

A new, remarkable *Chlorophila* Semenov, 1891 (Coleoptera: Tenebrionidae: Lagriinae) from China

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Chlorophila Semenov, 1891 is a small genus of emerald-green Lagriinae Latreille, 1825: Tenebrionidae Latreille, 1802 restricted to the mountain systems of China, the Himalayas, and northern Indochina. In the present paper a remarkable new species, *Chlorophila gemma* sp. nov. from mainland China, is described and illustrated.

Key words: Taxonomy, new species, Palaearctic Region, Lagriini.

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INTRODUCTION

Originally established to include a sole species from mainland China (Semenov, 1891), *Chlorophila* until the present study comprised five Palaearctic (Merkl, 2020) and one Oriental (Pic, 1913) species. In accordance with the contemporary systematics of Tenebrionidae Latreille, 1802, this lagriine genus is placed within the subtribe Statirina Blanchard, 1845 of the tribe Lagriini Latreille, 1825 (1820) (Merkl 2019, 2020; Bouchard *et al.* 2021). Rather uniform morphologically, *Chlorophila* never been properly taxonomically revised except a partly successful attempt by Borchmann (1936), who redescribed the genus and keyed all known species, but erroneously attributed *Arthromacra donckieri* (Pic,

1910) (China: Yunnan) to *Chlorophila* (Merkl 2004). Merkl (2004, 2011a) indicated the strong morphological similarity and lack of major distinguishing characters between the genera *Arthromacra* Kirby, 1837, *Chlorophila* Semenov, 1891, and *Donaciolagria* Pic, 1914. As of Merkl (2011b), the synapomorphies of the three aforementioned groups among other Statirina are primarily the narrow shape of the prosternal intercoxal process (the process is broad in other Statirina) and the strongly shortened first anal cross-vein of the metathoracic wing (the first anal cross-vein is complete or nearly complete in other Statirina). Not surprisingly, Merkl (2004) synonymized six taxa with the type species of the genus, the most widespread Palaearctic species *C. portschinskii* Semenov, 1891. The

apomorphies of *Chlorophila*, as is considered here, are presence of extremely dense, microscopical punctures covering whole surface of elytra (elytra therefore appear velvet; Fig. 4) in the combination with densely, transversely wrinkled pronotum.

Chlorophila species generally inhabit mountainous areas (personal observation based on the studied material of all known taxa). Merkl (2020) presented the most recent checklist of the Palaearctic *Chlorophila*.

The aim of the present paper is to describe and illustrate a new species of *Chlorophila* from mainland China.

MATERIAL AND METHODS

All label text is reproduced verbatim, with no corrections or additions. All labels are printed if not stated otherwise. All type specimens of the new species are provided with a black-framed, printed label on red paper with "HOLOTYPUS" or "PARATYPUS", respectively. Labels, if more than one is present for the same specimen, are separated by a double slash. Author's comments are placed in square brackets.

Paired morphological structures are generally treated as singular in the text, but with some exceptions.

For morphological studies, a Leica S6D binocular stereomicroscope with an attached external Canon EOS 77D SLR camera was used.

Dissected genitalia were mounted on paper cards and fixed in dimethyl hydantoin formaldehyde (DMHF).

Digital images were made using a Canon EOS 77D SLR camera mounted on a stand with a Canon EFS 60-mm lens. Helicon Focus 7 software (Helicon Soft, Kharkiv, Ukraine) was used for image stacking. Further image manipulations were performed using the GNU Image Manipulation Program (GIMP).

Acronyms for scientific repositories:

BMNH – Natural History Museum (formerly British Museum, Natural History), London, United Kingdom;
DTC – Collection Dmitry Telnov, Rīga, Latvia;
DUBC – Daugavpils University Coleoptera Research Center, Ilgas, Latvia;
ERC – Collection Enrico Ruzzier, Mirano, Italy;
MNHN – Muséum national d'Histoire naturelle, Paris, France;
NHMB – Naturhistorisches Museum Basel, Switzerland;
NME – Naturkundemuseum Erfurt, Germany;
ZIN – Zoological Institute Russian Academy of Sciences, St.-Petersburg, Russia.

