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## Description of a new species of *Spilomena* Shuckard, 1838 (Hymenoptera, Crabronidae: Pemphredoninae) from Western Ghats, India

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**ABSTRACT.** *Spilomena bobyjosei* Girish Kumar & Amal **sp. nov.**, a new species of aphid wasp in the genus *Spilomena* Shuckard, 1838, is described from the Southern Western Ghats of Kerala, India. This genus is rarely collected from the Indian subcontinent, and most species are described from a single specimen. The genus can be distinguished from closely related genera in having occipital carina absent, hind wing media not diverging before Cu-a, fore wing with marginal cell elongate (longer than stigma), one recurrent vein and two discoidal cells present, stigma large and pronotal collar with complete transverse carina. To date, ten species have been described from India. This paper adds an eleventh species. The differential diagnosis with its nearest species is provided. Additionally, a key to the Indian species of *Spilomena* is provided.

**Keywords:** Kerala, key, Pemphredonini, South India, Spilomenina, taxonomy

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## INTRODUCTION

The aphid wasp genus *Spilomena* Shuckard is a widely distributed genus within the subfamily Pemphredoninae of the family Crabronidae comprising 96 species worldwide (Pulawski, 2024). Most species are known from the Palearctic region followed by the Neotropical, Nearctic, Australian, Afrotropical, and Oriental regions (Blüthgen, 1953; Tsuneki, 1971; Bohart & Menke, 1976; Antropov, 1991, 1992; Bohart & Smith, 1995; Simon Thomas, 1995; Vikberg, 2000; Tessy et al., 2018, 2021, 2023; Bashir et al., 2021; Pulawski, 2024). Of the eighteen species known from the Oriental region ten are found in India (Turner, 1918; Tessy et al., 2018, 2021, 2023; Pulawski, 2024). Members of this genus make their nests in twigs, timber, decaying wood and buildings (Bohart & Menke, 1976; Turillazzi et al., 2014). They prey on thrips, psyllids, coccids and aphids (Blüthgen, 1953; Krombein, 1956; de Beaumont, 1964). Continuing the studies of the genus *Spilomena* from India, a new species is described here from Wayanad Wildlife Sanctuary of Kerala, India. A key to Indian species is also provided.

## MATERIAL AND METHODS

The specimen was collected by using yellow pan traps from Thottamoola (11°37'51.6"N 76°18'39.6"E Alt. 905 m, a.s.l.), Wayanad Wildlife Sanctuary, Kerala, India. The specimen was examined using a Leica® M205 stereo-zoom microscope. Imaging was performed with an attached LEICA® DFC 450 digital camera. Measurements were taken using Leica® LAS software (Leica Application Suite V3.80). Leica® Automontage Software was used to stack images taken at varying focal depths. The final illustrations were post-processed for contrast and brightness using Adobe® Photoshop. The type

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specimen of the new species is deposited in the 'National Zoological Collections' of the Zoological Survey of India, Western Ghat Regional Centre, Kozhikode, Kerala, India (ZSIK). The morphological terminology follows Tessa et al. (2021). The classification follows Pulawski (2024).

The following abbreviations are used: **OOL** = Ocello-Ocular Length (minimum distance between a posterior ocellus and eye); **POL** = Posterior Ocellar Length (distance between the two posterior ocelli); **S<sub>x</sub>** = metasomal sterna, *x* being the tergum number; **T<sub>x</sub>** = metasomal terga, *x* being the tergum number.

## RESULTS

### *Taxonomic hierarchy*

**Order Hymenoptera Linnaeus, 1758**

**Superfamily Apoidea Latreille, 1802**

**Family Crabronidae Latreille, 1802**

**Subfamily Pemphredoninae Dahlbom, 1835**

**Genus *Spilomena* Shuckard, 1838**

*Celia* Shuckard, 1837:182. Type species: *Celia troglodytes* (Van der Linden, 1829) [= *Stigmus troglodytes* Van der Linden], by original designation and monotypy. Junior homonym of *Celia* Zimmermann, 1832; *Spilomena* Shuckard, 1838:79. Substitute name for *Celia* Shuckard, 1837.

