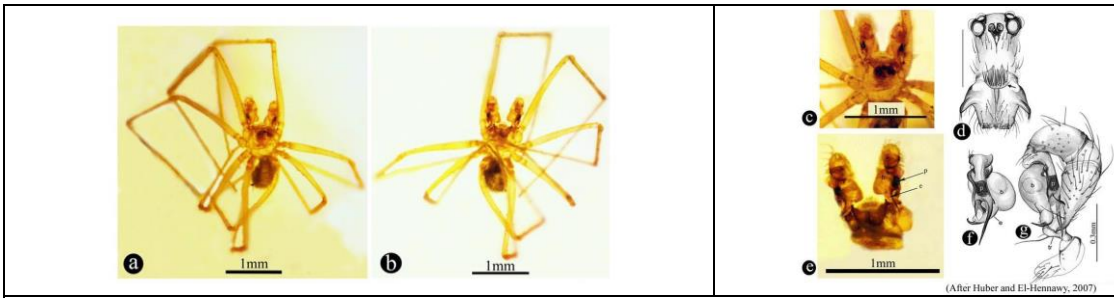


Plate (28): ***Nita elsaff*** (Huber and El-Hennawy, 2007)
a: male dorsal view, **b:** male ventral view **c:** carapace with eye distribution **d:** frontal view, showing eyes, clypeus (arrow points to modification), and chelicerae, **e:** chelicerae,ventral view**, f:** Left procursus and bulb, ventral view, **g:** Left palp, retrolateral view **(b: bulb, e: putative embolus and p: procursus)**

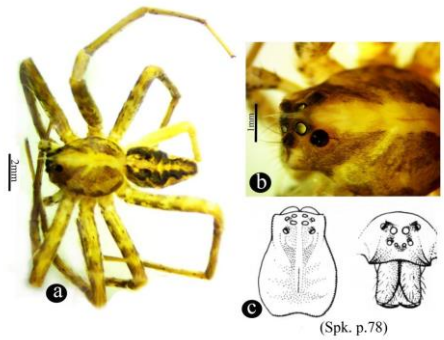


Plate (29): Pisauridae juvenile
a: dorsal view, **b:** carapace with eye distribution**, C:** carapace in anterior and dorsal view, showing eye pattern.

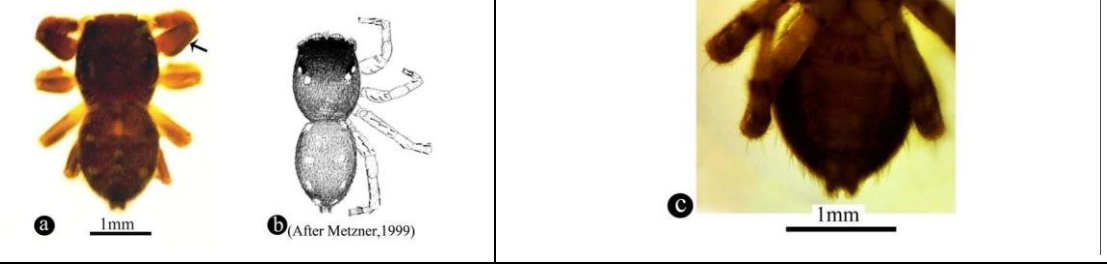


Plate (30): *Heliophanellus* sp.
a: female dorsal view, (arrow) leg I is short and robust than other legs **b:** male habitus **C:** female ventral view, with epignum.

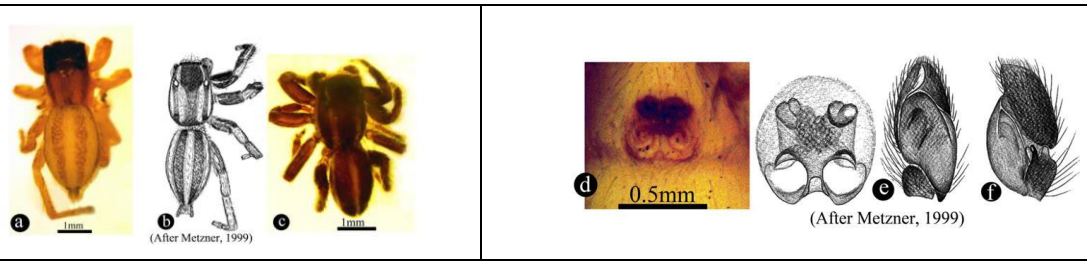


Plate (31): *Phlegra* sp.
a: female dorsal view, **b:** male habitus **C:** male dorsal view, **d:** female epigyne, **e:** Pedipalp, ventral view, **f:** Pedipalp, retrolateral view.