RESULTS

New description

Tenebrionidae Latreille, 1802
Lagriinae Latreille, 1825 (1820)
Lagriini Latreille, 1825 (1820)
Chlorophila Semenov, 1891
Type species: *Lagria portschinskii* Semenov, 1891 [monotypy]

Chlorophila gemma sp. nov.

(Figs. 1–5)

<http://zoobank.org/ABF58BA8-3B6F-46AD-8D1B-59BFDB5F9D67>

Type material designated. Holotype Male. NHMB: China N-YUNNAN 27°08'N 100°14'E Yulongshan mts. 2900–3500m BAISHUI vill. lgt.D.Král 7–12/7'90.

Paratypes 59 specimens. 10 males & females NHMB, 1 male & 1 female NME, 1 male DTC: same label as holotype; 1 female NHMB: CHINA: N. Yunnan 30km N of LIJIANG 3000m, 3.VII.1990 L. & M. Bocák lgt.; 5 males & 4 females NHMB: CHINA, Yunnan prov. 27° 13' n 100° 16' E Yulongshan mts. 14.VII.1990 3200m Vít Kubáň leg.; 10 males & females NHMB, 1 female ERC: China N-YUNNAN 27°06'N 100°15'E Yulongshan

mts. 3000–3500m GANHAIZI pass lgt.D.Král 18–23/7'90; 1 female NHMB: CHINA pr. Yunnan b. occ. Deqen env.4200m 8.6.1993 R.Cervenko lgt.; 6 males & females NHMB: YUNNAN, 20-21 Jun YULONG Mts., 1993 27.07N 100.13E Bolm lgt., 3400 m; 7 females NHMB & 1 female DUBC: YUNNAN, 23.-24. JUN YULONG Mts., 1993 27.00N 100.12E Bolm lgt. 3200 m; 2 females NHMB: YUNNAN 3200–2700m 27.00N 100.12E 1993 YULONGSHAN mts. 23 – Vít Kubáň leg.–4/6.; 1 female BMNH: CHINA, Yunnan Daju, 80 km N Lijiang 17.-19.6. 1995 P. Pekarovič leg. // BMNH{E} 2008-52; 2 males & 3 females BMNH: P.R. CHINA: Yunnan Lijiang Yu Long Mt KIB/RBGE Res. Stn. June 2009, 3200 m. A.C. Glasworthy // BMNH{E} 2009-127 A C Glasworthy; 1 male ZIN: CHINA, Sichuan, W Ningnan Xian, E Niubaoshan, 3.8 km W Bibucun, 3360 m, 30.vi.2018 Belousov & Kabak leg. // 27°03'40"N 102°32'49"E; 1 male ZIN: CHINA, Yunnan, N Weixi City, 5.15km W Shajiam, 27°21'52"N 99°17'43"E, 2960 m, 19.vi.2019 Belousov, Davidian & Kabak lg.

Derivatio nominis. The specific epithet derives from the Latin “gemma”, a substantive meaning precious stone or gem. This specific name is used in apposition and refers to bright coloration of the new species.

Measurements. Holotype male, total body length 14.7 mm; head length 1.9 mm, head width across compound eyes 1.7 mm, length of dorsally partially exposed cranial neck 0.2 mm, pronotal length 2.0 mm, pronotal width across anterior margin 1.8 mm, across laterally expanding median portion 2.1 mm, across base 2.1 mm, elytral length 10.6 mm, combined maximum elytral width across apical one third 4 mm.

Description. Colouration. Head emerald green dorsally and ventrally, with distinct metallic lustre. Pronotum dorsally and ventrally pale orange to reddish-brown, with or without variably strong green metallic lustre; in some aberrant specimens strong green metallic lustre of pronotal disc is concealing pale orange colouration and pronotum therefore appears uniformly green in dorsal view. Elytra generally emerald green (strength of this

colour varies from pale to dark, nearly blue) encircled by ochre lateral margins and base. Scutellar shield ochre. Venter except head uniformly pale to dark ochre, abdomen in some specimens with distinct green metallic lustre; morphological sternites VII–VIII and tergites VII–VIII contrastingly pale yellow. Antennae, maxillary and labial palps and legs ochre to reddish-brown; in some specimens 3–5 terminal antennomeres darker than basal ones or femora dorsally with vague green metallic lustre.

