

ADDITIONS TO THE KNOWLEDGE OF THE GENUS *SYMMORPHUS* WESMAEL, 1836 (HYMENOPTERA: VESPIDAE: EUMENINAE) IN INDIA WITH TWO NEW RECORDS OF SPECIES

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ABSTRACT

Two species of potter wasps of the genus *Symmorphus* Wesmael, 1836, namely *Symmorphus* (*Symmorphus*) *alkimus alkimus* Cumming & van der Vecht, 1986 and *S. (S.) ambotretus* Cumming, 1989, are recorded here for the first time from India. A key to the Indian species of the genus and an updated checklist of the species of *Symmorphus* of the Indian subcontinent are also provided.

Key words: Hymenoptera; Vespidae; Eumeninae; *Symmorphus*; first records; key; checklist; India.

RESUMEN

Novedades en el conocimiento del género *Symmorphus* Wesmael, 1836 (Hymenoptera: Vespidae: Eumeninae) en la India, con dos primeras citas de especies.

Se citan de la India por primera vez dos especies del género *Symmorphus* Wesmael, 1836, *Symmorphus* (*Symmorphus*) *alkimus alkimus* Cumming & van der Vecht, 1986 y *S. (S.) ambotretus* Cumming, 1989. Se incluyen una clave para las especies indias del género y una lista actualizada de las especies de *Symmorphus* del subcontinente indio.

Palabras clave: Hymenoptera; Vespidae; Eumeninae; *Symmorphus*; primeras citas; clave; catálogo; India.

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Introduction

Wesmael (1836) described the genus *Symmorphus* as a subgenus of *Odynerus* Latreille, 1802 based on the species *Odynerus elegans* Wesmael, 1833 [known now as *Symmorphus gracilis* (Brullé, 1832)]. This genus, with 51 species in two subgenera (*Parasymmorphus* Cumming & van der Vecht, 1986 and *Symmorphus* s.s.), is distributed in the Palearctic, Oriental and Nearctic Regions and the northernmost Neotropical Region. Six species of *Symmorphus* have so far been reported from India. In this paper, two more species, namely *Symmorphus* (*Symmorphus*) *alkimus alkimus* Cumming & van der Vecht, 1986, and *S. (S.) ambotretus* Cumming, 1989, are recorded for the first time from India. *Symmorphus (S.) alkimus alkimus* is recorded from Kerala and *S. (S.) ambotretus* is recorded from Kashmir. A key to the Indian species and an updated checklist of the Indian subcontinent's species are also provided.

Material and methods

The studied specimen of *Symmorphus (Symmorphus) alkimus alkimus* was collected at Muthappanpuzha (11°26'37.89" N, 76°05'16.00" E, alt. 52 m), in the Kozhikode district of Kerala, which is a part of the Western Ghats, one of the biodiversity hotspots of India. The specimens of *S. (S.) ambotretus* were collected at the village of Heff (33°75'94" N, 74°80'39" E, alt. 1594 m), in the Shopian district of Kashmir. The specimens were examined under a LEICA M60 stereozoom microscope and the images captured with a LEICA DFC-450 camera. The studied specimens have been added to the 'National Zoological Collections' of the Western Ghats Regional Centre, Zoological Survey of India, Kozhikode, India (ZSIK).

Abbreviations used for museums

USNM = National Museum of Natural History, Washington, DC, USA

ZSIK = Western Ghats Regional Centre, Zoological Survey of India, Kozhikode, India.

Abbreviations used for morphological terms

H = head
M = mesosoma
S = metasomal sternite
T = metasomal terga.

Results and discussion

Symmorphus (Symmorphus) alkimus alkimus
Cumming & van der Vecht, 1986
Figs. 1–6

Symmorphus alkimus Cumming & van der Vecht, 1986: 23, 28, fig. 3, ♀, ♂ (in subgenus *Symmorphus*) - "SRI LANKA: Kan. [Kandy] Dist./Udawattakele" (holotype ♀ USNM); also from four other localities.

Symmorphus alkimus alkimus - Cumming, 1989: 5, 21 (key), 27 (in subgenus *Symmorphus*).

MATERIAL EXAMINED. INDIA: Kerala, Kozhikode district, Muthappanpuzha, 1♀, 26.iv.2012, Coll. P. Girish Kumar, Regd. No. ZSI/WGRC/I.R.-INV.10206.