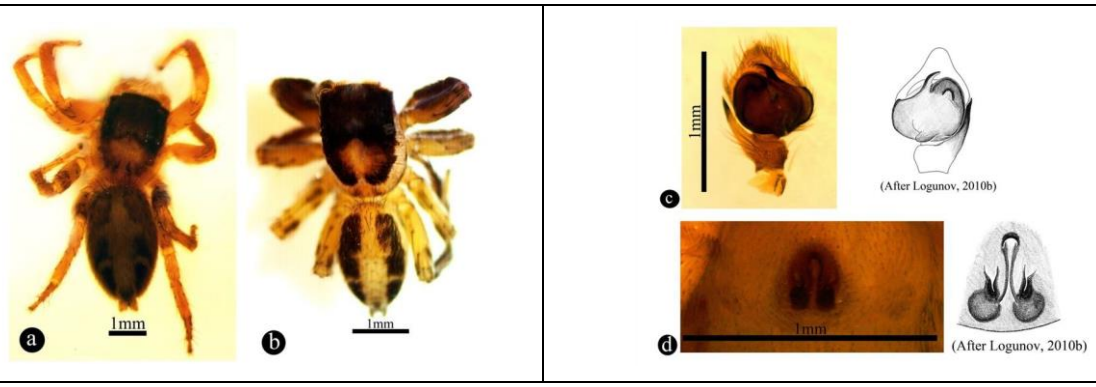


Plate (32): ***Plexippus clemens*** (Cambridge, 1872)
a: female dorsal view, **b:** male dorsal view, **c:** pedipalp, ventral view **d:** female epigyne.

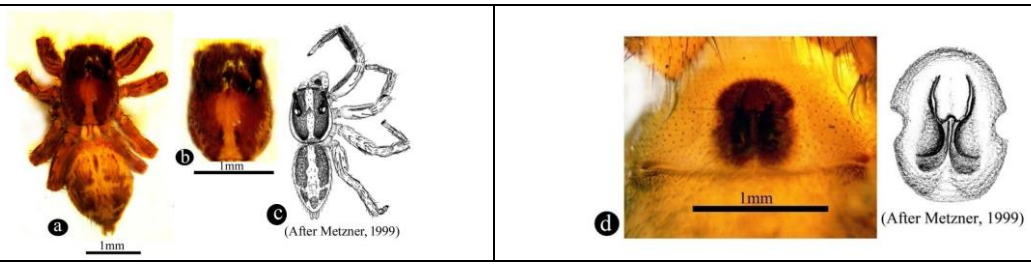


Plate (33): ***Plexippus paykulli*** (Audouin, 1825)
a: female dorsal view, **b:** carapace with eye distribution **c:** habitus of male **d:** female epigyne**.**

Plate (34): ***Thyene imperialis*** (Rossi, 1846)
a: male dorsal view, **b:** female dorsolateral view, **c:** carapace, dorsal view **d:** eye pattern,anterior view **e:** female epigyne **f:** pedipalp, ventral view **g:** pedipalp, retrolateral