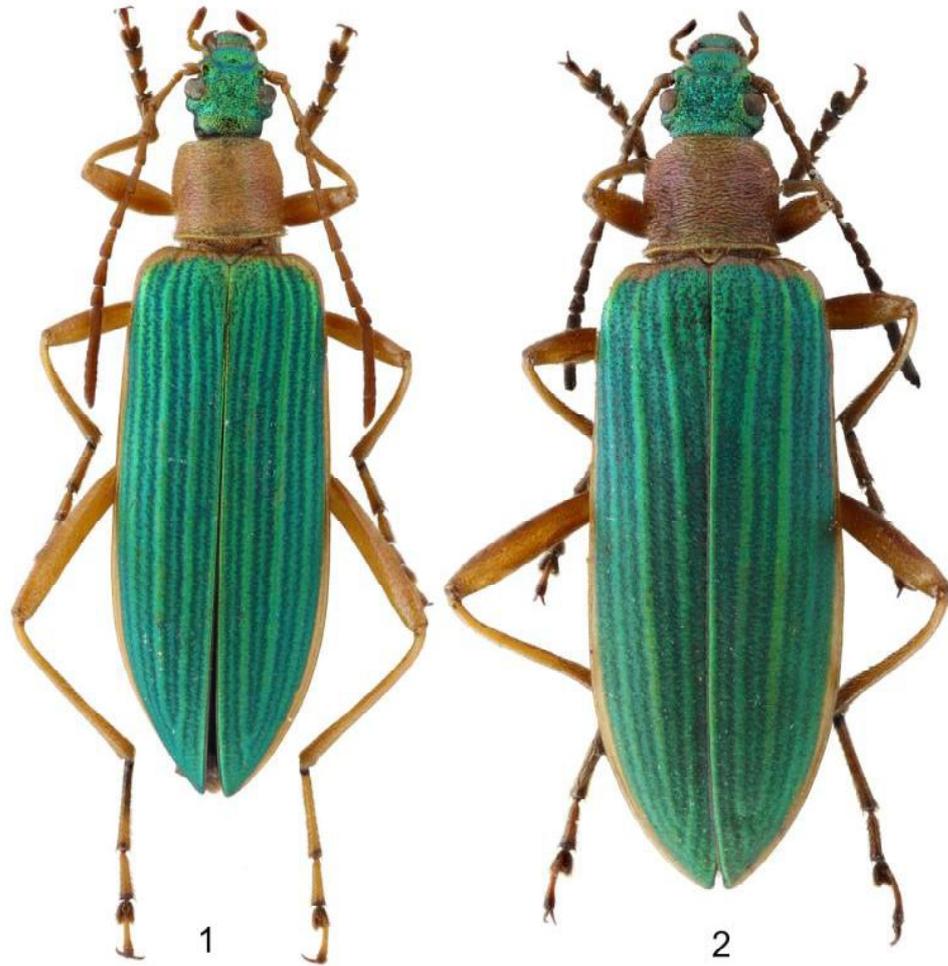
Male, body strongly elongate, slender, flattened in dorsal aspect. Head triangular, flattened dorsally, glossy. Labrum trapezoid, anterior margin broadly emarginate. Frons strongly transversely impressed anteriorly to antennal insertions. Anterolateral margin of frons moderately strongly prominent laterodorsad, not concealing insertion of antenna. Frons flattened between and beyond compound eyes. Interocular distance about 2.6–2.7× the dorsal eye length. Compound eye rather small in dorsal, large in lateral view, gently faceted, moderately strongly prominent laterally in dorsal view, with broadly emarginate anterior and very shallowly emarginate posterior margin (in lateral view). Interfacetal setae not observed. Tempora about half the dorsal eye length, nearly straight, posterior angles of tempora distinct. Head base truncate, occiput not delimited from short and broad cranial neck. Labrum densely punctured, intervening spaces about as large as punctures, in part gently microreticulate. Frons and occiput coarsely, densely, irregularly corrugate, intermixed with large punctures. Labrum with long, moderately dense, suberect, anteriorly-pointed, yellowish setae. Frons and occiput with somewhat shorter and less conspicuous, suberect, whitish to yellowish setae; tempora dorsally and laterally with long, dense, erect, whitish setae. Antenna filiform, long, rather heavy and slightly thickened distally, extending towards metacoxa. Antennomeres 1–5(6) glossy, 6(7)–11 opaque. Basal antennomere short, irregularly cylindrical, about 1.5–1.7× as long as antennomere two. Antennomere three about 3.2–3.3× as long as preceding antennomere. Antennomeres 3–7 nearly same length, antennomeres 7–10 slightly