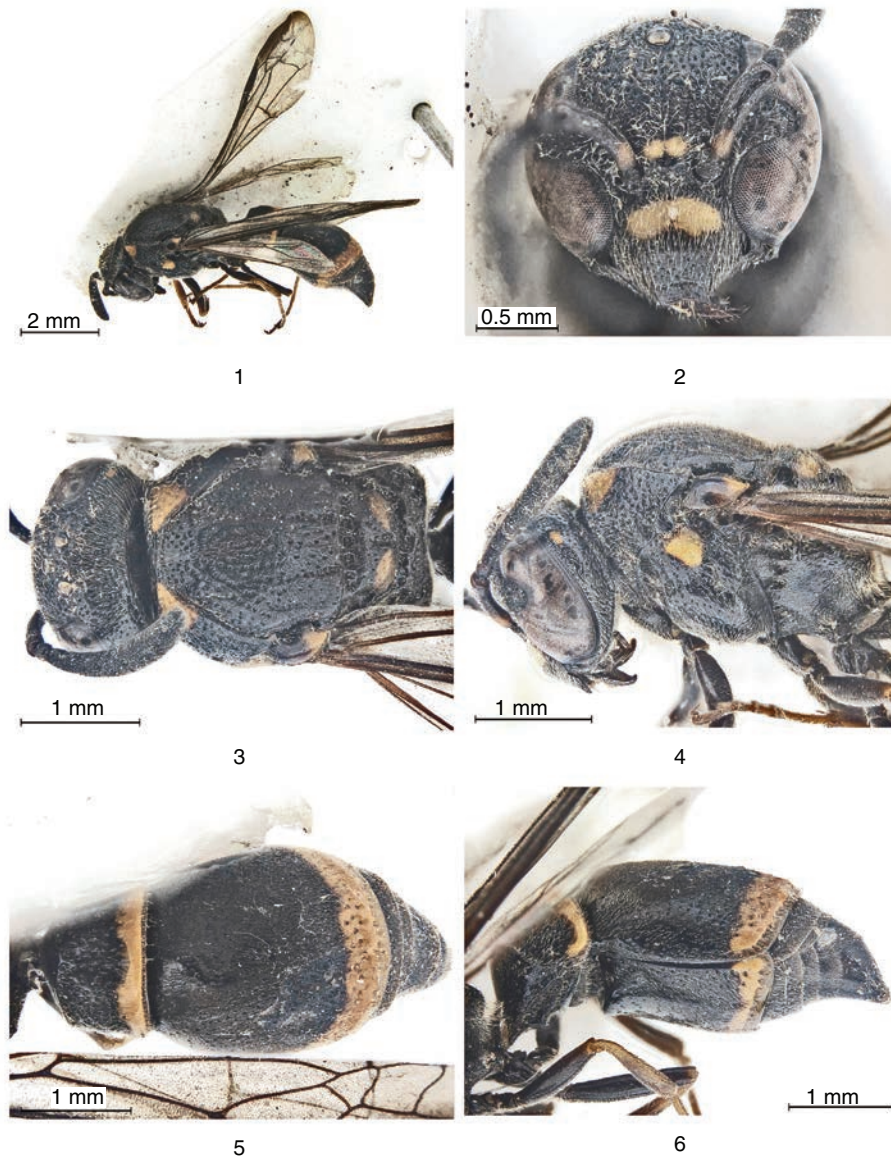
DIAGNOSIS. ♀. Median area of occipital carina without submedial incisions, slightly pointed medially; metanotum nearly vertical; T1 distinctly broad, medial postcarinal length 0.47-0.49x apical width; base of T2 obtusely angulate; base of S2 abruptly truncate; apical margin of T2 & S2 depressed; female clypeus shallowly emarginate apically; propodeal valvula short posteriorly, fused distally to posterolateral projection of submarginal carina; mesepisternum with epicnemial carina dorsally obsolete, not extended to posterolateral margin of pronotum; female mandible with 5 teeth.

COLOUR DESCRIPTION. ♀. Black with yellow as follows: transverse band at base of clypeus; interantennal spot; postocular dot; spot at base of ventral side of scape; pair of spots on dorsal face of pronotum; pair of spots on scutellum; spot on top of mesopleuron; tegula posteriorly; outer surface of tibiae (on hind tibia not extended to apex); narrow apical band on T1; narrow subapical band on T2 and S2. Tarsi pale brown basally to dark reddish brown apically. Wings lightly infuscate.

