



## On the status of the cuckoo wasp genus *Allochrysis*, with descriptions of the *Chrysis ear* and *Ch. slava* species groups (Hymenoptera: Chrysididae)

## О статусе рода ос-блестянок *Allochrysis* с описанием видовых групп *Chrysis ear* и *Ch. slava* (Hymenoptera: Chrysididae)

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**Abstract.** *Allochrysis* Kimsey et Bohart, 1991 is synonymised with *Chrysis* Linnaeus, 1761. The *Ch. ear* species group is established, with descriptions of two new species, *Ch. shestakovi* sp. nov. from Kazakhstan and *Ch. sericata* sp. nov. from Uzbekistan. *Chrysis paria* Bingham, 1903 is transferred to the *Ch. succincta* species group. The new *Ch. slava* species group is established for *Ch. slava* Semenov, 1967 and the new species, *Ch. priapus* sp. nov. from Mongolia, is described here.

**Резюме.** Род *Allochrysis* Kimsey et Bohart, 1991 синонимизирован с *Chrysis* Linnaeus, 1761. Выделена новая группа вида *Ch. ear*, в которой описаны два новых вида – *Ch. shestakovi* sp. nov. из Казахстана и *Ch. sericata* sp. nov. из Узбекистана. Вид *Ch. paria* Bingham, 1903 перенесен в видовую группу *Ch. succincta*. Выделена новая видовая группа *Ch. slava* для *Ch. slava* Semenov, 1967 и описываемого здесь из Монголии *Ch. priapus* sp. nov.

**Keyword:** Central Asia, Mongolia, Chrysidinae, Chrysidini, new species group, new species, new synonym

**Ключевые слова:** Центральная Азия, Монголия, Chrysidinae, Chrysidini, новые группы видов, новые виды, новый синоним

**ZooBank Article LSID:** urn:lsid:zoobank.org:pub:8D2AEE4F-3288-4F61-955C-B30D77A34528

### Introduction

Semenov (1954) introduced the subgenus *Allochrysis* in the genus *Chrysis* Linnaeus, 1761 based on *Ch. ear* Semenov, 1910, the new species *Ch. (Allochrysis) pavlovskii* Semenov et Nikol'skaya, 1954 and *Ch. laetula* Semenov et Nikol'skaya, 1954, with no a generic diagnosis nor designation of type species. Later Semenov (1967) added another species to this subgenus, *Ch. ismaeli* Semenov, 1967, and Linsenmaier (1968) included three members of the subgenus (*Ch. ear*, *Ch. laetula* and *Ch. pavlovskii*) in the *Ch. rufitarsis* species group.

However, according to the rules of the International Code of Zoological Nomenclature (fourth edition), the genus-group name *Allochrysis*, as proposed in Semenov & Nikol'skaya (1954), is unavailable because was not correctly described. Indeed, the Article 13.3 clearly states that every new genus-group name published after 1930, to be available, must be accompanied by the fixation of a type species in the original publication. In this sense, the first authors who fixed the type species of *Allochrysis* were Kimsey & Bohart (1991: 286); they additionally provided the first generic diagnosis, several illustrations and species checklist.

Consequently, Kimsey & Bohart (1991) automatically became the authors of *Allochrysis*. The same is true for the other two subgenera described by Semenov (1954), whose authorship should belong to Kimsey & Bohart (1991): *Glossochrysis* [type species *Chrysis (Glossochrysis) svetlana* Semenov, 1954, designated by Kimsey & Bohart, 1991: 316] and *Gonodontochoyris* [type species *Chrysis (Gonodontochoyris) flamma* Semenov, 1954, designated by Kimsey & Bohart, 1991: 316]. Furthermore, Kimsey & Bohart (1991: 286) transferred *Ch. slava* Semenov, 1967 (originally described in the subgenus *Gonodontochoyris*) and *Ch. paria* Bingham, 1903 into the subgenus *Allochrysis*.

## Materials and methods

Specimens were examined and described under a Carton Togonal SCZ stereomicroscope. Photographs of specimens were taken with a Nikon D-3400 camera connected to the Togonal SCZ stereomicroscope and stacked with the Combine ZP software. Abbreviations used in the descriptions as follows: F1, F2, F3, etc. = flagellomere 1, 2, 3, and so on; MOD = midocellus diameter; MS = malar space, the shortest distance between the base of mandible and lower margin of compound eye; OOL = the shortest distance between the posterior ocellus and compound eye; P = pedicel; PD = puncture diameter; POL = the shortest distance between posterior ocelli; PPW = propodeum posterior width, the distance between apices of propodeal angles; TFC = transverse frontal carina.

More than fifty specimens were examined for this revision. All studied specimens show a green to coppery-green post mortem colouration. The colouration of living specimens is likely to be mostly metallic red to coppery, as in many chrysidids, such as *Spintharina* Semenov, 1892 and several *Chrysis* species groups (e.g. *Ch. rufitarsis* and *Ch. bihamata* groups). Evidence of this alteration is that the green body colour of some dried specimens quickly turned into red once the specimens were rehydrated and softened for preparation; the colour turned into green after the cuticle was dry again.

Examined specimens are conserved in the following collections: Natural History Museum, London, United Kingdom (NHMUK); Natur-Museum, Luzern, Switzerland (NMLS); Paolo Rosa

private collection, Bernareggio, Italy (PRC); Zoological Institute of Russian Academy of Science, St Petersburg, Russia (ZIN).

## Taxonomic part

After examination of all type specimens and unidentified specimens housed at the Zoological Institute of the Russian Academy of Sciences in St Petersburg (Rosa et al., 2017), I synonymise *Allochrysis* with *Chrysis* Linnaeus, 1761. Members of *Allochrysis* sensu Semenov (1954) can be included in a species group closely related to the *Ch. rufitarsis* group, named *Chrysis ear* group, after the first species described in this group. Moreover, two new species described here, *Ch. shestakovi* sp. nov. from Kazakhstan and *Ch. sericata* sp. nov. from Uzbekistan, are placed into the *Ch. ear* group. *Ch. paria* Bingham, 1903 is transferred to the *Ch. succincta* group, and *Ch. slava* Semenov, 1967 to the newly described *Ch. slava* group characterised by the following characters: male flagellomeres ventrally bulging; TFC absent; flagellum dark brown; mesopleuron with incomplete episternal sulcus; third metasomal tergum with deep pit row; apex of third metasomal tergum with two sharp lateral teeth and convex, medially more or less notched medial area. Finally, another new species, *Ch. priapus* sp. nov. from Mongolia, is described here within the *Ch. slava* group.

## Order Hymenoptera

### Family Chrysididae

### Subfamily Chrysidinae

### Tribe Chrysidini

### Genus *Chrysis* Linnaeus, 1761

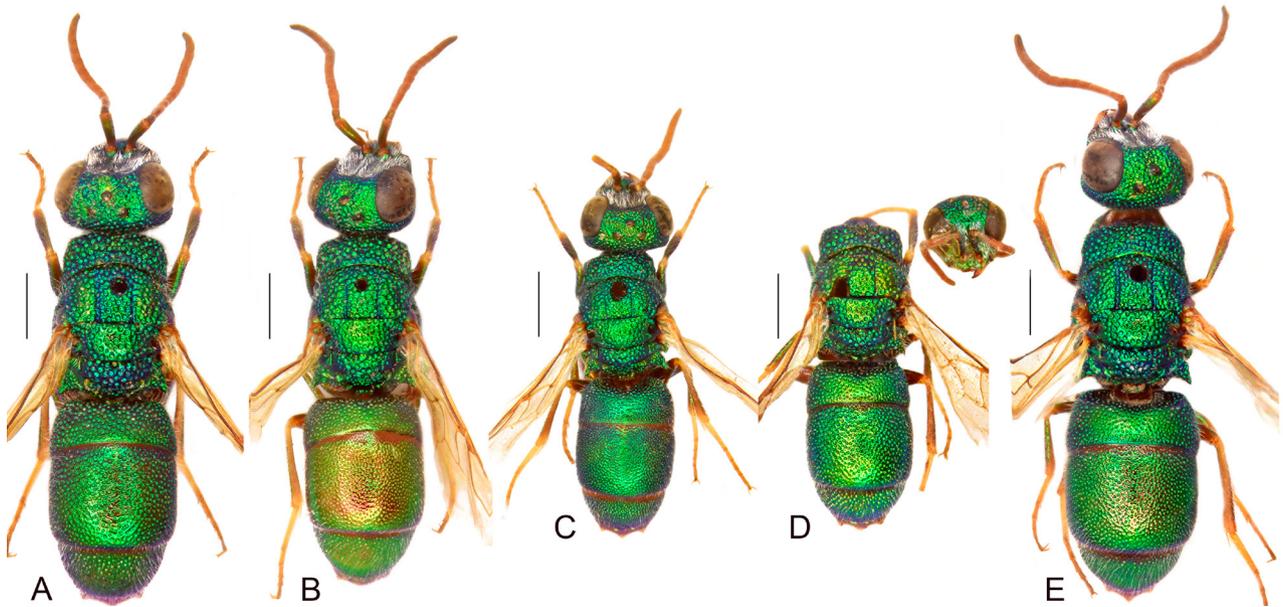
*Chrysis* Linnaeus, 1761: 414. Type species: *Sphex ignita* Linnaeus, 1758, by subsequent designation (Latreille, 1810).

*Chrysis (Allochrysis)* Semenov, 1954: 123. Unavailable. *Allochrysis* Kimsey et Bohart, 1991: 286, **syn. nov.**

Type species: *Allochrysis pavlovskii* Semenov et Nikol'skaya, 1954, by original designation.

### *Chrysis ear* species group

*Description.* Members of this group share following characters: face relatively flat, not deeply



**Fig. 1.** Habitus in species of the genus *Chrysis*, dorsal view. **A**, *Ch. ear* Semenov, female; **B**, *Ch. ismaeli* Semenov, paratype, female; **C**, *Ch. laetula* Semenov et Nikol'skaya, holotype, male; **D**, *Ch. pavlovskii* Semenov et Nikol'skaya, holotype, male; **E**, *Ch. pavlovskii*, female, paratype. Scale bars: 1.0 mm.

hollowed, fully punctate with tiny dots and covered by dense silvery setae, without cross-ridging on scapal basin; TFC absent; F1 longer than pedicel or as long as F2+F3; flagellum yellowish or light brown; malar space about 1.5 MOD; subantennal space 1.0–1.5 MOD; midocellus unridged; hind ocelli 2.0–2.5 diameters apart; fore wing discoidal cell close and complete, in *Ch. laetula* with lighter, fainter outer veins; radial cell almost closed, with *Rs* ending about 1 MOD to wing margin; metanotum unmodified; episternal sulcus of mesopleuron variable, sometimes incomplete or ill-defined; propodeal angles sharp and bent behind; legs with lighter joints and yellowish tarsi, becoming darker at apex; third metasomal tergum with weak pit row and pits mostly obsolete; apex of third metasomal tergum narrow, bearing three teeth, two lateral ones always sharp, median one either sharp or replaced by a rounded lobe (Fig. 4); black spots on second metasomal sternum large, always close medially, yet never fused (Figs 7A–7F). Male terminalia as in Figs 8A–8B, with simple, elongate gonocoxa.