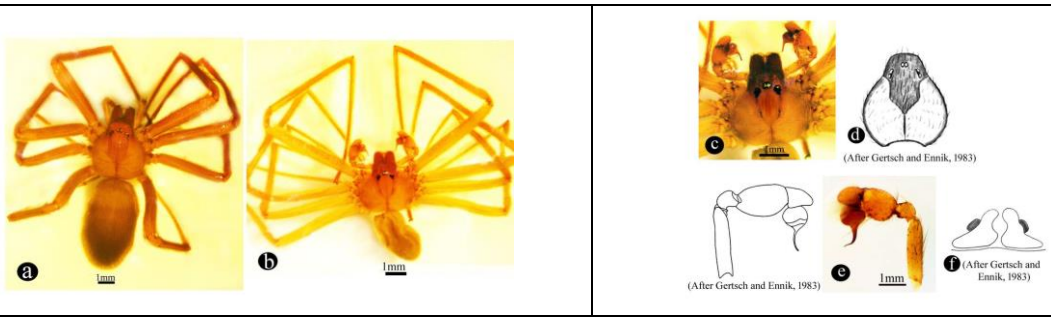


Plate (35): ***Loxosceles rufescens*** (Dufour, 1820)
a: female dorsal view, **b:** male dorsal view, **c:** male carapace in dorsal view, showing eye pattern, **d:** female carapace in dorsal view, **e:** pedipalp, retrolateral view, **f:** Seminal receptacles of female genitalia.

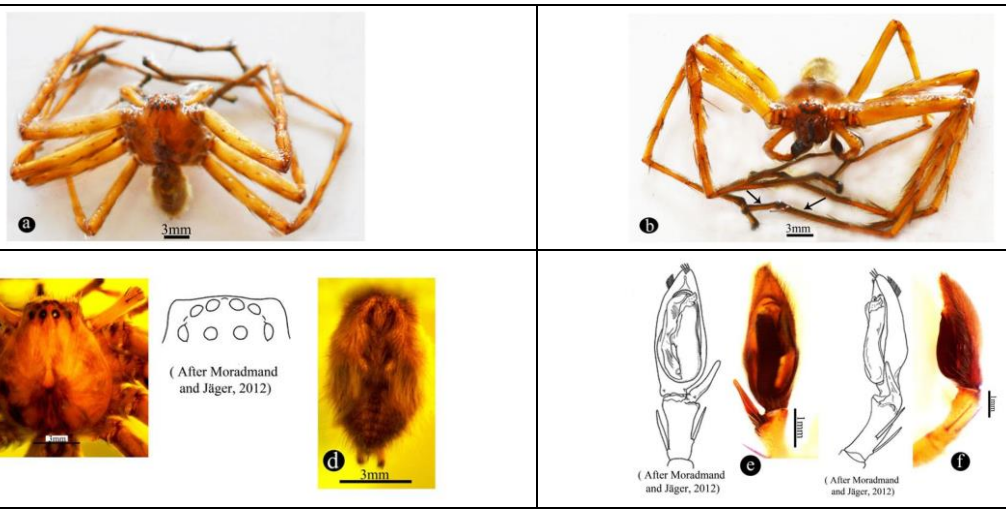


Plate (36): ***Eusparassus walckenaeri*** (Audouin, 1825)
a: male dorsal view**, b:** male, frontal view showing large scopulae (adhesive hairs) on tarsus and metatarsus **c:** carapace, dorsal view with eye distribution**, d:** abdomen: dorsum with a series of small chevron-like patterns, **e:** Pedipalp, ventral view, **f:** Pedipalp, retrolateral view.

Plate (37): ***Eusparassus*** **sp. juvenile**
a: dorsal view**, b:** carapace, dorsal view with eye distribution.

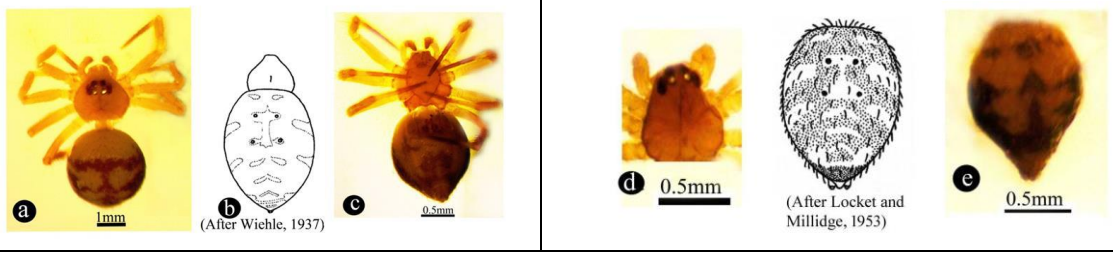


Plate (38): ***Euryopis*** **sp.**
a: dorsal view**, b:**female habitus, **c:** ventral view, **d:** carapace, dorsal view with eye distribution, **e:**abdomen, dorsal view.