DIMENSIONS. Body length (H+M+T1+T2): ♀, 7.5 mm; Forewing length: 6.5 mm.

DISTRIBUTION. India (**first record**): Kerala; Sri Lanka. A second subspecies, *S. alkimus dialeukus* Cumming, 1989, has been described from the Indonesian island of Sumatra (Cumming, 1989).

COMMENTS. The single female specimen examined here from Kerala has more extensive yellow markings on the body than the known material of the Sri Lankan population (comparison based on the descriptions in: Cumming & van der Vecht, 1986; Cumming, 1989). The additional yellow markings present in the Kerala specimen are as follows: transverse band at base of clypeus, spot at base of ventral side of scape, pair of spots on dorsal face of pronotum, pair of spots on scutellum, spot on top of mesopleuron and tegula posteriorly. These differences may be due to geographical isolation of Kerala from Sri Lanka. The colour differences between the Kerala specimen and the Sri Lankan population are perhaps significant, but it is not easy to decide, especially based on just one specimen, whether to describe a new subspecies. There is not enough information available about the possible colour variation of the Sri Lankan population



Figs. 1-6.— *Symmorphus (Symmorphus) alkimus alkimus* Cumming & van der Vecht, 1986, ♀. 1: Body, in profile. 2: Head, in frontal view. 3-4: Head and mesosoma, in dorsal (3) and lateral (4) view. 5-6: Metasoma, in dorsal (5) and lateral (6) view (Photographs by P.G. Kumar).

Figs. 1-6.— *Symmorphus (Symmorphus) alkimus alkimus* Cumming & van der Vecht, 1986, ♀. 1: Cuerpo de perfil. 2: Cabeza en vista frontal. 3-4: Cabeza y mesosoma, en vistas dorsal (3) y lateral (4). 5-6: Metasoma, en vistas dorsal (5) y lateral (6) (Fotos de P.G. Kumar).

(known only from the type material), and neither do we know if there is perhaps a cline across southern India, with a more xanthic form at the western end (Kerala) and a more melanistic form in the east (Sri Lanka), so, for the time being, we are identifying our Kerala specimen as *Symmorphus alkimus alkimus*.

***Symmorphus (Symmorphus) ambotretus* Cumming, 1989**
Figs. 7–18

Symmorphus ambotretus Cumming, 1989: 5, 21 (key), 28, ♀, ♂ (in subgenus *Symmorphus*) - “Mt[.]Omei [Emei Shan]/Szechuen [Sichuan Province] China/4400 ft” (holotype ♀ USNM); also

from another locality; and Nepal; fig. 11, 13. — Additional citations: Kim & Lee, 2002: 284 (key), 286, figs. 1-6 (Korea). — Gusenleitner, 2010: 702, fig. 14 (compared to *S. laoticus* n. sp.). — Li & Chen, 2014: 17 (China), 23 (key). — Kim, 2017: 243, figs. 5A, 5B, 5C, key.

MATERIAL EXAMINED. INDIA: Jammu & Kashmir, Shopian district, Heff Village, 2♀♀ & 1♂, 18.viii.2017, Coll. Altaf Hussain Sheikh, Regd. Nos. ZSI/WGRC/I.R.-INV.10207–10209.

DIAGNOSIS. ♀. Occipital carina with 2 submedial incisions that delimit a blunt median tooth; T1 slightly



Figs. 7-12.— *Symmorphus (Symmorphus) ambotretus* Cumming, 1989, ♀. 7: Body, in profile. 8: Head, in frontal view. 9: Head and mesosoma, in dorsal view. 10: Metasoma, in dorsal view. 11: T1, in dorsal view. 12: Metasoma, in lateral view (Photographs by P.G. Kumar).

Figs. 7-12.— *Symmorphus (Symmorphus) ambotretus* Cumming, 1989, ♀. 7: Cuerpo de perfil. 8: Cabeza en vista frontal. 9: Cabeza y mesosoma en vista dorsal. 10: Metasoma en vista dorsal. 11: T1 en vista dorsal. 12: Metasoma en vista lateral (Fotos de P.G. Kumar).

broad, medial postcarinal length 0.51-0.57x apical width; metasomal segment 2 in profile with base of tergum obtusely angulate and sternum abruptly truncate posteriorly; female clypeus shallowly emarginate apically; propodeal valvula short posteriorly, fused distally to posterolateral projection of submarginal carina; mesepisternum with epicnemial carina dorsally obsolete, not extended to posterolateral margin of pronotum; female mandible with 5 teeth.