**Remarks.** Some differences were noticed compared with the diagnosis of *Allochrysis*, provided by Kimsey & Bohart (1991): the apical median tooth on third metasomal tergum in three species

is sharp and spine-like, not lobulate; the episternal sulcus may be ill-defined or even incomplete, only indicated by a few small foveae just behind the notopleural suture; the black spots on the second metasomal sternum, said to be “practically fused medially”, are large, medially close to each other, yet never actually fused.

**Hosts.** Unknown. According to Pauli et al. (2018), members of the closely related *Chrysis rufitarsis* group develop on solitary bees of the family Megachilidae. Therefore, megachilid bees are the most likely expected hosts.

**Distribution.** All known species are from Central Asia (Turkmenistan, Tajikistan, Uzbekistan, Kazakhstan). Kimsey & Bohart (1991) in the distribution of *Allochrysis* added Iran and Turkey, without further indications. All species were collected in arid to semiarid, desert or semidesert regions. Members of this group are rarely collected.

**Species included.** *Chrysis ear* Semenov, 1910 (Kazakhstan), *Ch. ismaeli* Semenov, 1967 (Kazakhstan), *Ch. laetula* Semenov et Nikol'skaya, 1954 (Turkmenistan, Kazakhstan), *Ch. pavlovskii* Semenov et Nikol'skaya, 1954 (Kazakhstan, Uzbekistan [new record]), *Ch. shestakovi* sp. nov. (Kazakhstan), and *Ch. sericata* sp. nov. (Uzbekistan).

***Chrysis shestakovi* sp. nov.**

(Figs 2A, 3A, 4F, 5F, 6E, 7E)

*Holotype*. Female, **Kazakhstan**, *Kyzylorda Prov.*, Tartugay, 3–15.VI.1929, leg. A. Shestakov (ZIN).

*Paratype*. Female, same data as for holotype (PRC).

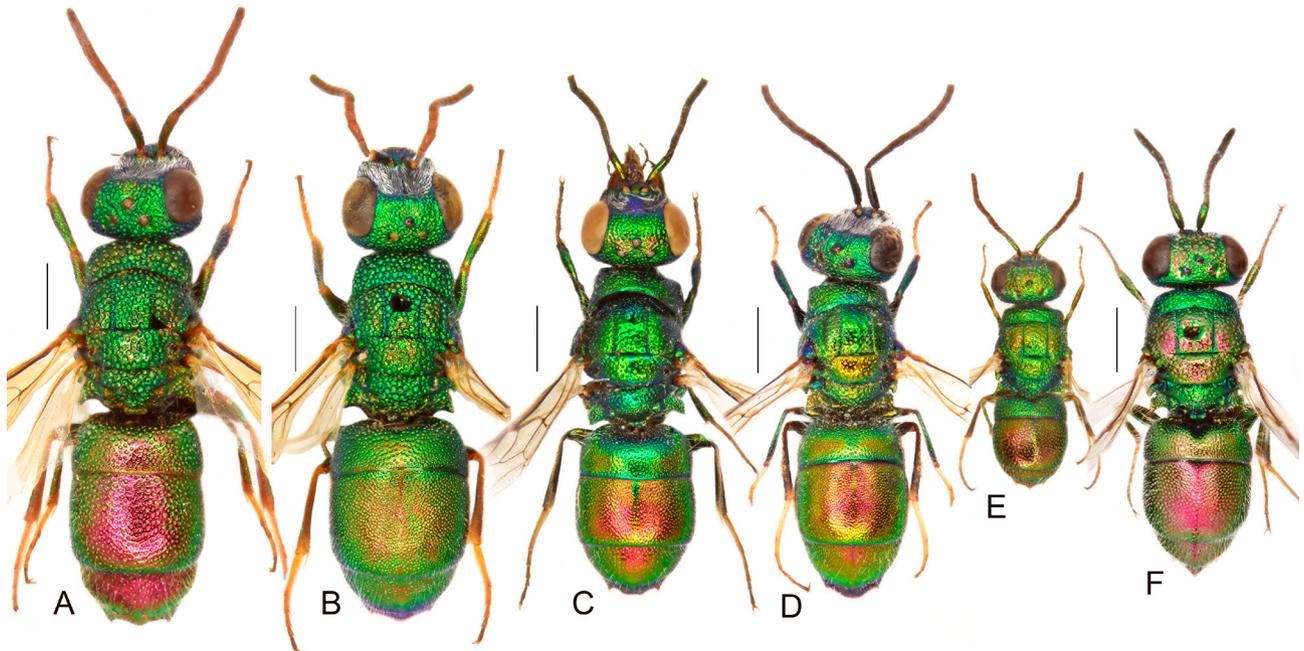
*Description*. Body length 7.5 mm.

**Female**. Head. In full face view, length 1.5 mm, width 1.9 mm; in dorsal view, thickness 0.8 mm. Face relatively flat, slightly hollowed, beneath brow fully covered by tiny dots, without cross-ridging, with dense silvery setae (Fig. 5F). Punctures large and coarse, irregularly sized and somewhere confluent on brow, vertex, and genae; laterally to ocelli with impunctate and polished area; TFC absent. Clypeus weakly notched apically. Malar space 1.6 MOD, shorter than F1; F1 2.2 MOD long. Mandibles with inner tooth. Sub-antennal distance 1.0 MOD. Ocelli unlidged. Relative lengths of P : F1 : F2 : F3 = 1.0 : 1.7 : 0.8 : 0.8; following flagellomeres length 1.1 times breadth, F11 slightly longer. Head with whitish scattered and short setae (maximum length 1.0 MOD); OOL = 1.7 MOD; POL = 2.1 MOD.

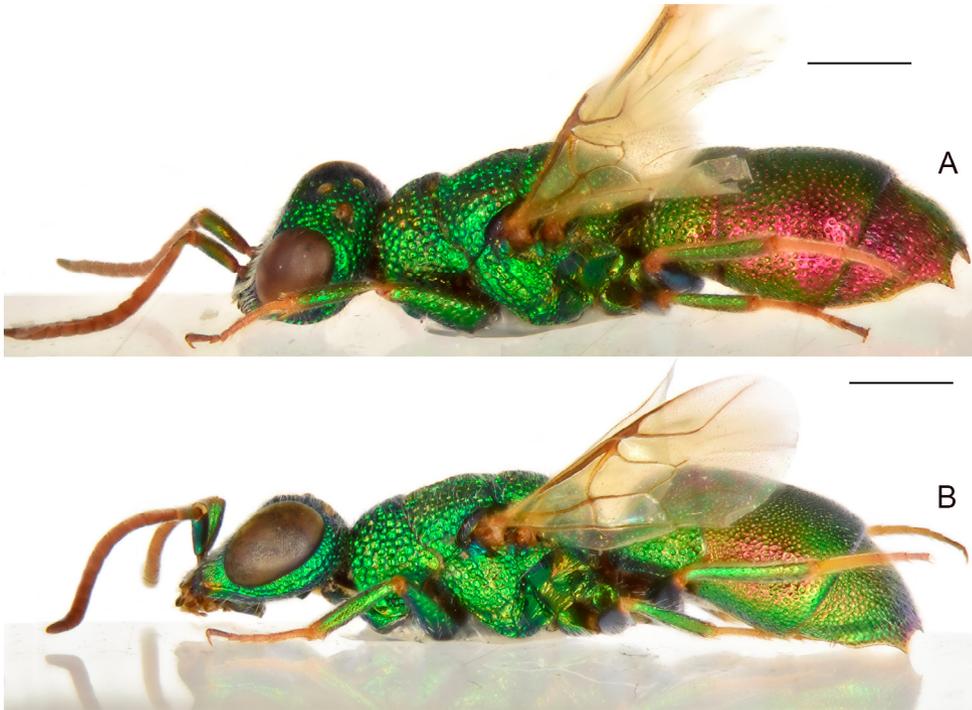
**Mesosoma**. Length 2.7 mm; width (PPW) 1.8 mm. Pronotum with slightly marked anteromedial depression; depression about half of total

pronotal length; pronotum with double punctation, with deep, relatively large (~ 0.5 MOD), subcontiguous punctures, interstices here and there with tiny punctures. Mesoscutum with deep and large (~ 0.5 MOD) punctures, basally subcontiguous, without interstices; apically with polished interstices 0.5 PD apart; lateral areas of mesoscutum with shallower punctures and wider interstices; parapsidal lines deep and complete; notauli large, composed by subquadrate foveae. Mesoscutellum with spaced punctures, largely polished on anterior and posterior margin, with tiny punctures on interstices. Metascutellum with coarse, deep, confluent and larger punctures, almost without interstices; anteromedially with a large fossa; propodeal teeth triangular, sharp and backwards directed, scarcely divergent. Mesopleuron with broad episternal sulcus, consisting of a row of large, irregular, confluent punctures, with broad and deep scrobal sulcus. Wings hyaline, slightly amber among cells on fore wings; radial sector open, around 1.0 MOD far from the wing margin.

**Metasoma**. Length 3.3 mm (Figs 4F, 6E, 7E). Punctation on first metasomal tergum double, with large (~ 0.3 MOD) and deep punctures, 1 PD apart, and tiny punctures on interstices; puncta-



**Fig. 2.** Habitus in species of the genus *Chrysis*, dorsal view. **A**, *Ch. shestakovi* sp. nov., holotype, female; **B**, *Ch. sericata* sp. nov., holotype, female; **C**, *Ch. slava* Semenov, paratype, female; **D**, *Ch. priapus* sp. nov., holotype, male; **E**, *Ch. maidaquensis* Strumia, male, Kazakhstan; **F**, *Ch. maidaquensis*, female, Kazakhstan. Scale bars: 1.0 mm.



**Fig. 3.** Habitus in species of the genus *Chrysis*, lateral view. **A**, *Ch. shestakovi* sp. nov., holotype, female; **B**, *Ch. sericata* sp. nov., holotype, female. Scale bars: 1.0 mm.

tion on second tergum double, with deep, coarser and larger punctures (~ 0.5 MOD) markedly decreasing towards the posterior margin; punctures are widely separated, 1–2 PD apart, and polished interstices have small to tiny punctures; longitudinal medial carina missing. Third tergum with narrow hyaline margin on lateral edge, prominently arcuate before lateral teeth (Fig. 3A); lateral teeth large and sharp, distinctly longer than the smooth median tooth; third tergum shallowly bulging transversely. Subapical row of pits shallow, formed by barely incised pits; two median pits deeper and vaguely elongated. Vestiture whitish and mostly erect, with short setae (1.0 MOD).