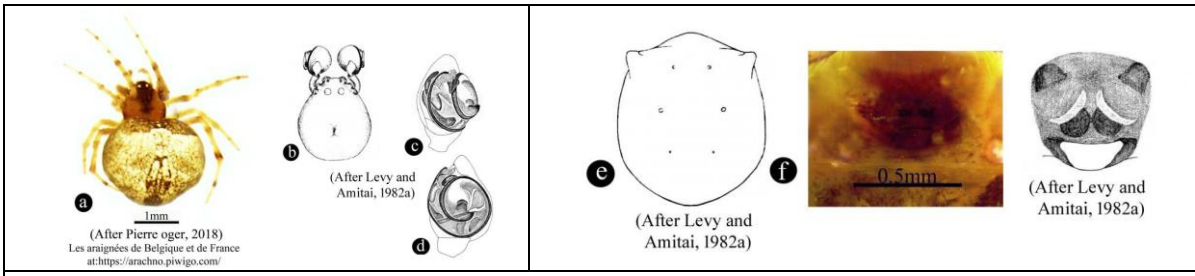


Plate (39): ***Paidiscura dromedaria*** (Simon, 1880)
a: female,dorsal view, **b:** male carapace with eyes distribution**, c:** pedipalp, ventral view**, d:** Pedipalp, retrolateral view, **e:** Opisthosoma, dorsal view, **f:** female epigyne.

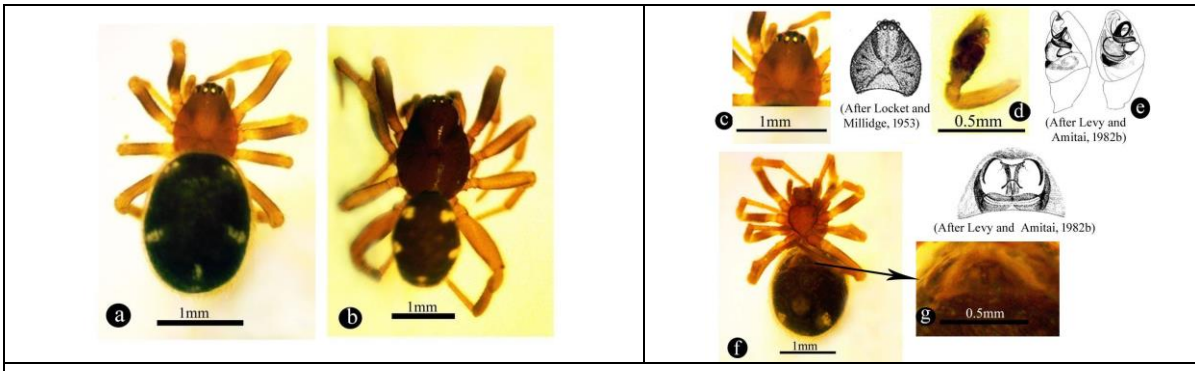


Plate (40): ***Steatoda erigoniformis*** (Cambridge, 1872)
a: female,dorsal view, **b:** male,dorsal view, **c:**female carapace with eyes distribution, **d:** Pedipalp, retrolateral view**,e:** pedipalp, ventral view**, f:** female, ventral view, **g**: epigyne.