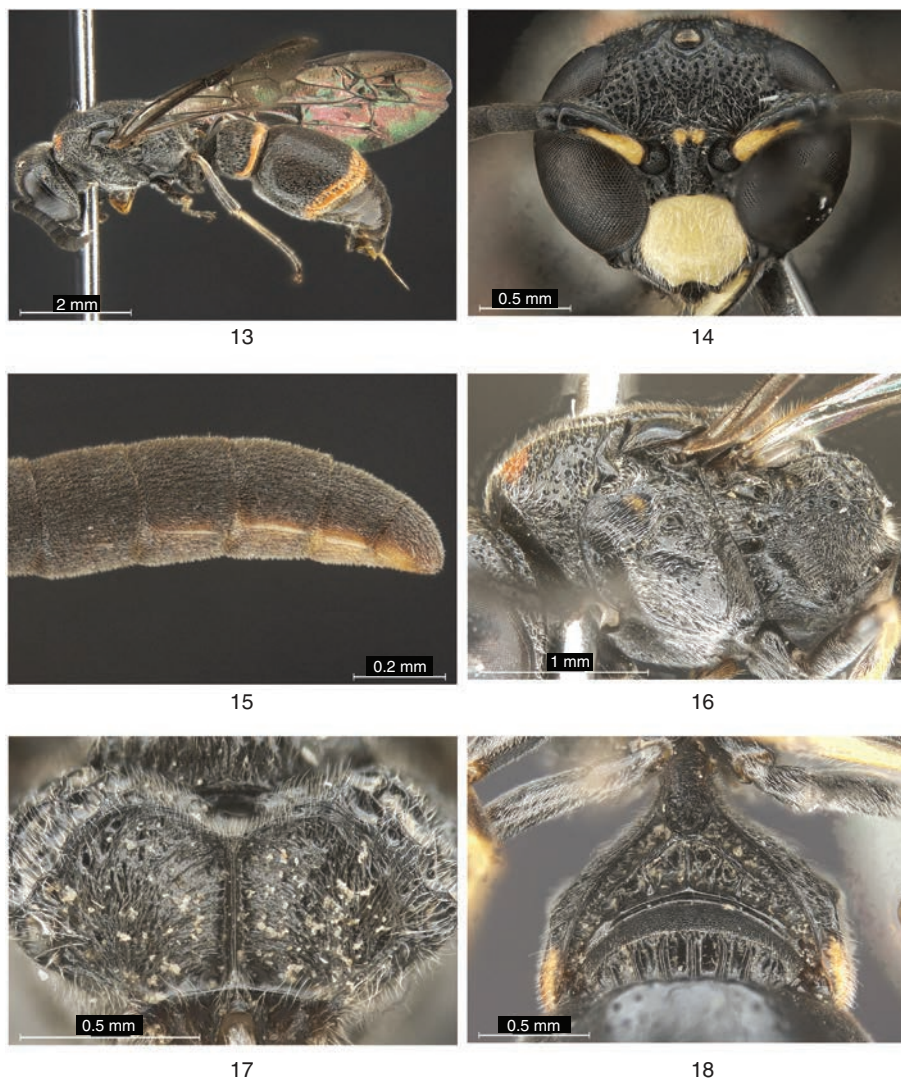
COLOUR DESCRIPTION. ♀. Black with orange red as follows: interantennal spot and postocular spot very small and vague; pair of spots on dorsal face of pronotum; pair of vague spots on scutellum (absent in one female); vague spot on top of mesopleuron; apical

band of T1; subapical band of T2 and S2. Tarsal claws brown. Wings lightly infuscate.

♂. In coloration similar to female except as follows: clypeus yellow except black apical margin; mandible yellow except black outer margins; scape with basal yellow spot; interantennal spot yellow; legs with line on outer surface of tibia and basitarsus yellow.

DIMENSIONS. Body length (H+M+T1+T2): ♀, 7.5-8 mm; Forewing length: 7.5 mm; ♂, 6.2 mm; Forewing length: 6 mm.

DISTRIBUTION. India (**first record**): Jammu & Kashmir; Nepal; China: Sichuan, Yunnan, Chongqing, Shaanxi; Korea.