***Spilomena bobyjosei* Girish Kumar & Amal sp. nov. (Figs 1 & 2A-H)**

<https://zoobank.org/urn:lsid:zoobank.org:act:9212D9DC-BF76-4ABC-B095-A05E6423F2B4>

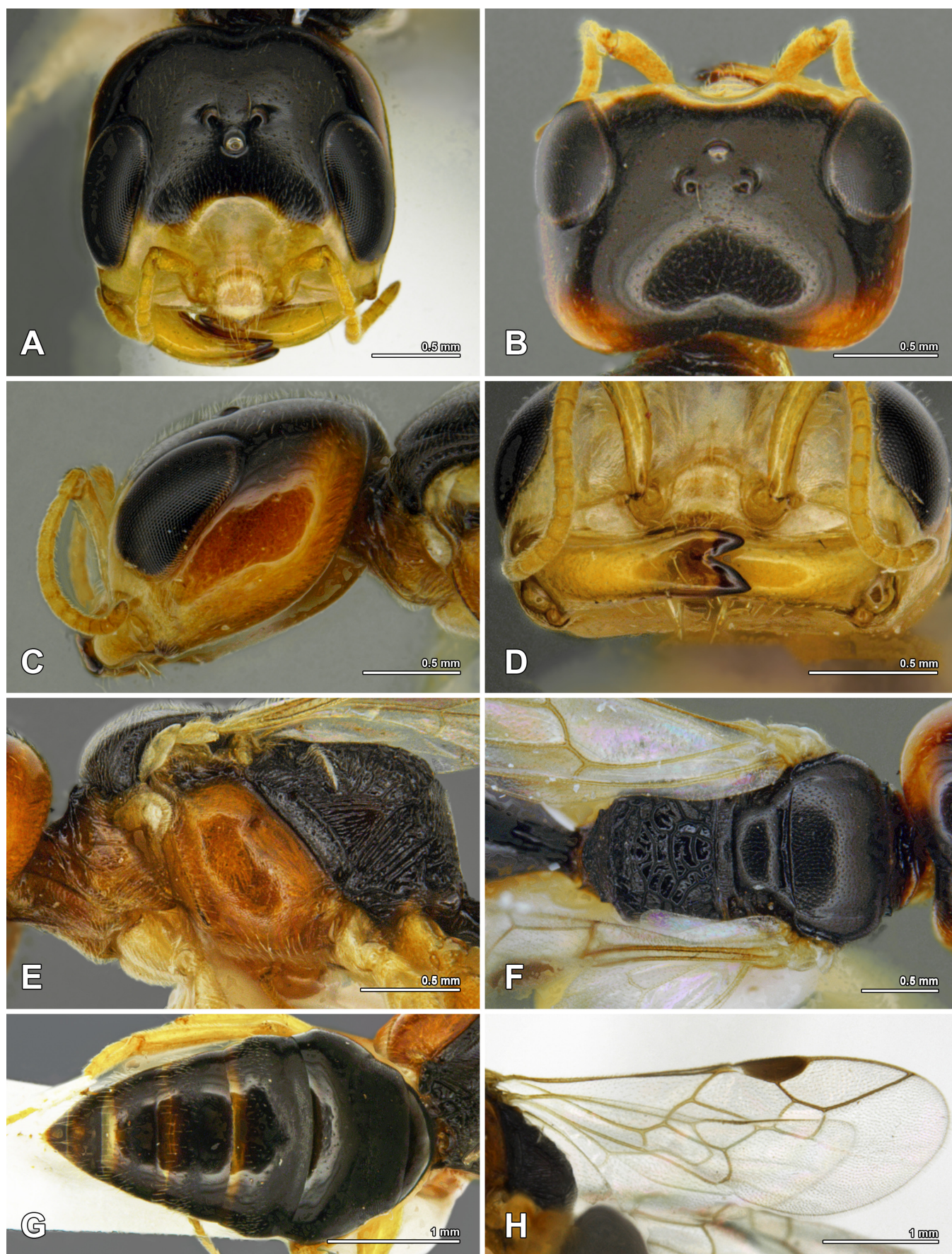
**Material examined.** **Holotype** ♂: India, Kerala, Wayanad district, Wayanad Wildlife Sanctuary, Muthanga Range, Thottamoola (11°37'51.6"N 76°18'39.6"E Alt. 905m), 6. xii.2024, Collector Sreejith S. Kumar & Party, ZSIK Regd. No. ZSI/WGRC/I.R.-INV.28483.

