Revision of vespid Wasps (Hymenoptera; Vespidae) in Iraq

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Article published on March 23, 2017

Key words: Eumeninae, Hymenoptera, Iraq, Polistinae, Vespidae, Vespinae

Abstract

A key to the recognized subfamilies and genera of Vespidae that collected in current investigations from different localities of Iraq are presented. A total of 10 species are recorded: *Eumenes pomiformis* (Fabricius), *Odynerus spinipes* (Linnaeus), *Delta esuriens* (Fabricius), *D. dimidiatipenne* (de Saussure), *Stenodynerus* sp., *Polistes gallicus* (Linnaeus), *P. wattii* Cameron, *Vespa orientalis* Linnaeus, *Vespula germanica* (Fabricius) and *V. vulgaris* (Linnaeus).

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Introduction

The family of Vespidae (Order; Hymenoptera) is a large, diverse, cosmopolitan family of wasps, including nearly all the known eusocial wasps and many solitary wasps (Pickett and Wenzel, 2004).

In earlier literatures, this guild was consisted form two subfamilies: Polistinae and Vespinae; while the subfamilies Eumeninae and Masarinae were ranked as different families; currently are considered as subfamilies belong to Vespidae as well (Carpenter, 1982).

In general, the social wasps are foragers that collect water; plant fibers and carbohydrates hunt other arthropods and scavenge on animal proteins (Raveret Richter, 2000); for these reasons that some species are pests, interfering intensely with human activities and domestic animals (Akre et al., 1980).

The occurrence of some species belonging to the genera: Polistes Latreille, Vespa Linnaeus and Vespula Thomson in the crop fields, urban and suburban areas and entertaining places, often results in a pest status that ranges from a gentle nuisance to harsh hazard for workers and people, who can be stung too (Chang, 1988; Seath, 1999).

According to Goulet and Huber (1993) the members of vespid wasps can be identified by many characters: compound eyes with inner margin deeply emarginated; pronotum with posterodorsal margin V-shaped, and with posterolaterally apex acute and strongly produced above the anterior margin of tegula; mesocoxae and metacoxae closest; hind wing without distinct claval lobe, and usually with distinct jugal lobe but sometimes without; inner spur of hind tibia weakly modified as a calcar.

First gasteral sternite separated from the second by a deep constriction; eighth gasteral sternite or hypopygium in male is simple, not concealed. In worker caste, usually no sterile; the sexual dimorphisms are slightly and both sexes macropterous.

In Iraq; there is not any paper that deals with the survey of Vespidae species or designed key to genera or species, this reason was confirmed by Haddad et al. (2007), so this study was suggested that for the purpose of identifying the actual number of species that are found in Iraq, with key design to diagnose it, in addition to be the basis for wider studies in this area.

Materials and methods

The Specimens collection: The wasps were collected from different regions of Iraq, by using aerial and sweeping nets during 2016; in addition to, we used many specimens that unknown and preserved in the department of Entomology and Invertebrates, Iraq Natural History Research Center & Museum, University of Baghdad.

The specimens were killed by freezing, and mounting with insect pins, date and localities of sampling were provided.

The specimens and their morphological features were photographed by a Samsung galaxy S4, GT-19500 and used binocular dissecting microscope for clarification.

Identification:

The wasps were diagnosed to subfamilies, genera and species by using various taxonomic keys and designed a key to genera and species is chiefly based upon: Archer (1989 a, b); Gusenleitner (1998); Tüzün et al. (2000); Carpenter and Nguyen (2003); Dvořák and Roberts (2006); Barthélémy (2008); Buck et al. (2008); Carpenter (2008); Ebrahimi and Carpenter (2008); Dvořák et al. (2012) and Nguyen (2015).

To confirm the diagnosis of some species of wasps, they compared with the known specimens that stored in collection of Iraq Natural History Research Center and Museum, University of Baghdad.
**Result and discussion**

*Key to subfamilies and genera*

1-Apical of mid tibiae with two spurs (Fig. 1A), claws simple (Fig. 1B), parategula missing (Fig. 1E) (social species) .................2

Apical of mid tibiae with one spur (Fig. 2A), claws bifid (Fig. 2B), parategula present (Fig. 2C). ...........

subfamily: Eumeninae ...... 3.