Figs. 13-18.— *Symmorphus (Symmorphus) ambotretus* Cumming, 1989, ♂. 13: Body, in profile. 14: Head, in frontal view. 15: Apical antennal segments. 16: Mesosoma, in lateral view. 17: Propodeum. 18: S1 (Photographs by P.G. Kumar).

Figs. 13-18.— *Symmorphus (Symmorphus) ambotretus* Cumming, 1989, ♂. 13: Cuerpo de perfil. 14: Cabeza en vista frontal. 15: Últimos segmentos antenales. 16: Mesosoma en vista lateral. 17: Propodeo. 18: S1 (Fotos de P.G. Kumar).

Key to the Indian species of the genus *Symmorphus* (modified from Cumming, 1989)

- 1 Propodeal valvula produced posteriorly, free distally from posterolateral projection of submarginal carina; mesepisternum with epicnemial carina complete, extended to posterolateral margin of pronotum; female mandible with 4 teeth; metasomal segment 2 in profile with base of tergum obtusely angulate and sternum abruptly truncate posterior of basal sulcus; T1 elongate, medial postcarinal length 0.73x apical width; occipital carina with 2 submedial incisions that delimit a sharp median tooth; interocellar area not raised ***S. (Parasymmorphus) parvilineatus*** (Cameron, 1904)
- Propodeal valvula short posteriorly, fused distally to posterolateral projection of submarginal carina; mesepisternum with epicnemial carina dorsally obsolete, not extended to posterolateral margin of pronotum or absent; female mandible with 5 teeth; other characters partly or completely different 2
- 2 Metasomal segment 2 in profile with base of tergum obtusely angulate and sternum abruptly truncate posterior of basal sulcus; female clypeus shallowly emarginate apically 3
- Metasomal segment 2 in profile with base of tergum gradually rounded and sternum flat to slightly convex posterior of basal sulcus; female clypeus shallowly to deeply emarginate apically 4
- 3 Occipital carina with 2 submedial incisions that delimit a blunt median tooth; T1 slightly broad, medial postcarinal length 0.51-0.57x apical width; maculation orange-yellow to orange red ***S. (Symmorphus) ambotretus*** Cumming, 1989
- Occipital carina without submedial incisions, slightly pointed medially; T1 distinctly broad, medial postcarinal length 0.47-0.49x apical width; maculation yellow ***S. (S.) alkimus alkimus*** Cumming & van der Vecht, 1986

- 4 Pseudosternum of mesopleuron with high reflexed border along anterior margin; pronotal carina obsolete along entire width of dorsum of pronotum; S1 without basal carina; S2 in profile with base slightly convex posteriad of basal sulcus **S. (S.) gracilis** (Brullé, 1832)
- Pseudosternum of mesopleuron with low to moderately low reflexed border along anterior margin; pronotal carina present at least laterally or medially along dorsum of pronotum, or complete; S1 with or without basal carina; other characters partly or completely different5
- 5 Mesosoma with sparse to moderately dense long setae in addition to short pubescence6
- Mesosoma without long setae in addition to short pubescence7
- 6 S1 with basal carina (slightly obscure in some specimens); propodeal valvula pointed dorsally, extended apically along posterolateral projection of submarginal carina as a prominent acute tooth; small to moderate size species (H+M+T1+T2 = 8.5-10 mm); maculation orange-yellow **S. (S.) violaceipennis** Giordani Soika, 1966
- S1 without basal carina; propodeal valvula somewhat rounded dorsally, barely extended apically along posterolateral projection of submarginal carina; moderate to large size species (H+M+T1+T2 = 10.5-14 mm); maculation white to yellow **S. (S.) crassicornis** (Panzer, 1798)
- 7 S1 with lateral oblique ridges low and barely raised basally, median longitudinal ridge prominent; propodeum with medial length of dorsal shelf 2.01-2.63x length of trans-scutal sulcus **S. (S.) nipteroides** Cumming, 1989
- S1 with lateral oblique ridges raised basally to height of posterior margin of basal carina, median longitudinal ridge indistinct; propodeum with medial length of dorsal shelf 1.13-1.38x length of trans-scutal sulcus **S. (S.) tukvarensis** (Meade-Waldo, 1910)
5. *Symmorphus (Symmorphus) gracilis* (Brullé, 1832) — India (Jammu & Kashmir). *Elsewhere*: Sweden, Denmark, Netherlands, Belgium, Luxembourg, England, Wales, Scotland, France, Spain, Portugal, Italy, Switzerland, Germany, Austria, Czech Republic, Slovakia, Hungary, Poland, Belarus, Lithuania, Romania, Ukraine, Bulgaria, Montenegro, Albania, Macedonia, Greece, Turkey, Lebanon, Syria, Jordan, Iran, Armenia, Kazakhstan.
6. *Symmorphus (Symmorphus) lamriensis* Gusenleitner, 2010 — Nepal.
7. *Symmorphus (Symmorphus) nipteroides* Cumming, 1989 — India (Jammu & Kashmir).
8. *Symmorphus (Symmorphus) tukvarensis* (Meade-Waldo, 1910) — India (Himachal Pradesh, Sikkim).
9. *Symmorphus (Symmorphus) violaceipennis* Giordani Soika, 1966 — India (Sikkim), Nepal; China (Yunnan, Sichuan).