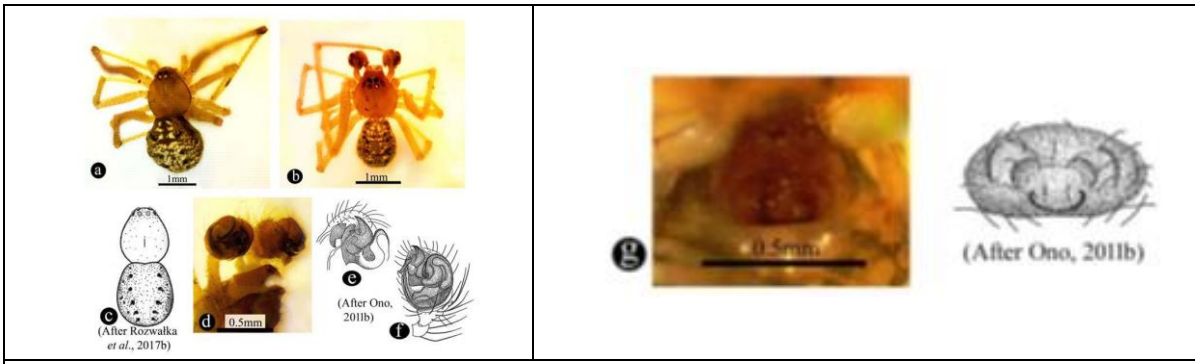


Plate (41): ***Theridion melanostictum*** (Cambridge, 1876)
a: female, dorsal view, **b:** male, dorsal view, **c:** male habitus showing carapace with eyes distribution, **d:** Chelichera with pedipalp, **e:** Pedipalp, prolateral view**, f:** pedipalp, ventral view**, g:** female, epigyne.

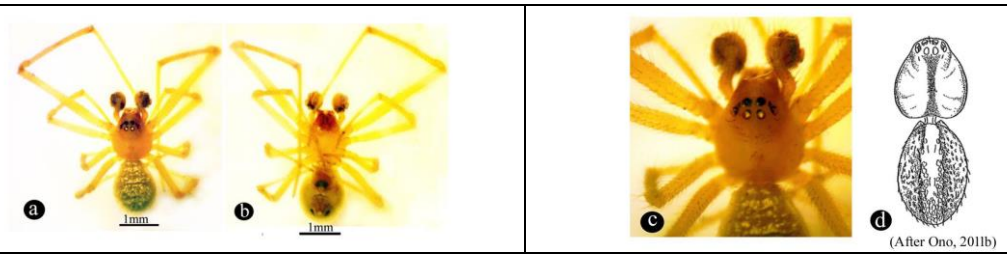


Plate (42): *Theridion* sp.
a: male, dorsal view, **b:** male, ventral view, **c:** carapace with eyes distribution, **d:** Habitus, dorsal view.