**Colouration.** Head and mesosoma green metallic, metasoma purplish with greenish lateral reflections. Mandibles brown, medially lighter or yellowish, metallic green at base. Scapus and pedicellus metallic green, with discoloured joints; flagellum brownish to yellowish. Tibiae and femora greenish; joints and tarsi yellowish with the last tarsomere brownish. Head and mesosoma ventrally metallic green with golden reflections; metasoma ventrally red with large black spots on the second sternum.

**Male.** Unknown.

**Phenology.** Specimens were collected in central Kazakhstan in the first half of June.

**Bionomics.** Unknown.

**Etymology.** This species is named after A. Shestakov, who collected the specimens available for this study.

**Comparative diagnosis.** *Chrysis shestakovi* sp. nov. is similar to *Ch. ismaeli* Semenov, 1967 and *Ch. sericata* sp. nov. in having the lobate median tooth at the apex of the third metasomal tergum. It can be easily distinguished by the large and coarse punctation basally on second metasomal tergum, decreasing in size toward the apical margin (Fig. 6E) (*vs.* densely and evenly punctate in other species), and by the black spots on second sternum large, with posterior margin exceeding sternum mid-length (Fig. 7E). Furthermore, it can be separated from other species by the purple colouration of metasoma (Fig. 3A), the shortened median tooth of the third metasomal tergum, and the acute lateral teeth that are anyhow curved under the apical margin (Fig. 4F).

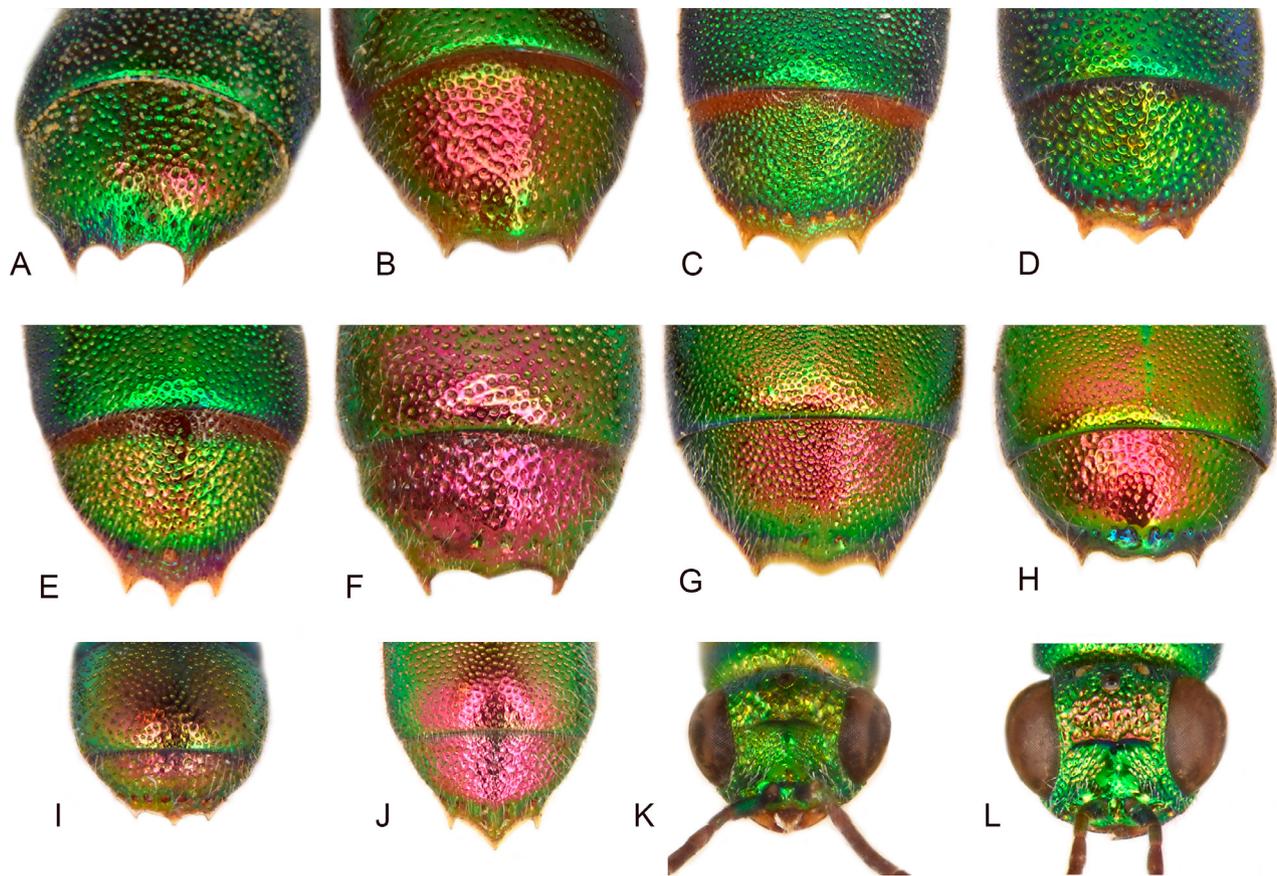
**Distribution.** Kazakhstan.

***Chrysis sericata* sp. nov.**

(Figs 2B, 3B, 4G, 5G, 6F, 7F)

**Holotype.** Female, **Uzbekistan, Qashqadaryo Prov., Kammashi**, 12.V.1931, leg. B. Gussakovskij (ZIN).

**Description.** Body length 7.3 mm (Fig. 3B).

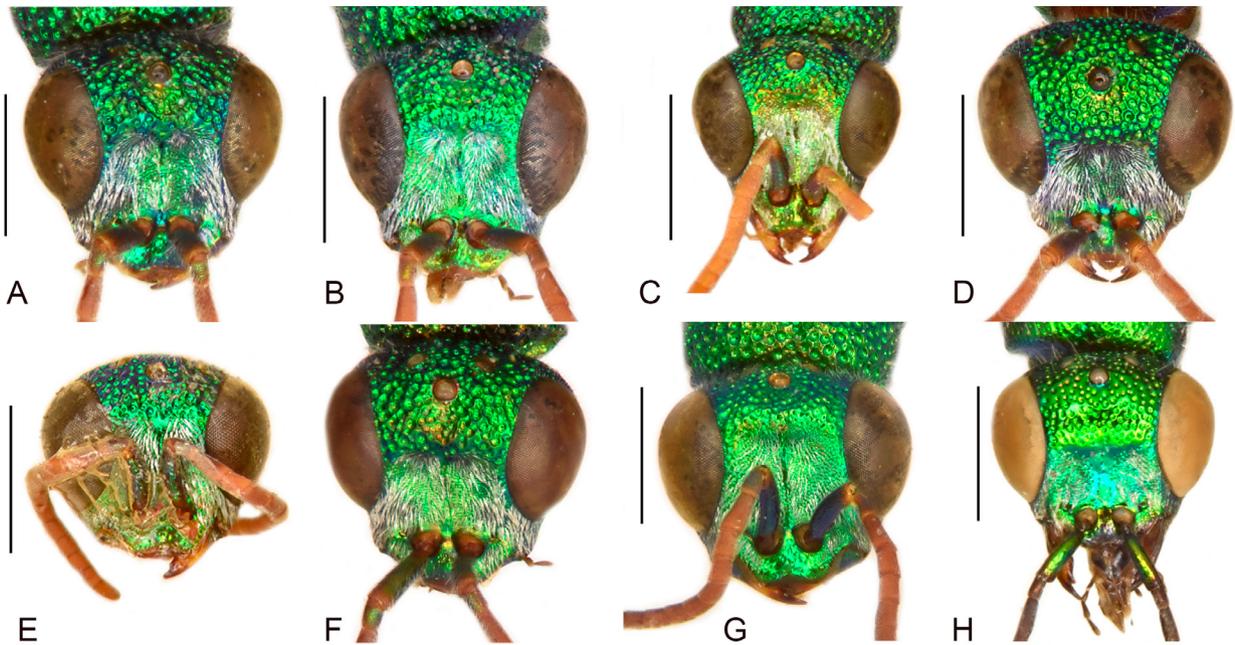


**Fig. 4.** Metasoma and third metasomal tergum in species of the genus *Chrysis*. **A**, *Ch. ear* Semenov, holotype, female; **B**, *Ch. ismaeli* Semenov, paratype, female; **C**, *Ch. laetula* Semenov et Nikol'skaya, holotype, male; **D**, *Ch. pavlovskii* Semenov et Nikol'skaya, holotype, male; **E**, *Ch. pavlovskii*, paratype, female; **F**, *Ch. shestakovi* sp. nov., holotype, female; **G**, *Ch. sericata* sp. nov., holotype, female; **H**, *Ch. slava* Semenov, paratype, female; **I**, *Ch. maidaquensis* Strumia, male, Kazakhstan; **J**, *Ch. maidaquensis*, female, Kazakhstan. **K**, **L**, *Ch. maidaquensis*, face, dorsal view in male (K) and female (L). Scale bars: 1.0 mm.

**Female.** Head. In full face view, length 1.4 mm, width 1.9 mm; in dorsal view, thickness 0.8 mm. Face relatively flat, slightly hollowed, fully covered by tiny dots, without cross-ridging, with dense silvery setae (Fig. 5G). Punctures on brow and vertex uneven, relatively large, somewhere confluent; laterally to ocelli with impunctate and polished area; brow without TFC, yet with an arched row of longitudinally elongate punctures above scapal basin. Clypeus weakly notched apically. Malar space 1.5 MOD, shorter than F1; F1 2.0 MOD long. Mandibles with inner tooth. Sub-antennal distance 1.2 MOD. Ocelli not lidded. Relative lengths of P : F1 : F2 : F3 = 1.0 : 1.5 : 1.1 : 1.0; following flagellomeres length 1.1 times breadth, F11 slightly longer. Head with whitish

scattered and short setae (maximum length 1.0 MOD). OOL = 1.5 MOD; POL = 1.8 MOD.