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**Fig. 1.** The species of *Polistes wattii*, A: two spurs on apical part of mid tibia; B: claws of mid tibia; C: dorsal surface of hind coxa; D: basal part of hind wing that shown jugal lobe (yellow pointer), E: dorsal surface of thorax that shown no parategula (red pointer); F and G: lateral and dorsal view of propodeum and anterior parts of gaster (Prop: propodeum; T: tergite).

**Fig. 2.** The different parts of *Delta dimidiatipenne*, A: One spurs on apical part of mid tibia; B: Claw of mid tibia (red pointer on bifid); C: Dorsal surface of thorax.
2-Coxa with longitudinal carina dorsally (Fig. 3A); jugal lobe absent on hind wing (Fig. 3B); first gastral segment truncate anteriorly in dorsal view, so that gaster appears sessile, sharply angular in lateral view (Fig. 3C, D) .......... subfamily: Vespinae ..........6.

Coxa without longitudinal carina dorsally (Fig. 1 C); jugal lobe present on hind wing (Fig. 1 D); first gastral segment not anteriorly truncate dorsally, gaster sub-sessile and semi-petiolate, gradually sloping in lateral view (Fig. 1 F, G) ............. subfamily: Polistinae .........

Genus of *Polistes* Latreille, 1802.

**Fig. 3.** The species of *Vespa orientalis*, A: dorsal surface of hind coxa (the pointer on carina); B: base of wings; C, D: lateral and dorsal view of propodeum and anterior parts of gaster, (Prop: propodeum; T: tergite).

3-Gaster not petiolate; first gastral segment relatively short, always wider than long (Fig. 4A, B) .............4

Gaster clearly petiolate; the first gastral segment at least two times as long as wide (Fig. 4C, D) ............ 5.

4- Anterior face of pronotum with two small, close set, deeply impressed medial pits (Fig. 5 A); tegula campanulate, abruptly expanded and broadly rounded posterolaterally (Fig. 5B) ............ Genus of *Stenodynerus* de Saussure, 1863

Anterior face of pronotum without pits; tegula variously shaped, posteriorly rounded (Fig. 4A) ........ Genus of *Odynerus* Latreille, 1802.

5-Pronotum with pretegular carina (Fig 6 A); first gasteral sternite gradually widening toward the apex, usually clear along the full petiole length, never appearing as a posterior crescent like-shaped sclerite, lateral margins of first gasteral tergite not meeting ventrally (Fig 6C); first gasteral tergite without clearly punctate (Fig. 6E) ........... Genus of *Delta* de Saussure, 1855.

Pronotum without pretegular carina (Fig. 6B); first gasteral sternite suddenly widening at near apex, forming a posterior crescent like-shaped sclerite, lateral margins of first gasteral tergite very closely from each to other ventrally (Fig. 6D); first gasteral tergite usually densely punctate (Fig. 6F)............... Genus of *Eumenes* Latreille, 1802.
6-Vertex long, distance between posterior ocelli and occiput greater than distance between posterior ocelli and compound eyes (Fig. 7A) .......... Genus of Vespa Linnaeus, 1758.

**Fig. 4.** A, B: Dorsal and lateral body of Odynerus sp.; C, D: Dorsal and ventral view of Delta sp.

**Fig. 5.** Genus of Stenodynerus, A: dorsal surface of anterior parts (pointer refer to pits that found on anterior margin of pronotum), B: tegula; C, D: female habit, lateral and dorsal view.
Vertex shorter, distance between posterior ocelli and occiput shorter than or equal to distance between posterior ocelli and compound eyes (Fig. 7B).……..…….… Genus of Vespa Thomson, 1869.

Subfamily
Eumeninae
In our investigations, there four species that belonging to three genera belonging to this subfamily, these species are:

Stenodynerus sp. (Figure 5).

Material

Fig. 6. Delta esuriens A: lateral view of thorax, C & E: ventral and dorsal metasoma that shown petiole; Eumenes pomiformis B, lateral view of thorax, D & F ventral and dorsal of petiole (yellow pointer: sternite1, red pointer: tergite1).