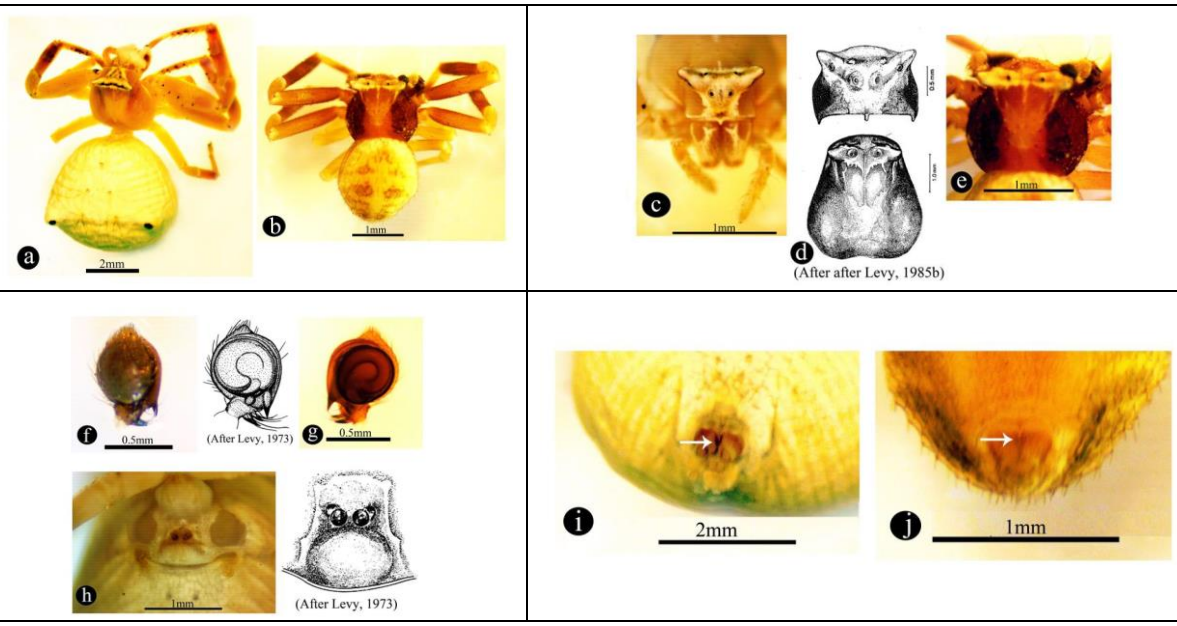


Plate (43): *Thomisus spinifer* (Cambridge, 1872)
a: female, dorsal view, **b:** male, dorsal view**, c:** female carapace, frontal view **d:** female, carapace, frontal view and dorsal view with eye pattern showing all eyes equal in size**, e:** male, carapace dorsal view **f:** pedipalp, dorsal view, **g:** pedipalp, ventral view**, h:** female epigyne, ventral view, **i:** female spinnerets with colulus, **j:** male spinnerets with colulus.

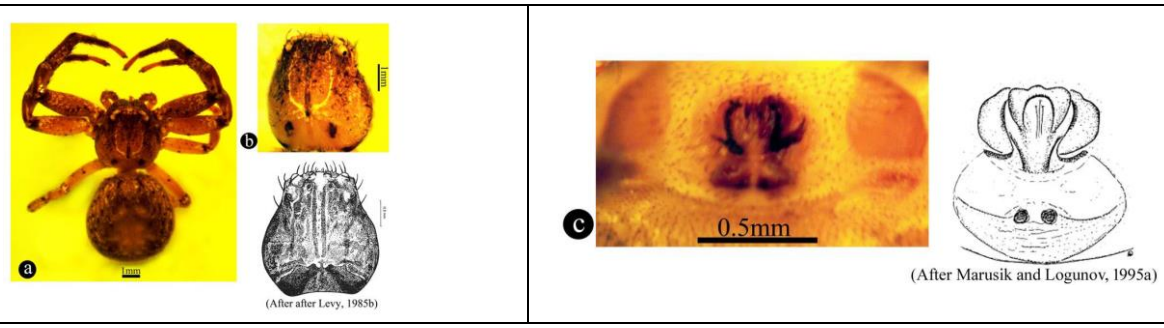


Plate (44): *Xysticus tristrami* (Cambridge, 1872)
a: dorsal view, **b:** carapace, dorsal view with eye pattern**, c:** female, epigyne.

Plate (45): *Xysticus* sp.
a: dorsal view, **b:** ventral view, **c:** carapace, dorsal view with eye pattern**, d:** carapace, frontal view **e:** dorsal view of spider show the abdomen flattened above, widest behind.