**Mesosoma.** Length 2.5 mm; width (PPW) 1.8 mm. Pronotum with slightly marked antero-medial depression; depression about 2/3 of total pronotal length; pronotum with irregular punctation, with deep, relatively large (~ 0.5 MOD), contiguous punctures, almost without polished interstices, here and there with tiny punctures among the largest ones. Mesoscutum with deep and large (~ 0.8 MOD) punctures, basally contiguous, without interstices; apically with narrow and polished interstices; lateral lobes of mesoscutum with large, yet shallower punctures, with wider interstices; parapsidal lines deep and complete; notauli large, composed by subquadrate foveae. Mesoscutellum



**Fig. 5.** Head in species of the genus *Chrysis*, frontal view. **A**, *Ch. ear* Semenov, holotype, female; **B**, *Ch. ismaeli* Semenov, paratype, female; **C**, *Ch. laetula* Semenov et Nikol'skaya, holotype, male; **D**, *Ch. pavlovskii* Semenov et Nikol'skaya, paratype, female; **E**, *Ch. pavlovskii*, holotype, male; **F**, *Ch. shestakovi* sp. nov., holotype, female; **G**, *Ch. sericata* sp. nov., holotype, female; **H**, *Ch. slava* Semenov, paratype, female. Scale bars: 1.0 mm.

with more spaced punctures, largely polished on anterior and posterior margins, with punctures of different size. Metascutellum with coarse, deep and larger punctures, almost without interspaces; propodeal teeth triangular, sharp and backwards directed, scarcely divergent. Mesopleuron with barely visible episternal sulcus, apparently developed only above, under the mesonotal alar fossa (Fig. 3B). Wings clear, weakly amber on fore wings; radial sector slightly open, less than 1 MOD far from the wing margin.

**Metasoma.** Length 3.1 mm (Fig. 6F). Punctuation on first metasomal tergum double, with small and geminate punctures, 1 PD apart, and with tiny punctures on polished interstices; punctuation on second tergum even, with small, dense punctures slightly decreasing in size towards the apical margin; second and third tergum without longitudinal medial carina. Third metasomal tergum with even, small punctures, with narrow hyaline margin, prominently arcuate laterally, before the lateral teeth (Fig. 2B); lateral teeth large and sharp, as long as median one, which is lobate. Subapical row of pits shallow, formed by vaguely incised pits, two median ones widely separated,

deeper and larger. Vestiture whitish and mostly erect, with short setae (1.0 MOD).

**Colouration.** Body metallic green, with golden reflections on mesosoma and metasoma. Mandibles brown, medially lighter, metallic green at base. Scapus and pedicellus metallic green, with discoloured joints; flagellum brownish with distal flagellomeres darker. Tibiae and femora greenish, joints and tarsi yellowish with last tarsomere brownish. Body ventrally metallic green, sterna green with slightly golden reflections.

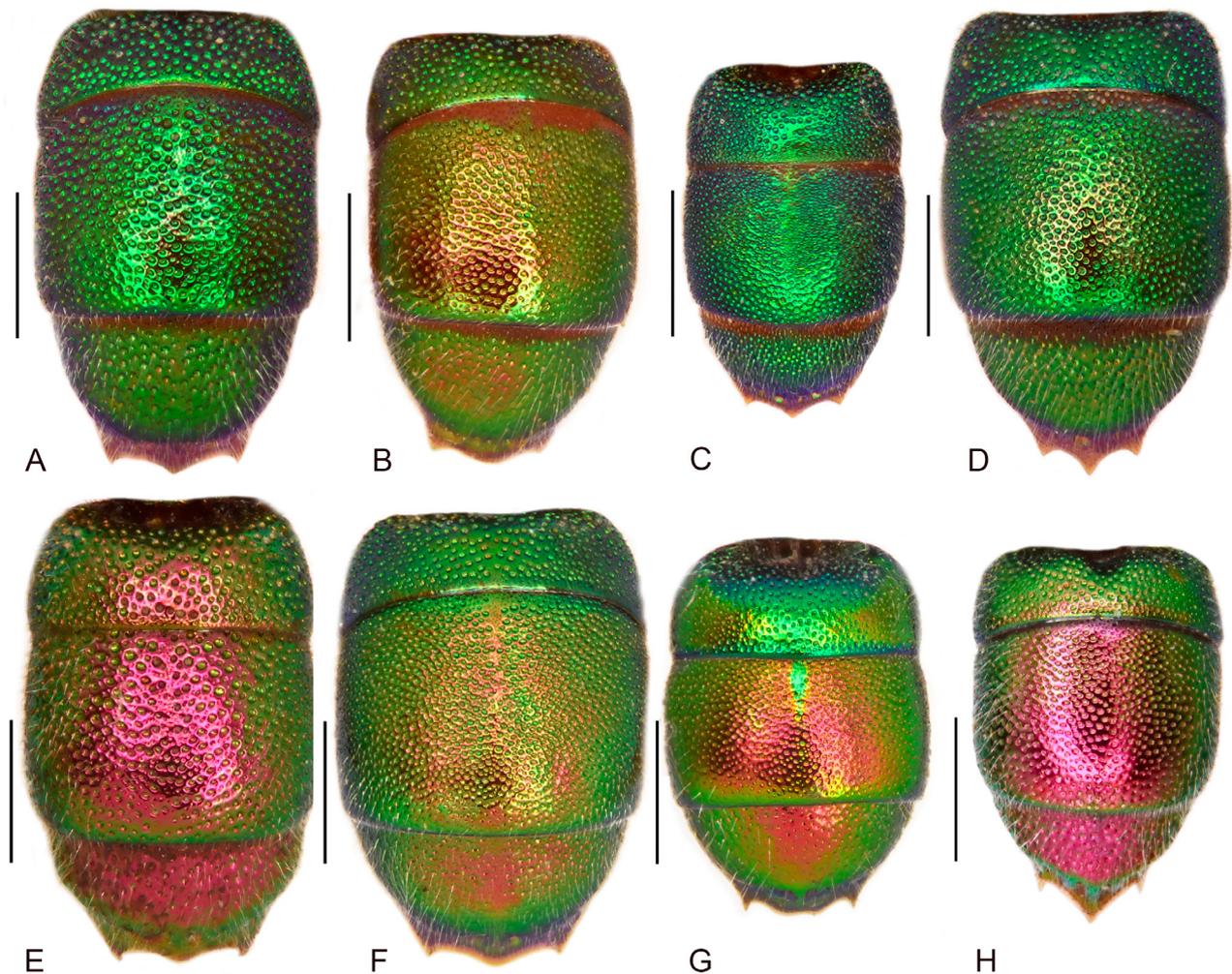
**Male.** Unknown.

**Phenology.** The unique known specimen was collected in Uzbekistan, in the first half of May.

**Bionomics.** Unknown.

**Etymology.** The specific epithet is a Latin adjective *sericatus* meaning dressed in silk; the name refers to the small and dense punctures on metasoma compared with metasomal punctuation of *Ch. shestakovi* sp. nov. and other known species

**Comparative diagnosis.** *Chrysis sericata* sp. nov. is similar to *Ch. shestakovi* sp. nov. and *Ch. ismaeli* in having the lobate median tooth at the apex of the third metasomal tergum. It can be separated from these species by the small and



**Fig. 6.** Metasoma in species of the genus *Chrysis*, dorsal view. **A**, *Ch. ear* Semenov, female; **B**, *Ch. ismaeli* Semenov, paratype, female; **C**, *Ch. laetula* Semenov et Nikol'skaya, holotype, male; **D**, *Ch. pavlovskii* Semenov et Nikol'skaya, paratype, female; **E**, *Ch. shestakovi* sp. nov., holotype, female; **F**, *Ch. sericata* sp. nov., holotype, female; **G**, *Ch. slava* Semenov, paratype, female; **H**, *Ch. maidaquensis* Strumia, female, Kazakhstan. Scale bars: 1.0 mm.

dense punctures on the second and third tergum; the incomplete episternal sulcus on mesopleuron; the complete narrow hyaline rim on the apical margin; the lateral margin of the last tergum prominently arcuate laterally (similarly to species in the *Ch. rufitarsis* group); the relatively small and subquadrate black spots on the second metasomal sternum. In *Ch. shestakovi* sp. nov., the punctuation is distinctly double; the episternal sulcus is complete and formed by large foveae; the hyaline rim is medially interrupted; and the black spots on the second sternite are longer, suboval, covering more than half of the segment. In *Ch. ismaeli*, the punctuation is not distinctly small and

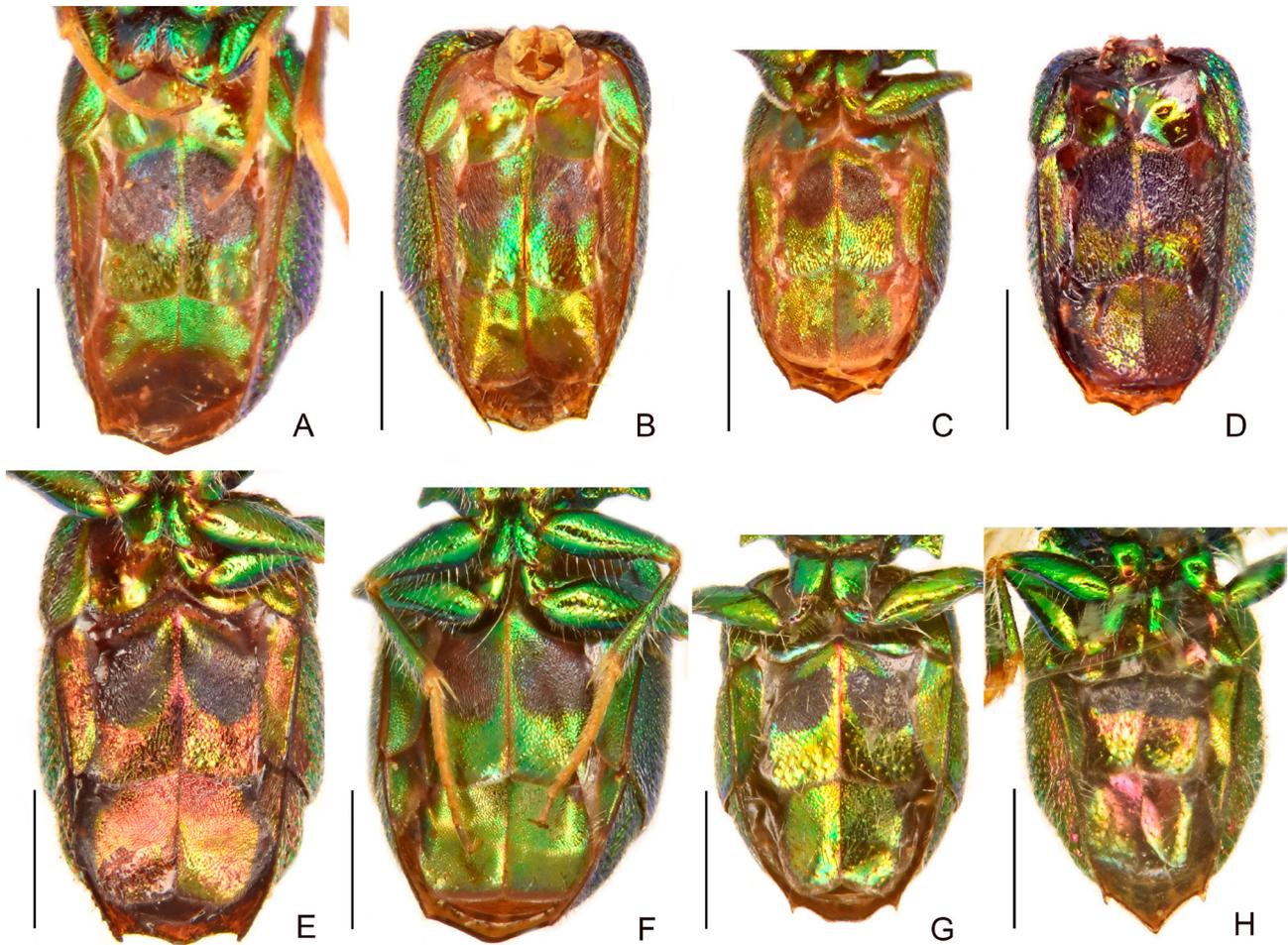
dense; the episternal sulcus is complete; the hyaline rim is medially interrupted; black spots on the second sternite are ill-defined and medially well separated.