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References

- Bequaert, J., 1928. A study of certain types of diplopterous wasps in the collection of the British Museum. *Annals and Magazine of Natural History*, Series 10, 2: 138–176. <https://doi.org/10.1080/00222932808672864>
- Cumming, J. M., 1989. Classification and evolution of the eumenine wasp genus *Symmorphus* Wesm. (Hymenoptera: Vespidae). *Memoirs of the Entomological Society of Canada*, 148: 1–168.
- Cumming, J. M. & Vecht, J. van der, 1986. New Oriental species of *Symmorphus* Wesm., with description of a new subgenus (Hymenoptera: Vespidae, Eumeninae). *Entomologische Berichten*, 46: 23–32.
- Giordani Soika, A., 1941. Studi sui vespidi solitari. *Bollettino della Società Veneziana di Storia Naturale*, 2(3): 130–280.
- Gusenleitner, J., 2010. Bemerkenswerte Faltenwespen-Funde aus der orientalischen Region Teil 5 (Hymenoptera: Vespidae, Eumeninae). *Linzer biologische Beiträge*, 42(1): 695–709.
- Kim, J. K., 2017. Descriptions of three new species of the genus *Symmorphus* Wesm., 1836 (Hymenoptera: Vespidae: Eumeninae) from South Korea, with an updated revised key to Far Eastern species. *Zootaxa*, 4350(2): 234–250. <https://doi.org/10.11646/zootaxa.4350.2.2>
- Kim, J. K. & Lee, S. G., 2002. Taxonomic review of Korean eumenine wasp genus *Symmorphus* Wesm.

Checklist of the Indian subcontinent species of the genus *Symmorphus*

- Symmorphus (Parasymmorphus) parvilineatus* (Cameron, 1904) — India (Meghalaya*, Sikkim); Laos. *Bequaert (1928) and Giordani Soika (1941) reported this species from “Shillong (Assam)”. At present, Shillong is in the state of Meghalaya.
- Symmorphus (Symmorphus) alkimus alkimus* Cumming & van der Vecht, 1986 — India (**new record**) (Kerala); Sri Lanka.
- Symmorphus (Symmorphus) ambotretus* Cumming, 1989 — India (**new record**) (Jammu & Kashmir); Nepal. *Elsewhere*: China: Sichuan, Yunnan, Chongqing, Shaanxi; Korea.
- Symmorphus (Symmorphus) crassicornis* (Panzer, 1798) — India (Himachal Pradesh). *Elsewhere*: Sweden, Finland, Denmark, England, Ireland, Belgium, Netherlands, Luxembourg, France, Spain, Italy, Switzerland, Germany, Austria, Czech Republic, Slovakia, Hungary, Poland, Belarus, Lithuania, Russia, Slovenia, Croatia, Bosnia and Herzegovina, Greece, Bulgaria, Turkey, Iran, Pakistan, Tajikistan, Kyrgyzstan, Kazakhstan, Mongolia, China (Manchuria).

- (Hymenoptera: Vespidae: Eumeninae). *Insecta Koreana*, 19(3-4): 283–297.
- Li, T. & Chen, B., 2014. The taxonomic accounts of the genus *Symmorphus* Wesmael (Hymenoptera, Vespidae, Eumeninae) from China, with descriptions of three new species. *ZooKeys*, 389: 9–26. <https://doi.org/10.3897/zookeys.389.7045>
- Wesmael, C., 1836. Supplément à la Monographie des Odyneres de la Belgique. *Bulletin de l'Académie Royale des Sciences et Belles-Lettres de Bruxelles*, 3: 44–51.