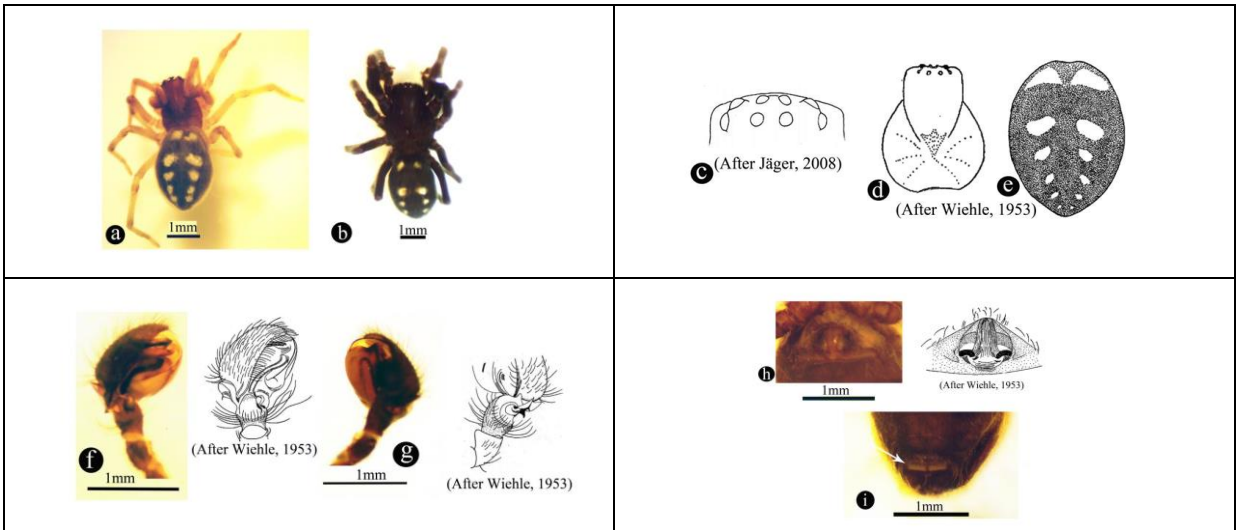


Plate (46): *Nurscia albomaculata* (Lucas, 1846)
a: female dorsal view, **b:** male dorsal view **c:** ocular area, dorsal view **d:** carapace with eye distribution , **e:** Abdomen, dorsal view with rows consist each of 5-6 white spots. **f:** left pedipalp, ventral view, **g:** right pedipalp, ventral view **,h:** female, epigyne, **i:** female spinnerets ventral view showing cribellum divided in to two partite.

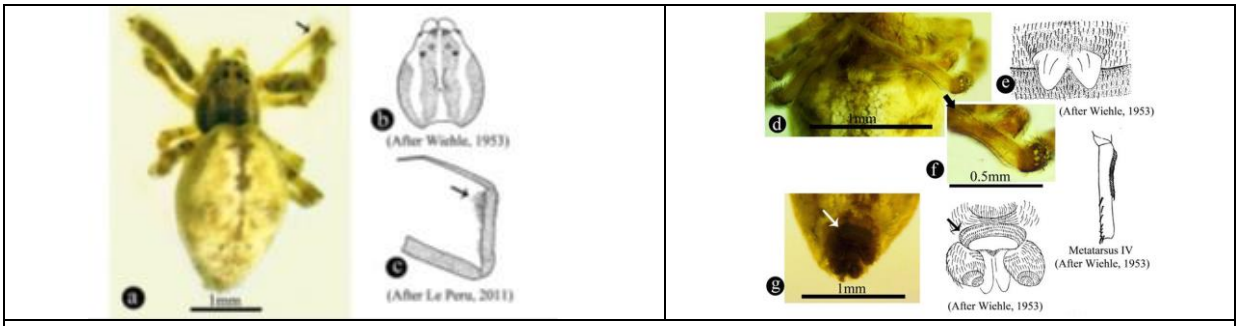


Plate (47): *Uloborus walckellaerius* (Latreille, 1806)
a: female, dorsal view, **b:** carapace with eye distribution**, c:** female, leg I brush of hair on tibia, **d:**ventralview, showing (**e:**epigyne**, f:** metatarsus IV, showing calamistrum), **g:** spinnerets ventral view showing cribellum.

DISCUSSION

To the best of the present authors' knowledge and as far as can be ascertained, the present study is the first one of its kind in Assiut Governorate, only very limited areas have been comprehensively studied. By the end of this investigation, total number of 3457 spider specimens was collected and could be assigned in 42 genera and 47 species that fall in 22 families at Assiut governorate locality which is considered the first study to cover the central part of Egypt. Further studies must be required for identifying the unknown genera and species. In Egypt, there are 41 families belonging to 204 genera and 405 species (El-Hennawy, 2017). This study indicated that Assiut governorate minimally contains 54% of the families (22 vs. 41), 21% of the genera (42 vs. 204), and 12% of spider species (47 vs. 405) found in Egypt.