Eumenes pomiformis (Fabricius, 1781) (Plate 8 A, B)

Material

Distribution
Iraq (Khalaf, 1958); Europe, Malta, Turkey, Lebanon, Crimea, Tunisia (Yıldırım and Kojima, 1999).

Male: Clypeus yellow, mandibles black. Scape yellow ventrally, black dorsally.

The last flagellomere mat yellow recurved hook-shaped to the eleventh flagellomere. Sixth and seventh gasteral tergites black, the rest with yellow bands.
Female: Clypeus yellow, longer than wide and free margin is toothed. Mandibles black. Scape yellow ventrally, black dorsally; pedicel and flagellum black. Gasteral tergites 3-5 with yellow bands, 6th tergum black.

*Odynerus spinipes* (Linnaeus, 1758) (Figure 4 A, B)

**Material**


**Distribution**

Europe, Turkey (Yıldırım and Kojima, 1999); in Iraq, this species is registered under name *Hoplomerus spinipes* (Linnaeus, 1758) by Khalaf (1958).

The males of this species characterized by markings of all body with yellow; mid femurs diagnosed by have toothed-like projections.

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*Delta dimidiatipenne* (de Saussure, 1852) (Figure 4, 6, 8C).

**Materials**


**Distribution**

Iraq (Derwesh, 1965); North-West Africa, Egypt, Somalia, Turkey, Yemen, and Afghanistan to Nepal and western India (Vecht and Fischer, 1972); Iran, Oman, Palestine, Saudi Arabia (Yıldırım and Kojima, 1999); Pakistan (Bodlah et al., 2011); Canary Islands (Vardy and Vardy, 1988).

This species can be diagnosed from *Delta esuriens* by the posterior part of second gasteral tergite black, there no yellow color in other parts, while in the *D. esuriens*, the posterior part of second gasteral tergite and other different parts of body with yellow color.

*Delta esuriens* (Fabricius, 1787) (Plate 4 C, D; 6 A, C, E; 8D, E)

**Materials**

(8♂, 13♀♀): Baghdad: Jaddria, 30.IX.2016 (2♀♀); Wasit: Al-Zubaidiya 9.IX.2016 (2♂♂, 4♀♀); Dohuk, Sersenk, 27.VII.2016 (1♂, 3♀♀); Erbil: Rawanduz, 1.VIII.2016 (2♂); Maysan: Hawizeh Marshes, Umm An-Ni’aaj, 28. X.2016 (3♂♂, 4♀♀).

**Distribution**

This species was registered for Iraq by Morice (1921) as *Eumenes esuriens* (Fabricius), then Vecht and Fischer (1972) were referred to this species in Iraqi fauna as *Delta esuriens* (Fabricius); in the world it distributed in India, Saudi Arabia, Indonesia, Iran, Myanmar, Pakistan, Philippines, Sri Lanka; Thailand, Vietnam (Nguyen et al., 2007); Thailand (Srinivasan...
and Kumar 2010); Australia, Laos, Mauritius, Timor (Kumar, 2012; Kumar and Sharma, 2014).

*D. esuriens* characterizes by the mesoscutum with red and black markings; apical part of petiole with yellow band.

**Subfamily Polistinae**

According to previous checklists the genus of *Polistes* Latreille, 1802 was registered in Iraq only.

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*Fig. 8.* A, B: *Eumenes pomiformis*; C: Female of *Delta dimidiatipenne*; D, E: *Delta esuriens*.

**Polistes gallicus** (Linnaeus, 1767) *(Figure 9 A, B, C, D)*

**Materials**

(9♂♂, 11♀♀): Maysan; Amara, (1♂, 3♀♀) 27.X.2016; Wasit: Al-Zubaidiya, (6♂♂, 3♀♀) 29.VI.2016; Dohuk, Sersenk, (2♂♂, 5♀♀) 27.VII.2016.

**Distribution**

Iraq (1965); South and Central of Europe, North Africa, Ukraine, Russia, Caucasus, Mongolia, China, Israel, Turkey (Carpenter, 1996); Jordan (Haddad et al., 2007).