*Distribution.* Uzbekistan.

***Chrysis ear*** Semenov, 1910  
(Figs 1A, 4A, 5A, 6A, 7A)

*Chrysis (Trichrysis) ear* Semenov-Tian-Shansky, 1910: 219.

*Material examined.* Holotype, female, **Kazakhstan**, Kyzylorda Prov., Shieli, 16.V.1905, leg. Yu. Baeckmann (ZIN); 2 females.



**Fig. 7.** Metasoma in species of the genus *Chrysis*, ventral view. **A**, *Ch. ear* Semenov, female; **B**, *Ch. ismaeli* Semenov, paratype, female; **C**, *Ch. laetula* Semenov et Nikol'skaya, holotype, male; **D**, *Ch. pavlovskii* Semenov et Nikol'skaya, holotype, male; **E**, *Ch. shestakovi* **sp. nov.**, holotype, female; **F**, *Ch. sericata* **sp. nov.**, holotype, female; **G**, *Ch. slava* Semenov, paratype, female; **H**, *Ch. maidaquensis* Strumia, female, Kazakhstan. Scale bars: 1.0 mm.

*Additional material examined.* **Kazakhstan**, *Kyzylorda Prov.*, Balamurun, Karatau Mountain ridge foothill, 21–22.V.1913, leg. V. Kozhantschikov (ZIN).

*Diagnosis.* Length 7.0–7.5 mm. Metasomal apical margin with median tooth spine-like and shorter than lateral tooth (Fig. 4A); metasoma with large punctures and small, shallow tiny dots on interstices (Fig. 1A). Notauli large and deep, as a row of subquadrate foveate punctures; mesopleuron with complete episternal sulcus. Lateral teeth of third metasomal tergum large, triangular and straight, not distinctly curved under apical margin (Fig. 4A); lateral edge of third tergum almost straight, not prominently arcuate before lateral teeth; black spots on second sternum large, with posterior margin reaching half of sternum length (Fig. 7A).

*Remarks.* The two specimens from Balamurun have an apically blunted median tooth of third metasomal tergum, anyway not lobate as in other species. For this reason, they can be superficially confused with *Chrysis sericata* **sp. nov.**, yet in this case, the metasomal punctation with large punctures and interstices is diagnostic compared with the small and dense metasomal punctures of the latter species.

*Distribution.* Kazakhstan.

***Chrysis ismaeli* Semenov, 1967**  
(Figs 1B, 4B, 5B, 6B, 7B)

*Chrysis (Allochrysis) ismaeli* Semenov-Tian-Shanskij, 1967: 124.

**Material examined.** *Holotype*, female, **Kazakhstan**, *Kyzylorda Prov.*, Balamurun, Karatau Mountain ridge foothills, 27–29.V.1913, leg. V. Kozhantschikov (ZIN); *paratype*, 1 female, same locality, 24.–26.V.1913, leg. V. Kozhantschikov (ZIN).

**Diagnosis.** Length 7.0–7.5 mm. Median tooth of third metasomal tergum lobate (Fig. 4B); metasomal punctation with even and dense punctures (Figs 5B); mesopleuron with complete episternal sulcus; second and third terga apically with polished interstices, 1–2 PD apart; propodeal angles uniformly arched downwards directed (Fig. 1B); mesopleuron with complete scrobal sulcus; lateral edge of third tergum slightly arcuate before lateral teeth; black spots on second sternum small, elliptical with posterior margin at most reaching half sternum length (Fig. 7B).

**Distribution.** Kazakhstan.

***Chrysis laetula*** Semenov et Nikol'skaya, 1954 (Figs 1C, 4C, 5C, 6C, 7C, 8A)

*Chrysis (Allochrysis) laetula* Semenov-Tian-Shanskij et Nikol'skaya, 1954: 124.

**Material examined.** *Holotype*, male, **Tajikistan**, *Khatlon Region*, Dzhilikul' on Vakhsh River, 15.VI.1934, leg. Gussakovskij (ZIN).

**Additional material examined.** Female, **Turkmenistan**, *Ahal Region*, Tedshen, tugai, 27.V.1964, leg. W.J. Pulawski (NMLS).

**Diagnosis.** Length 5.7 mm. Median tooth at third metasomal tergum apical margin spine-like, sharp and slightly longer than lateral tooth (Fig. 4C); metasoma punctation dense (Fig. 5C); in front view, head longer than wider, with convergent malar spaces (Fig. 6C); mesopleuron with incomplete episternal sulcus, which is faint towards scrobal sulcus; black spots on second sternum small and rounded (Fig. 7C). Male genital capsule as in Fig. 8A.

**Remarks.** Linsenmaier (1968) designated the female from Turkmenistan as the allotype. This specimen, not belonging to the type series, has no type status (Rosa et al., 2017a), moreover its identification is in need of confirmation.

**Distribution.** Turkmenistan, Tajikistan.

### ***Chrysis pavlovskii***

Semenov et Nikol'skaya, 1954 (Figs 1D–1E, 4D–4E, 5D–5E, 6D, 7D, 8B)

*Chrysis (Allochrysis) pavlovskii* Semenov-Tian-Shanskij et Nikol'skaya, 1954: 123.

**Material examined.** *Holotype*, male, **Tajikistan**, *Qurghonteppa Region*, Dzhilikul' on Vakhsh River, 12.VI.1934, leg. Gussakovskij (ZIN).

**Additional material examined.** 1 female, **Tajikistan**, *Khatlon Region*, "Kurgan-Tyube" [Bokhtar], 27.VIII.1948, leg. V. Rudolf (ZIN); 4 females, **Uzbekistan**, *Qashqadaryo Prov.*, env. Qarshi, 38.888448°N,



**Fig. 8.** Male genital capsule in species of the genus *Chrysis*, dorsal view. **A**, *Ch. laetula* Semenov et Nikol'skaya, holotype; **B**, *Ch. pavlovskii* Semenov et Nikol'skaya, holotype; **C**, *Ch. priapus* sp. nov., holotype; **D**, *Ch. slava* Semenov, Kazakhstan; **E**, *Ch. maidaquensis* Strumia, Kazakhstan. Scale bars: 1.0 mm.

65.831745°E, 13.V, 1–6.VI.2015, leg. V. Gromenko, M. Mokrousov, M. Proshalykin & K. Samartsev (ZIN, PRC).

**Diagnosis.** Length 5.5–7.8 mm. Metasomal apical margin of third metasomal tergum with median tooth spine-like as long as lateral teeth in male, and longer in female (Figs 4D, 4E); metasoma punctation dense, with small punctures and tiny dots on polished, shining interstices (Figs 1D, 1E); punctures on second metasomal tergum of male larger and sparser (Fig. 1D) [*vs.* smaller and denser in *Ch. laetula* male (Fig. 1C)]; male head subquadrate in frontal view (Fig. 6E) [*vs.* head in frontal view longer than width in *Ch. laetula* male (Fig. 6C)]; mesopleuron with complete episternal sulcus, with large, subrectangular, foveate punctures; black spots on male second sternum large, elliptical, with posterior margin reaching half of sternum length (Fig. 7D); female black spots smaller and subquadrate. Genital capsule as in Fig. 8B.

**Distribution.** Tajikistan, Uzbekistan (**new record**).

**Remarks.** The sex association proposed by Semenov & Nikol'skaya (1954) is likely unreliable, being only based on the tridentate margin of third metasomal tergum.

**Key to species of the *Chrysis ear* species group** (males of *Ch. ear*, *Ch. shestakovi* and *Ch. sericata* are unknown)

1. Median tooth of third metasomal tergum spine-like (Figs 4A, 4C–4E) ..... 2
  - Median tooth of third metasomal tergum lobe-shaped (Figs 4B, 4F–4G) ..... 5
2. Median tooth of third metasomal tergum shorter than lateral tooth (Fig. 4A) ..... *Ch. ear* (female)
  - Median tooth of third metasomal tergum as long as lateral tooth (Figs 4C–4E) ..... 3
3. Female ..... *Ch. pavlovskii*
  - Male ..... 4
4. Median tooth on third metasomal tergum sharp (Fig. 4C); punctures on second metasomal tergum smaller and denser (Figs 1C, 6C); head in front view longer than width (Fig. 5C) ..... *Ch. laetula*
  - Median tooth on third metasomal tergum triangular, more angulate (Fig. 4D); punctures on second metasomal tergum larger and sparser (Fig. 1D); head in front view subquadrate (Fig. 5E) ..... *Ch. pavlovskii*

5. Second metasomal tergum with large and coarse punctures basally (Fig. 6E), decreasing in size toward apex; black spots on second sternum large, with posterior margin exceeding half of sternum length ..... *Ch. shestakovi* **sp. nov.**
  - Second metasomal tergum with even and dense punctures (Figs 6B, 6F); black spots on second sternum round, with posterior margin at most reaching half of sternum length ..... 6
6. Second and third metasomal tergum apically with polished interstices, 1–2 PD apart (Fig. 6B); propodeal angles uniformly arched downwards directed; mesopleuron with complete episternal sulcus ...
  - ..... *Ch. ismaeli*
  - Second and third metasomal tergum apically with dense punctures and narrow interstices (Fig. 6F), 0–1 PD apart; propodeal angle basally angled; mesopleuron with episternal sulcus not completely outlined (Fig. 3B) ..... *Ch. sericata* **sp. nov.**

**Discussion and notes to the comparative diagnosis**

Kimsey & Bohart (1991) raised *Allochrysis* to genus rank on the basis of the peculiar shape of the third metasomal tergum. In the generic diagnosis of *Allochrysis*, the shape of the apical margin is described as: “the form of the T-III apex with its acute lateral teeth and lobulate middle projection (Fig. 92d) is unusual, and only in *Odontochrydium* is T-III similar”. Moreover, in the systematic introduction, Kimsey & Bohart (1991) reported: “The medial tooth of *Allochrysis* is unusually rounded and not sharp (41)”. Actually, among *Allochrysis* sensu Semenov, only *Chrysis ismaeli* shows the lobate middle projection (Fig. 4B), whereas the other species [*Ch. ear*, *Ch. laetula*, *Ch. pavlovskii* (Figs 4A, 4C–4D)] share with *Trichrysis* Lightenstein, 1876 the sharp median tooth (see also Rosa et al., 2017). However, *Trichrysis* species can be easily separated by the following characters: concave and transversely ridged-punctate scapal basin; developed TFC; and black spots on second metasomal sternum small and medially fused or nearly so (Rosa et al., 2016). Conversely, species in the genus *Odontochrydium* Brauns, 1928 can be easily recognised by: robust habitus, quite unlike “*Allochrysis*”; long subantennal space (1.8–2.0 MOD); deep, microridged scapal basin; and lidded midocellus (Rosa, 2018).