LIST OF ABBREVIATIONS

Selected taxonomic terms used in the key:

Anal Tubercle	A small process, dorsal to the spinnerets, carrying the anal opening.
Afr.Sp.	African Spiders (Dippenaar-Schoeman & Jocqué, 1997).
Calamistrum (p. calamistra)	A comb of hairs on metatarsus IV of cribellate spiders; used for combing out silk from the cribellum.
Cephalothorax	Anterior portion of the body formed by the fusion of head and thorax.
Chelicerae	Enlarged mouth appendages with a fang on their distal end.
Cheliceral teeth	Large and/or tiny tooth like projections on the cheliceral furrow margins.
Claw	A strong, curved, sharp-pointed process (often toothed) on the distal extremity of a leg.
Claw tuft	A bunch of hairs at the tip of the leg tarsus in those spiders with two claws.
Clypeus (adj. clypeal)	The area between the anterior row of eyes and the anterior edge of the carapace.
Comb	It is a series of serrated spines which they use to comb out the silk from the spinnerets.
Cribellum	A spinning organ in the form of, a transverse sieve-like plate, just in front of the spinnerets in some cribellate spiders.
Eye tubercle	Mygalomorphs, eye turret, eyes grouped together on a turret
Labium	Lower appendage in the mouth area fused to the ventral plate of the cephalothorax.
Laterigrade	Denotes the orientation of the legs of some spiders, which are rotated on their bases so that the prolateral surface is uppermost; also describes the mode of locomotion of such spiders
Metatarsus	The sixth segment of the leg, counting from the body end, not found in the palps.
Procurved	Curved as an arc having its ends anterior to its center.
Prograde	Denotes the normal or non-laterigrade orientation of the legs in spiders with limbs not rotated on their bases; also used to describe the mode of locomotion of such spiders.
Recurved	Curved as an arc having its ends posterior to its center.
Scopula	A brush of hairs on the ventral aspect of the tarsus and metatarsus in some spiders.
Serrated	Saw-like.
Setae	Hair-like spines found on the outer body surface.
Spinnerets	Paired appendages at the posterior end of the abdomen, through its spigots silk, are extruded.
SpK	Spiders and their Kin (Levi & Levi, 1968).
Stridulating organ	An area with numerous sclerotized, parallel striate which are rubbed by hairs or a tooth on an opposing structure thus creating sound. It can be located on the palps, legs, chelicerae, abdomen or the carapace.
Tarsal claw	Sharply curved structure at the tip of the tarsus, typically on the palp and 2 or 3 on the legs.
Trichobothrium	A long, fine hair rising almost vertically from a hemispherical socket on the legs, which detect air vibration and currents.

Acknowledgements

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ARABIC SUMMARY

مفتاح تصنيفي مصور للعناكب الأرضية التي تقطن محافظة أسيوط ، جنوب مصر

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تعتبر العنكبوتيات من أكبر رتب طائفة العنكبيات والتي تمثل ما يقرب من 48000 نوع من الأنواع المختلفة منتمية الي 120 عائلة ، والتي تعيش في جميع البيئات والأماكن ، ونظرا لأهمية العناكب في البيئة الأرضية ودورها في حفظ التوازن البيئي ، جاءت هذه الدراسة والتي تهدف إلي تقديم كتالوج كدليل مستخدم للمساعدة في كيفية تصنيف العناكب بصورة علمية طبقا للصفات الظاهرية المميزة لكل مرتبة تصنيفية وذلك لتسهيل عملية التعرف علي الأنواع التي تقطن محافظة أسيوط في جنوب مصر ، حيث تمت الدراسة في 6 مواقع مختلفة تم اختيارها لتغطي المحافظة بالكامل ، وذلك لمدة عام (من ديسمبر 2015 وحتي نوفمبر 2016) ، باستخدام الشبكة اليدوية للتجميع ، وقد أظهرت الدراسة وجود 47

نوعا من العناكب الأرضية تنتمى الي 42 جنسا متمثلة في 22 عائلة ، ومن بين هذه الأنواع سجلت الدراسة وجود 40 نوعً تم تجميعه لأول مرة في محافظة أسيوط.