**Etymology.** The species is named in honour of Dr. Bobby Jose, Principal, St. Joseph's College, Devagiri, Kozhikode, Kerala, a distinguished Zoologist in recognition of his keen interest and support for the studies conducted by the first author.



**Figure 1.** *Spilomena bobyjosei* Girish Kumar & Amal sp. nov. holotype male. Habitus, lateral view.





**Figure 2.** *Spilomena bobyjosei* Girish Kumar & Amal **sp. nov.** holotype male. **A.** Head, frontal view; **B.** Head, dorsal view; **C.** Head, lateral view; **D.** Lower half of head, frontal view; **E.** Mesosoma, lateral view; **F.** Mesosoma, dorsal view; **G.** Metasoma, dorsal view; **H.** Forewing.



**Diagnosis.** *Spilomena bobyjosei* **sp. nov.** differs from its congeners by the following combination of characters: head in frontal view subquadrate; inter-ocular distance at vertex distinctly shorter than that at clypeus; level of topmost margin of eyes distinctly above the median ocellus; dorsal side of propodeum irregularly rugose; recurrent vein of the forewing joins the first submarginal cell distinctly away from first transverse cubital vein; second submarginal cell of forewing almost square-shaped; basal half of T2 micropunctate; temple, propleuron, mesopleuron and lateral sides of pronotum ferruginous; lower half of frons yellow.

**Description.** — **Holotype male** (Fig. 1). Body length 6.6 mm; forewing length 4.07 mm.

**Colour.** Head and mesosoma largely black; mandible (except at the apex of tooth ferruginous to dark red), clypeus, lower half of frons, antennae, pronotal tubercle, tegula and legs yellow; temple, propleuron, lateral sides of pronotum and mesopleuron ferruginous; metasoma black, apex of T3–T6 and S3–S6 yellowish brown, T7 & S7 largely yellowish brown; fore wing veins and stigma brown.

**Vestiture.** T2–T6 with setigerous micropunctures posteriorly; apex of S3 with decumbent setae; remaining body with sparse vestitures.

**Head.** Subquadrate in frontal view (Fig. 2A); apical margin of clypeus (Fig. 2D) produced medially with a median cleft; inter-antennal tubercle inconspicuous, not distinctly pointed, not extending towards the upper part of frons; mandible bidentate apically, with a short, sharp inner tooth (Fig. 2D); scape length to breadth ratio = 16:3; lower part of frons imbricate, upper part of frons and vertex imbricate to microcoriaceous with setigerous punctures; OOL  $2.51 \times$  POL (Fig. 2B); interocular distance at vertex distinctly shorter than that at clypeus; level of topmost margin of eyes distinctly above the median ocellus (Fig. 2A); upper margin of vertex depressed medially (Fig. 2B); gena shiny (Fig. 2C).

**Mesosoma** (Figs. 2E–F). Dorsal surface of pronotum with irregular weak striations, lateral surface with few distinct regular striations; pronotal collar with weak transverse carina, almost straight; mesoscutum weakly microcoriaceous, with dense micropunctures; admedian line and parapsidal line weak; scutellum punctured as that of mesoscutum; anterior groove of scutellum crenulate medially; metanotum weakly striated laterally; mesopleuron weakly microcoriaceous; dorsal side of propodeum (Fig. 2F) irregularly rugose, lateral side of propodeum (Fig. 2E) distinctly striate, posterior side of propodeum with a median carina with weakly radiating striations becoming irregular rugae. Fore wing (Fig. 2H) with stigma elongate, relative length to breadth = 38:13; recurrent vein of fore wing joining to first submarginal cell distinctly away from first transverse cubital vein; second submarginal cell almost square-shaped.