On the other hand, the metasomal apical margin with two lateral sharp teeth, medially straight,

slightly notched, or outcurved can be also found in some members of the *Chrysis bihamata* group, *Ch. rufitarsis* group and *Ch. pulchella* group (= *Gonodontochrysis* Kimsey et Bohart, 1991) (Linsenmaier, 1959). Furthermore, the extreme reduction of the median lobe to a single sharp tooth (in *Ch. ear*, *Ch. laetula*, and *Ch. pavlovskii*) can be considered as a derived character, already known in the *Ch. succincta* group, where two medial teeth are almost fused in a pointed median tooth (e.g. females of *Ch. minutissima* Radoszkowski, 1877, *Ch. pallescens* du Buysson, 1901, and *Ch. aegyptiaca* du Buysson, 1908) or completely fused in a single sharp tooth in both sexes of *Ch. maidaquensis* Strumia, 2014 (Figs 4I–4J) and *Ch. paria* Bingham, 1903.

In more detail, members of *Allochrysis* sensu Semenov (1954) share habitus, body sculpture, colouration, third metasomal tergum narrow at apex, black spots on the second metasomal sternum, flagellum, wings and male genitalia (Figs 1–3, 6–8) with members of the *Ch. rufitarsis* group. For this reason, Linsenmaier (1968) included *Allochrysis* species in the latter group. In my opinion, these species may be included either in a sister group of the *Ch. rufitarsis* group or in a subgroup of the latter; waiting for future molecular systematic analyses, I prefer to include them in a separate species-group. In fact, species in the *Ch. rufitarsis* group can be separated from species of the *Ch. ear* group by: different apical margin of the third tergum, without distinct median sharp tooth, yet medially slightly indented, straight, incurved or even outcurved (Kimsey & Bohart 1991); anteromedial pronotal depression usually more deeply marked; third metasomal tergum laterally more evidently toothed (in most females) or angled (in males and in the females of some species), sometimes with an unusual concave lateral edge before lateral teeth; flagellum black; legs usually without discoloured joints; malar spaces usually longer (1.2–2.1 MOD); and TFC sometimes vestigial and vaguely M-like.

In conclusion, the shape of the apical margin of the third metasomal tergum is similar to that found in other *Chrysis* species-groups (*Ch. bihamata*, *Ch. rufitarsis* and *Ch. succincta* groups). No unique, distinctive feature or combination of features separating *Allochrysis* from *Chrysis* s.l. could

be found. Therefore, I propose the new synonymy, *Chrysis* Linnaeus, 1761 = *Allochrysis* Kimsey & Bohart, 1991, **syn. nov.**

### Species excluded from the *Chrysis ear* species group

Kimsey & Bohart (1991) included in the genus *Allochrysis* two more species with tridentate apical margin, *Chrysis paria* and *Ch. slava*. Yet, these species belong to different species groups. *Chrysis paria* belongs to the *Ch. succincta* group, because of: shape of the head wider than long in frontal view; mandible edentate; scapal basin deeply hollowed; TFC fully developed; flagellum black; black spots on second metasomal sternum small, subquadrate and medially fused; and pit row fully developed (see below). *Chrysis slava* is not referable to any of the previously described groups, and is included in the new, herewith described *Ch. slava* group, characterised by: male flagellomeres ventrally lobate; flagellum dark brown to black; female scapal basin medially polished, neither punctate nor finely wrinkled; apex of third metasomal tergum with two lateral sharp teeth and convex, medially more or less notched median area, where median teeth are only visible as undulations; and male genitalia (Figs 8C–8D), whose shape exclude it from the *Ch. ear* group.

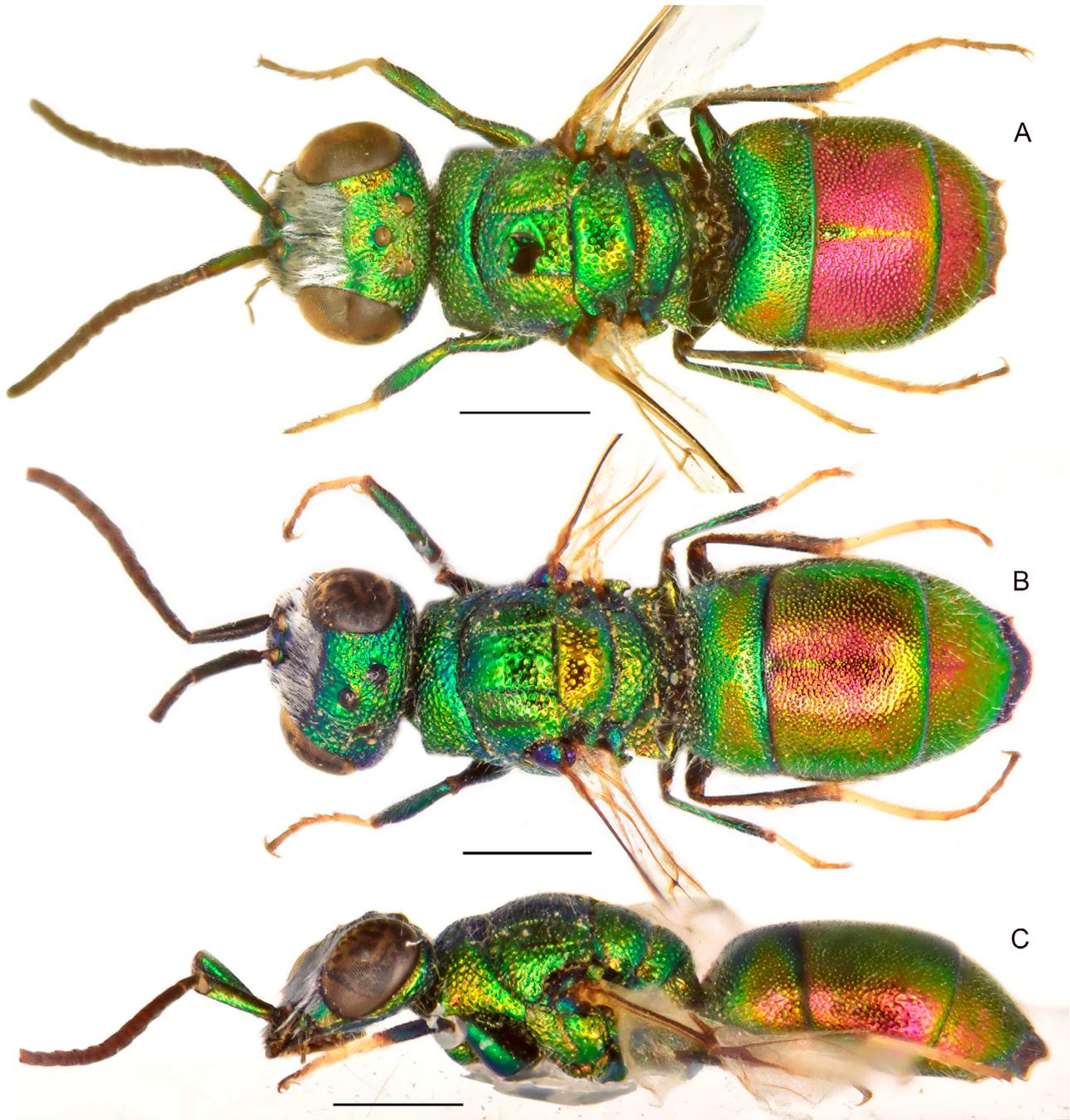
### *Chrysis paria* Bingham, 1903 (Figs 9A–9F)

*Chrysis paria* Bingham, 1903: 455. [Syntype: male, Pakistan: Quetta (NHMUK)].

*Chrysis sara* Nurse, 1904: 20. [Holotype: female (possibly male), Pakistan: Quetta (NHMUK)]; synonymised by Kimsey & Bohart, 1991.

**Material examined.** *Syntype*, 1 male, **Pakistan, Balochistan Prov.**, “Quetta, V.[19]02”, “col. C.G. Nurse Collection. 1920-72”, “*Chrysis paria* ♂ Bingham Type”, “Syntype” “B.M. type Hym. 13.48”, “NHMUK 013379410” (NHMUK). *Holotype*, female (male?), **Pakistan, Balochistan Prov.**, “Quetta, VI.[19]02”, “*Chrysis sara* (Nurse)”, “♀ Type”, “col. C.G. Nurse Collection. 1920-72”, “Syntype”, “B.M. type Hym. 13.47”, “NHMUK 013379411” (NHMUK).

**Additional material examined.** Six specimens were identified as *Chrysis maidaquensis* Strumia, 2014, one of which labelled as type of *Allochrysis minuscula* by Nikol'skaya; a species never described. **Kazakhstan,**



**Fig. 9.** Habitus in species of the genus *Chrysis*. **A**, *Ch. slava* Semenov, male, Kazakhstan, dorsal view; **B**, *Ch. priapus* sp. nov., holotype, male, dorsal view; **C**, *Ch. priapus* sp. nov., holotype, male, lateral view. Scale bars: 1.0 mm.

*Almaty Prov.*: 1 female, 20 km NW of Aydarli vill., 44°11'34.7" N – 79°22'29.6" E, 934 m, 28.V.2016, leg. K. Fadeev; 1 male, 10 km W of Chundzhi Settlm., Charyn Riv., urochishche Sortogay, 19.VI.1999, leg. V. Kazenas; 1 male, 30 km E of "Chilik" [Shelek], 3 km NEE of Borandysu, 8.VII.1996, leg. V. Kazenas; 1 male, same label, but 8.VII.1999; **Turkmenistan**: 1 male, *Lebap Region*, Mirzabek, Kerkipskiy env., 30.VI.1932, leg.

G.M; **Uzbekistan**: 1 female, *Surxondaryo Prov.*, Termiz Distr., E of env. Uchkyzil vill., 37°20'58", 067°15'19", 7.V.2015, leg. M. Mokrousov & M. Proshchalykin. (All specimens in ZIN).