*P. gallicus* characterize from *P. nimpha* (Christ, 1791) that recorded to Iraqi fauna previously (Derwesh, 1965) by having many features: generally, body color less black; female: mandibles black with yellow spot, genae and temples black; last sternum yellow with black marking. Male: lateral sides of clypeus convergent below keel between antennae without groove; clypeus without ridges at lateral margins; antennae with orange-yellow color above beyond third antennomere.

**Polistes wattii**

Cameron, 1900  *(Figure 1; 9 E, F, G)*

**Materials**

Fig. 9. *Polistes gallicus* A, B: male and female, C, D: face male and female; E, F, G: male, female and ocelli of *P. wattii*.

**Distribution**

Iraq (El-Haidari et al., 1971); Mauritius, China, Afghanistan, Iran, Saudi Arabia, United Arab Emirates, Tajikistan, Oman, Pakistan and India (Kumar and Sharma, 2014 and 2015).

The species of *P. wattii* differ from *P. olivaceus* (De Geer, 1773) that registered in Iraq by Khalaf and Al-Omar (1974) in different features: the first one is larger form wasps (usually exceed 16 mm), occipital carina in female complete; ocellus enclosed with black mark. Mesoscutum brownish without distinct yellow stripes; metasoma brown, mixed with yellow color; coxae without black markings.

**Subfamily: Vespinae**

*Vespa orientalis* Linnaeus, 1771 (Figure 3, 10 C).

**Materials**


Distribution

Iraq (Morice, 1921); Afghanistan, Pakistan, India, Mexico, Italy, Malta, Bulgaria, Albania, Romania, Russia, Uzbekistan, Tajikistan, Turkmenistan, Turkey, Nepal, China, Madagascar, Greece, Cyprus, Ethiopia, Somalia, Algeria, Libya, Egypt, Israel, Iran, Bahrain, Oman, Saudi Arabia, U.A.E., Yemen, Palestine, Lebanon, Syria and Jordan (Carpenter and Kojima, 1997; Dvořák, 2006; Gusenleitner, 2013; Kumar and Sharma, 2014).

This species can be diagnostic by: pretergular carina complete; second, fifth and sixth gasteral tergites dark brown color; third and fourth gasteral tergites yellow.
**Vespula germanica** (Fabricius, 1793).

**Materials**

**Distribution**
Iraq (Khalaf, 1958); South Africa (Whitehead and Prins, 1975); North Africa, South and Central Europe, Scandinavia (Pekkarinen and Huldén, 1995), Asia Minor, Iran, Afghanistan, Pakistan, India, Central Asia, Kazakhstan, Mongolia, China, Korea. Iceland, Canada, USA, Chile, Argentina, Australia, New Zealand, Russia, N. Caucasus, Southern Siberia (Tobias, 1978; Dubatolov, 1998).

![Fig. 9. Polistes gallicus A, B: male and female, C, D: face male and female; E, F, G: male, female and ocelli of P. wattii.](image)

**Vespula vulgaris** (Linnaeus, 1758).

**Materials**

**Distribution**
Iraq (Khalaf, 1961); Most of North America, from Alaska to northern Mexico; widespread in Europe; across the Palaearctic part of Asia to Japan; introduced to Iceland, New Zealand, Australia and Hawaii (Carpenter and Kojima, 1997).

The two species above that belonging to *Vespula* are very closely that having body with black and yellow colored, but we can isolate *V. germanica* from *V. vulgaris* by: margin behind third mandibular tooth distinctly concave, usually with three black dots on clypeus while in last species the margin behind third mandibular tooth straight and clypeus usually with one black mark (Figure 10 A, B).
Fig. 10. A: Vespula vulgaris, female; B: Vespula germanica, female; C: Vespa orientalis, female.

Acknowledgments
The author is thankful to the professor of insect taxonomy, Dr. M. S. Abdul-Rassoul, Iraq Natural History Research Center and Museum, Baghdad University for providing facilities.

References


Morice FD. 1921. Annotated lists of aculeate Hymenoptera (except Heterogyna) and chrysids recently collected in Mesopotamia and north-west Persia. Journal of the Bombay Natural History Society 28, 192–203.