**Metasoma** (Fig. 2G). T1 shiny, base with few distinct longitudinal carinae; basal half of T2 micro-punctate.

**Female.** Unknown.

**Habitat.** Semi evergreen forest (Fig. 3).

**Distribution.** India: Kerala.

**Remarks.** The new species described here is closely allied to *S. fulvopleuris*, sharing the following characteristics: ferruginous mesopleuron and lateral sides of pronotum; inter-antennal tubercle not distinctly pointed; and propodeum black to brownish black. However, it distinctly differs in the following ways: (1) head in frontal view subquadrate (in *S. fulvopleuris* somewhat circular); (2) inter ocular distance at vertex distinctly shorter than that at clypeus (in *S. fulvopleuris* inter ocular distance almost same at vertex and clypeus); (3) level of topmost margin of eyes distinctly above the median ocellus (in *S. fulvopleuris* distinctly below the median ocellus); (4) pronotal collar with weak transverse carina, almost straight (in *S. fulvopleuris* with strong transverse carina, distinctly curved); (5) mesoscutum and scutellum weakly microcoriaceous, with dense micropunctures (in *S. fulvopleuris* strongly microcoriaceous, with sparse micropunctures); (6) dorsal side of propodeum irregularly rugose (in *S. fulvopleuris* apical half of dorsal side of propodeum transversely striated); (7) recurrent vein of fore wing joining to first submarginal cell distinctly away from first transverse cubital vein (in *S. fulvopleuris* recurrent vein of fore wing interstitial with the first transverse cubital vein); (8) second submarginal cell of forewing almost square-shaped (in *S. fulvopleuris* second submarginal cell rectangular); and (9) basal half of T2 micropunctate (in *S. fulvopleuris* T2 impunctate).





**Figure 3.** Collection locality of *Spilomena bobyjosei* Girish Kumar & Amal sp. nov.

### Key to the Indian species of *Spilomena* Shuckard, 1838

- 1 Forewing with single submarginal cell. .... *S. unus* Tessy, Girish Kumar & Sureshan, 2023
- Forewing with two submarginal cells (Fig. 2H). .... 2
- 2 Interantennal tubercle acutely pointed; propodeum brownish yellow with faint black patch on base of propodeum. .... *S. tuberculata* Tessy, Sureshan & Girish Kumar, 2021
- Interantennal tubercle not distinctly pointed; propodeum black to brownish black (Figs 2E & 2F). .... 3
- 3 Mesopleuron and lateral sides of pronotum ferruginous (Fig. 2E). .... 4
- Mesopleuron and lateral sides of pronotum black to brownish black. .... 5
- 4 Lower half of head in frontal view yellow (Figs 2A & 2D); temple ferruginous (Fig. 2C); level of topmost margin of eyes distinctly above the median ocellus (Fig. 2A); second submarginal cell of forewing almost square-shaped (Fig. 2H); size larger (6.62 mm). .... *S. bobyjosei* Girish Kumar & Amal sp. nov.
- Lower half of head in frontal view black except a narrow yellow margin at apex of clypeus; temple black; level of topmost margin of eyes distinctly below the median ocellus; second submarginal cell rectangular; size smaller (4.6 mm). .... *S. fulvopleuris* Tessy, Sureshan & Binoy, 2021
- 5 Clypeus either entirely pale white to yellow or yellow with area above antennal toruli brown. .... 6
- Clypeus entirely black to blackish brown. .... 7
- 6 Clypeus entirely pale white to yellow. .... *S. attenboroughi* Tessy, Sureshan & Binoy, 2021
- Clypeus yellow with area above antennal toruli brown. .... *S. keralaensis* Tessy, Sureshan & Girish Kumar, 2018
- 7 Forewing with stigma subglobose. .... *S. tsunekii* Tessy, Sureshan & Girish Kumar, 2021
- Forewing with stigma elongate. .... 8



- 8 Propodeal dorsum weakly transversely striated with two carina medially and a small smooth area at apex; all coxae and femora dark brown. .... *S. nilgiriensis* Tessy, Girish Kumar & Sureshan, 2023
- Propodeal dorsum rugose or rugose to rugulose, with or without transverse ridges laterally; all coxae and femora yellow. .... 9
- 9 Posterior surface of propodeum with a distinct median groove; second submarginal cell almost square-shaped. .... *S. reticularis* Tessy, Sureshan & Binoy, 2021
- Posterior surface of propodeum without a distinct median groove or carina; second submarginal cell almost rectangular-shaped. .... 10
- 10 Apical margin of clypeus invertly V-shaped at middle; area towards middle of lower front shiny without imbricate punctures. .... *S. indostana* Turner, 1918
- Apical margin of clypeus not invertly V-shaped at middle; area towards middle of lower front also with imbricate punctures. .... *S. sahyadriensis* Tessy, Sureshan & Girish Kumar, 2021