**Diagnosis.** The male of *Ch. paria* (Figs 9A, C, E) is very similar to the male of *Ch. maidaquensis* Strumia, 2014 (Fig. 2E) in having the similar morphology and colouration. Both the syntype of

*Ch. paria* and the holotype of *Ch. sara* (Figs 9B, D, F), are females; they were examined by me based on pictures kindly provided by D. Notton (NHMUK). Nevertheless, based on pictures, the holotype of *Ch. sara* is seemingly another male of *Ch. paria*; the main difference is the shape of the apical teeth, which is likely a case of intraspecific variability. The genital capsule of *Ch. paria* was not examined; however, it is needed to exclude the outwardly obvious synonymy of *Ch. maidaquensis* with *Ch. paria*.

**Distribution.** Pakistan, Turkmenistan (**new record**), Uzbekistan (**new record**), Kazakhstan (**new record**).

**Remarks.** Kimsey & Bohart (1991) included *Ch. paria* in the genus *Allochrysis* because of the tridentate apical margin of third metasomal tergum. Nevertheless, the most important diagnostic feature is the shape of the head, as described by Bingham (1903): “transverse, much broader than long and with the eyes much broader than the pronotum; [...] facial hollow broad, somewhat shallow, arched above and margined by a transverse carina”. The above described transverse head, with sharp transverse frontal carina (Figs 6I–6J, 11A, 11B) is the basis for the exclusion of *Ch. paria* from the “*Allochrysis*” group and assigning it to the *Ch. succincta* group. Moreover, the apical margin of the third tergum, with three short teeth in male and female (Figs 4I–4J) is already known in some species of the *Ch. succincta* group, including *Ch. maidaquensis*, described from United Arab Emirates and reported for Iran and now found in Central Asia. The tridentate shape of the apical margin in *Ch. succincta* group results from two median teeth fused with each other. An intermediate form found in a female of *Ch. minutissima* Radoszkowski, 1877, a widespread species in Egypt and Palestine, whose median teeth are not completely fused; yet, the male of *Ch. minutissima* still has four small teeth on the apical margin.

### ***Chrysis slava* species group**

**Description.** Members of this group share: face relatively flat, not deeply hollowed; male scapal basin fully punctate, with tiny dots and covered by dense silvery setae; female scapal basin medially polished, laterally covered by tiny dots and silvery setae; TFC absent; malar space about 1.0 MOD,

shorter than F1; F1 longer than pedicel; flagellum dark brown; male F1–F8 to F10 ventrally lobate; subantennal space 1.0–1.5 MOD; midocellus unilidged; hind ocelli 2.5 diameters apart; forewing discoidal cell almost closed, with *Rs* ending about 1.0 MOD to wing margin; metanotum simple, evenly rounded in lateral view; mesopleuron with incomplete episternal sulcus; propodeal angle sharp and incurved behind; male legs with lightened joints and yellowish tarsi, female legs darker; third metasomal tergum with deep pit row, with small round pits; apex of third metasomal tergum bearing two sharp lateral teeth and medial area between convex, more or less indented medially (Fig. 4H); and black spots on second metasomal sternum small, rounded, medially separated. Male terminalia as in Figs 8C–8D.

**Hosts.** Unknown.

**Distribution.** Specimens are known from Kazakhstan (*Ch. slava*) and Mongolia (*Ch. priapus* sp. nov.). This species group is likely distributed all over Central Asia to Mongolia, and not yet reported from some regions due to lack of collecting data.

**Species included.** *Chrysis slava* Semenov, 1967; *Ch. priapus* sp. nov.

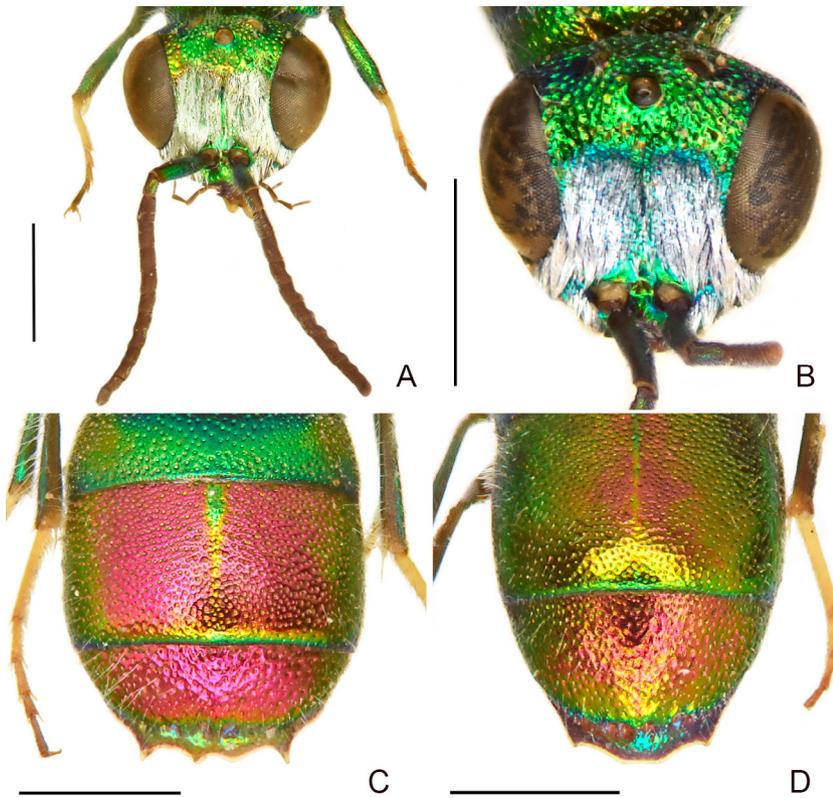
### ***Chrysis priapus* sp. nov.**

(Figs 8C, 10B–10C, 11B, 11D)

**Holotype.** Male, **Mongolia:** *Govi-Altai Prov.*, 8 km SE of Argalant-Ula, 20.VI.1980, leg. G. Medvedev (ZIN).

**Description.** Full length 5.9 mm.

**Male.** Head. In full face view, length 1.4 mm, width 1.6 mm; in dorsal view, thickness 0.8 mm. Face slightly hollowed, fully covered by tiny dots, without cross-ridging, with dense silvery setae (Fig. 11B); these dense, adpressed silvery setae also cover malar spaces and clypeus laterally. Punctures small, shallow, irregularly sized and somewhere confluent; laterally to ocelli and in front of midocellus, head with impunctate area; brow without TFC. Clypeus weakly notched apicomediaally. Malar space 1.0 MOD, shorter than F1; F1 1.9 MOD long. Subantennal distance 1.0 MOD. Ocelli unilidged. Relative lengths of P : F1 : F2 : F3 = 1.0 : 1.3 : 1.1 : 1.1; following flagellomeres elongate, length 1.6 times breadth. Head with whitish scattered and short setae (maximum



**Fig. 10.** Head and metasoma in species of the genus *Chrysis*. **A**, *Ch. slava* Semenov, male, Kazakhstan, head, frontal view; **B**, *Ch. priapus* sp. nov., holotype, male, head, frontal view; **C**, *Ch. slava* Semenov, metasoma, dorsal view; **D**, *Ch. priapus* sp. nov., holotype, male, metasoma, dorsal view. Scale bars: 1.0 mm.

length 1.0 MOD); OOL = 1.5 MOD; POL = 2.6 MOD.

**Mesosoma.** Length 2.0 mm; width (PPW) 1.3 mm. Pronotum with ill-defined anteromedial depression; with small punctures and tiny dots on shining interstices. Mesoscutum with small, very shallow, spaced punctures (1–2 PD), with shining interstices among punctures; lateral areas of mesoscutum with larger, shallow, subcontiguous punctures, with tiny dots on interstices; parapsidal lines deep and complete; notauli deep, composed by subquadrate foveae decreasing towards pronotum. Mesoscutellum largely polished, with small, spaced punctures and tiny punctures on interstices; metascutellum with larger, deeper, reticulate-foveate punctures, almost without interspaces; propodeal angles almost falcate, backwards directed. Mesopleuron with small, incomplete episternal sulcus, consisting of row of confluent punctures, from alar fossa to two-thirds of mesopleuron length; punctures confluent on anterior half, shallow and largely spaced in the posterior half, after episternal sulcus. Wings hyaline, with brown veins; radial sector open, around 1.0 MOD far from the wing margin.

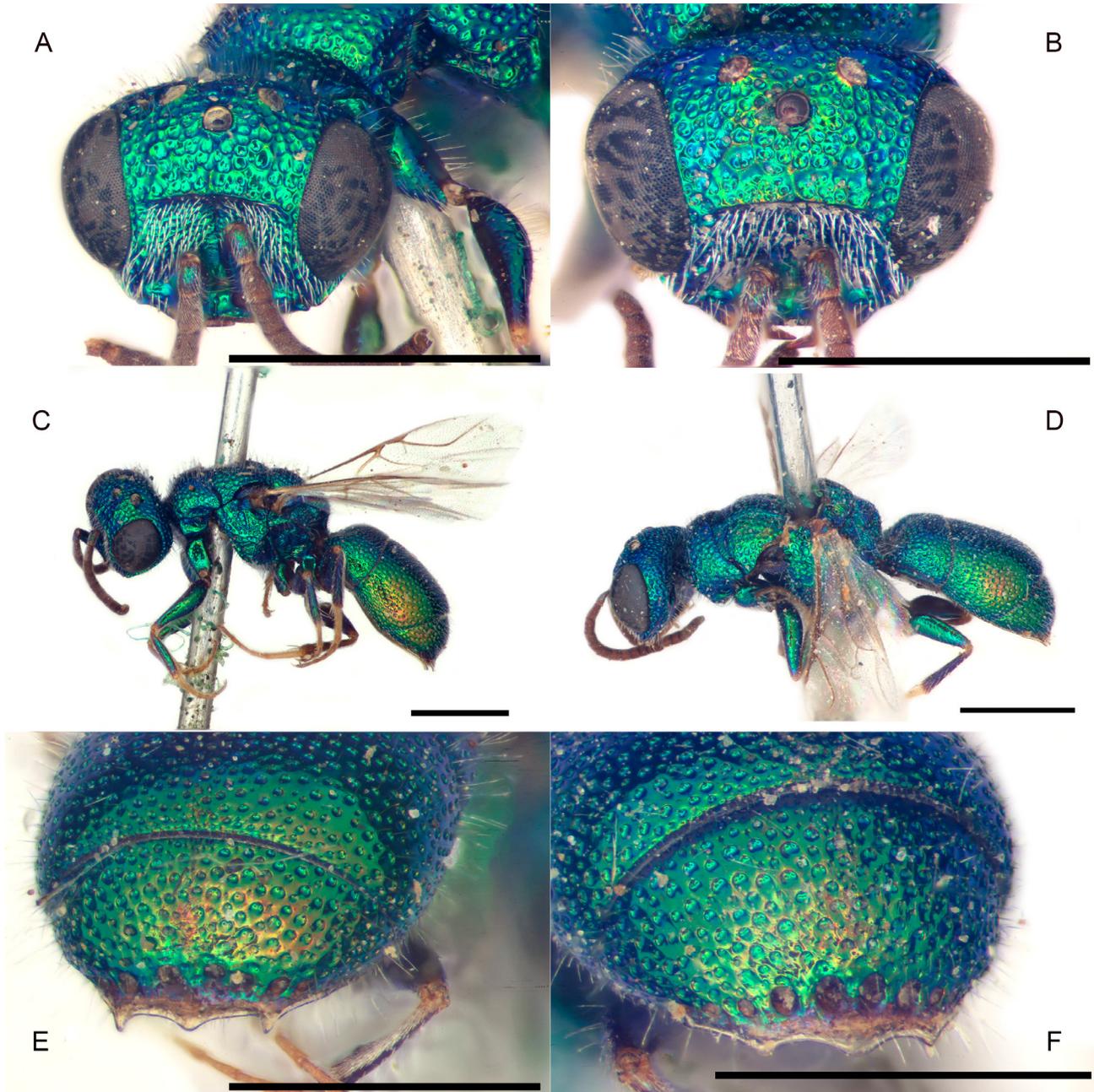
**Metasoma.** Length 2.6 mm. Punctuation on first metasomal tergum with small punctures ( $> 0.2$ – $0.3$  MOD), with tiny dots on interstices; punctuation on second tergum with small, subcontiguous punctures, slightly decreasing and becoming scattered towards the posterior and lateral margin; metasomal longitudinal carina missing. Apical margin of third tergum with narrow hyaline rim; lateral teeth large and obtuse, median area between almost straight (Fig. 11D). Subapical pit row formed by deep, rounded pits. Vestiture whitish and mostly erect, with sparse short setae (1.0 MOD).