## DISCUSSION

Out of the 18 species of *Spilomena* described from the Oriental region (Pulawski, 2024), 10 of them are from India (Tessy et al., 2018, 2021, 2023; Pulawski, 2024), and the rest of the species are from the Oriental China (*S. clypei* Q. Li & He, 1998; *S. rhytithoracica* Li & He, 1998; *S. zhejiangana* Q. Li and He, 1998), Malaysia (*S. obliterated* R. Turner, 1914; *S. socialis* Matthews, 2014), Taiwan (*S. formosana* (Tsuneki, 1971)), Indonesia (*S. jacobsoni* Maidl, 1925), and Philippines (*S. palawanensis* Tsuneki, 1976) (Pulawski, 2024). All the Oriental species show a restricted distribution which might be due to lack of extensive studies from the region. All the species described from India are either from Western Ghats or its adjacent areas (Turner, 1918; Tessy et al., 2018, 2021, 2023). This skewed distribution might be due to the lack of studies from other regions of the country. The new species was collected adjacent to a semi-evergreen forest. Further research is needed to better understand the biology and diversity of these less-studied wasps.

## AUTHOR'S CONTRIBUTION

The authors confirm their contribution to the paper as follows: P. Girish Kumar, and S. Amal together designed the methodology and wrote the manuscript. Both authors discussed the results and equally contributed to the final version of the manuscript. The authors read and approved the final version of the manuscript.

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## AVAILABILITY OF DATA AND MATERIAL

The specimens listed in this study are deposited in the 'National Zoological Collections' of the Zoological Survey of India, Western Ghat Regional Centre, Kozhikode, Kerala, India (ZSIK) and are available from the curator, upon request.

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study only included arthropod material, and all required ethical guidelines for the treatment and use of animals were strictly adhered to in accordance with international, national, and institutional regulations. No human participants were involved in any studies conducted by the authors for this article.

## CONSENT FOR PUBLICATION

The authors declare that this study received consent for publication from the competent authority.

## CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest regarding the publication of this paper.

## ACKNOWLEDGMENTS

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## توصیف یک گونه جدید از *Spilomena* Shukard, 1838 (Hymenoptera, Crabronidae: Pemphredoninae) از گهات غربی، هند

پوتو وایی گیریش کومار\* و سریدهران آمال

مرکز منطقه‌ای گهات غربی، بخش مطالعات جانورشناسی هند، کرالا، هند.

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**چکیده:** گونه *Spilomena bobyjosei* Girish Kumar & Amal **sp. nov.** یک آرایه جدید از زنبورهای شته‌خوار در جنس *Spilomena* Shukard, 1838 است که از منطقه جنوبی گهات غربی (کرالا، هند)، توصیف شد. گونه‌های این جنس به ندرت در شبه‌قاره هند جمع‌آوری شده و اغلب بر اساس تک نمونه توصیف شده‌اند. گونه‌های این جنس را می‌توان از سایر جنس‌های نزدیک بر اساس عدم وجود کارین پس‌سری، عدم انشعاب رگ میانی بال‌های عقب پیش از رگ Cu-a، بال‌های عقب با سلول حاشیه‌ای کشیده (بلندتر از استیگما)، وجود یک رگ بازگشتی و دو سلول مرکزی، استیگمای بزرگ و یقه پرونوتال با کارین عرضی کامل تشخیص داد. تاکنون ده گونه از این جنس در هند توصیف شده و با احتساب گونه جدید، این تعداد به یازده گونه می‌رسد. خصوصیات افتراقی گونه جدید با نزدیک‌ترین گونه و کلید شناسایی گونه‌های جنس *Spilomena* در هند نیز ارائه شد.

**واژگان کلیدی:** کرالا، کلید، Pemphredonini، جنوب هند، Spilomenina، تاکسونومی