**Colouration.** Head and mesosoma green metallic with golden reflections, metasoma golden red, with greenish lateral reflections; apical margin of last tergum blue after pit row. Mandibles brown, metallic green at base. Scapus and pedicellus metallic green; flagellum dark brown. Tibiae and femora green; tarsi yellowish with the last tarsomere brownish. Ventral side metallic green, with golden reflections.

**Female.** Unknown.

**Bionomics.** Unknown.

**Etymology.** The species is named after Priapus, the god of fertility in Greek mythology, known



**Fig. 11.** Head and third metasomal tergum in species of the genus *Chrysis*. **A, C, E**, *Chrysis paria* Bingham, syn-type, male; **B, D, F**, *Ch. sara* Nurse, holotype, female. Head frontal view (A, B); habitus, lateral view (C, D); third metasomal tergum, posterior view (E, F).

for his oversized penis and permanent erection. The name was chosen for the extremely elongated genital capsule of this cuckoo wasp, twice the size of the same in *Ch. slava*.

*Distribution.* Mongolia.

*Comparative diagnosis.* The male of *Ch. priapus* **sp. nov.** is similar to *Ch. slava* but it is clearly separated by the shape of the genital capsule with

extremely elongate cuspis and shortened gonostyle and digitus (Fig. 8C); it can be also separated by the slender and elongated metasoma, in particular the second and third tergum, compared to male of *Ch. slava* (Figs 10A–10B); the sparser metasomal punctation, giving a shining luster; and the apical margin of the last visible tergum is distinctly narrower and the median teeth closer.

***Chrysis slava*** Semenov, 1967  
(Figs 2C, 4H, 5G, 6H, 7G, 8D, 10A, 11A, 11C)

*Chrysis* (*Gonodontochrysis*) *slava* Semenov-Tian-Shanskij, 1967: 158. [Holotype: female, Kazakhstan: Djulek (ZIN)].

*Material examined.* *Holotype*, female, **Kazakhstan**, *Kyzylorda Prov.*, Djulek, 29.V.1913, leg. A. Gutbir. *Paratypes*: 1 female same date as for holotype; **Kazakhstan**, *Kyzylorda Prov.*: 1 female, Djulek, Syr-Darja gebiet, 5.VI.1913, leg. A. Gutbir; 1 female; Baigakum, 3.V., leg. A. Gutbir; 1 female, Syr-Daria, Baigacum, 5–11.VI.1913, leg. V. Kozhantschikov; 1 female, Balamurun, 16.V.1913, leg. V. Kozhantschikov; 2 females, same locality, 24–26.V.1913; 1 female, same locality, 25.V.1913; 1 female, same locality, 28.V.1913; 1 female, same locality, 31.V.1913; 1 female; Balamurun, Karatau Mt. ridge, 16.V.1913, leg. V. Kozhantschikov; 2 females, same locality, 23–24.V.1913; 1 female, same locality, 24–26.V.1913.

*Additional material examined.* 5 females, **Kazakhstan**: *Almaty Prov.*, 20 km NW Aidarly, 44°11'34"N 79°22'29"E, 934 m, 28.V.2016, leg. K. Fadeev; *Zhambul Prov.*: 2 males, 3 females, env. Toghuzken, Talas River, 29.V.1988, leg. V. Kazenas; 1 female, 50 km SW of Ulanbel, Muyunkum Desert, 2.VI.1988, leg. V. Kazenas. (All specimens in ZIN).

*Diagnosis.* Male flagellomeres F1–F8 ventrally lobate; female flagellomeres unmodified; scapus and pedicel metallic green, flagellum dark brown to black; scapal basin slightly hollowed, beneath brow fully covered by tiny dots, without cross-ridging, with dense silvery setae; female scapal basin medially polished, without punctures or cross-ridging; female malar spaces slightly subparallel, male ones convergent. Mesopleuron with small and incomplete episternal sulcus. Apex of third metasomal tergum variable, with sharp lateral teeth and median ones set close together, almost straight, more or less medially emarginate or distinctly sinuate. Punctuation all over body with small, dense and shallow punctures, giving a matt aspect. This species is very variable also in colouration, with specimens almost entirely red or golden-red, with posterior margins of metasomal terga green (Rosa et al., 2017) to largely green on head, mesosoma and first tergum; the apical margin of the last tergum after pit row can be blue, green or concolour golden-red.

*Distribution.* Kazakhstan.

## Discussion and notes on the comparative diagnosis

The male lobulate flagellomeres are an unusual diagnostic character in the Chrysididae. Linsenmaier (1959, 1968, 1999) included *Chrysis* species with this feature in the section “Incisicornia”, subgenus *Chrysogona* Förster, 1853, subdivided in two different branches: A) species with scapal basin mostly flat, with no differentiate sculpturing and no TFC; metanotum bulging, triangularly raised or conical; and apical margin of last metasomal tergum continuous, without teeth or undulations (species currently included in *Chrysura* sensu Kimsey & Bohart, 1991); B) species with distinct scapal basin, sometimes with faint TFC; metanotum unmodified; and apical margin various, from unmodified to bidentate or quadridentate.

The *Chrysis slava* group is included in the second Linsenmaier’s branch, together with the following species groups: *Ch. phryne*, *Ch. aureomaculata*, *Ch. varidens*, *Ch. ragusae* *Ch. jucunda* and *Ch. gracillima*. Among these groups, Kimsey & Bohart (1991) recognised only the first three groups as real, whereas *Ch. ragusae* group and *Ch. jucunda* group were included in the *Ch. varidens* group, and *Ch. gracillima* was considered as a subgroup of the *Ch. varidens* group.

*Chrysis slava* group is separated from the *Ch. phryne* group by toothed apical margin of the third tergum (continuous, without teeth in the *Ch. phryne* group); from the *Ch. aureomaculata* group by lacking TFC (TFC fully developed in the *Ch. aureomaculata* group); from the *Ch. jucunda* group by short F1 (slightly longer than pedicel in the *Ch. slava* group, more than twice as long as pedicel in the *Ch. jucunda* group); from the *Ch. gracillima* group by the number of lobate flagellomeres and shape of lateral teeth (only F2–F4 ventrally lobate; lateral teeth rounded or weakly angled in *Ch. gracillima* group); from *Ch. varidens* and *Ch. ragusae* groups by several characters that are complex and largely heterogeneous in the *Ch. varidens* – *Ch. ragusae* groups complex; however, in *Ch. slava* group, almost all male flagellomeres are ventrally lobate (*vs.* only basal ones in all others); TFC absent (at least faintly, when not fully developed in other species); female scapal

basin medially polished (*vs.* transversely microridged); female apical margin unmodified before pit row (*vs.* saddled to strongly saddled).

## Conclusions

Species of the *Chrysis ear* and *Ch. slava* groups were collected only occasionally and just a few distributional data are known. As a result, the distribution of these groups in Central Asia is still very incompletely studied, no doubt partly because their behaviour and autecology are almost unknown, and also because of very short and hardly predictable phenology, typical of insects living in arid or semiarid environments, adapted to harsh climatic conditions. The Chrysididae fauna of Central Asia is actually still poorly known, and so far partially investigated only in two countries: Tajikistan (Semenov & Nikol'skaya, 1954) and Kyrgyzstan (Tarbinsky, 2000a, 2000b, 2001, 2002a, 2002b, 2002c, 2004). An even worse situation applies to Mongolia, for which only a few Chrysididae records have hitherto been published (Rosa, 2017).

A recent publication (Pauli et al., 2018) analysed phylogenetical significance of ten nuclear-encoded genes and one mitochondrial gene, all protein-coding, in a total of 186 different species of the cuckoo wasps, representing most major lineages of the family. The result was that the current genus-level systematics of the cuckoo wasps is highly artificial. Discussed options for taxonomically resolving the shortcomings in the classification of the cuckoo wasps at the generic level include the opportunity to merge into *Chrysis* several currently recognised genera, such as *Argochrysis* Kimsey et Bohart, 1981, *Caenochrysis* Kimsey et Bohart, 1981, *Ceratochrysis* Cooper, 1952, *Chrysidea* Bischoff, 1910, *Chrysura* Dahlbom, 1845, *Chrysurissa* Bohart, 1980, *Pentachrysis* Lichtenstein, 1876, *Pleurochrysis* Bohart, 1966, *Spintharina* Semenov, 1892, and *Trichrysis* Lichtenstein, 1876, as well as in the future possibly other genera, not yet analysed. Unfortunately, "*Allochrysis*" specimens were not available for this molecular study; yet it appears reasonable to assume that the latter group may be closely related to the *Chrysis rufitarsis* s.l. group (possibly also including the *Ch. bihamata* group), and to be included in the rich clade of *Chrysis* bee parasitoids, waiting for molecular and biological confirmations.

## Acknowledgements

I am grateful to Sergey A. Belokobylskij (ZIN) for access to Semenov's collection and loan of type specimens; him also, Maurizio Pavesi (Museo di Storia Naturale, Milan, Italy) and three anonymous referees for critical reading and helpful corrections of the text; and David Notton (NHMUK) for the pictures of *Chrysis paria* and *Ch. sara*.

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Received 22 October 2018 / Accepted 29 November 2018. Editorial responsibility: S.A. Belokobylskij