widen distally. Penultimate antennomere shortened, transverse, 0.3 mm long in holotype, widened distally. Terminal antennomere slightly arched, strongly elongate (1.8 mm long in holotype), about 5.0–5.3× as penultimate antennomere and nearly as long as combined length of four preceding antennomeres. Terminal maxillary palpomere subcultriform, widest mesally. Cranial neck about same strongly and densely corrugate as frons. Pronotum nearly flattened in dorsal aspect, dorsal shape subquadrate, widest across base and medially, slightly expanded laterally at midlength and slightly constricted anteriorly and postmedium. Anterior and posterior pronotal margin truncate, pronotal margins not beaded, anterior and basal rim not present. Anterolateral angles obtuse angulate, not projected in any aspect. Posterolateral angles nearly acute angulate in dorsal view, slightly projected laterad. Pronotal disc densely, irregularly, moderately roughly, transversely wrinkled; wrinkles intermixed with sporadic, rather large punctures. Intervening spaces widely glossy. Dorsal pronotal setae inconspicuous, rather dense, erect, whitish. Prothoracic hypomeron glossy, gently transversely striate, with erect, whitish setae. Scutellar shield triangular, small, impunctate, glossy and glabrous. Elytron strongly elongate, constricted at apex, flattened dorsally. Humerus broadly rounded. Humeral callosity not prominent, not or barely convex dorsally, glossy, sparsely punctured. Postbasal transverse impression not indicated. Each elytron with several conspicuous, slightly raised, broad longitudinal costae. Apical sutural angle acute angulate in dorsal view. Elytral deflected lateral margin visible in dorsal view except at humeral one fifth and at apex. Whole dorsal surface of elytra extremely densely, microscopically punctured (Fig. 4); micropunctures ovoid to hexagonal, their intervening spaces distinctly narrower than micropunctures. Additionally, basal third of elytron with larger, strongly irregular, variably dense, ordinary punctures, which disappearing on rest of elytron. Some of those larger punctures bear minute, appressed seta not surpassing diameter of puncture, some other punctures bear sporadic, moderately long, erect, white tactile setae. Epipleuron widest at humeral area,

gradually narrows towards apex, becomes very narrow in apical one fifth of elytra. Metathoracic wings fully developed. Legs long and slender, femora and tibiae glossy, shortly, sparsely setose. Femora not clavate, subequal in length to tibiae. Tibiae slightly curved in basal third. Tarsomeres sparsely setose ventrally, protarsomeres distinctly widened. Basal metatarsomere shorter than combined length of remaining metatarsomeres. Tergites VII–VIII broadly rounded at posterior margin. Morphological sternite VII subtruncate at posterior margin. Morphological sternite VIII broadly emarginate at posterior margin, with inconspicuous, subspherical, median protruding. Spiculum gastrale V-shaped, arms interconnected with membrane. Aedeagus rather short, arched in lateral aspect, impressed on dorsal surface before apex (Fig. 3).

Female, generally larger and more robust compared to male. Antenna shorter, not extending towards metacoxa, antennomeres 3–7 comparatively shorter, terminal antennomere about 3.5–3.6× as long as penultimate antennomere, as long as combined length of three preceding antennomeres. Pronotum stronger transverse than that in male. Basal metatarsomere comparatively shorter than that of male. Selected paratype female, total body length 17.1 mm; head length 2.1 mm, head width across compound eyes 1.8 mm, length of dorsally partially exposed cranial neck 0.2 mm, pronotal length 2.2 mm, pronotal width across anterior margin 2.0 mm, across laterally expanding median portion 2.4 mm, across base 2.5 mm, elytral length 12.6 mm, combined maximum elytral width across apical one third 4.7 mm.

Interspecific variability. The new species varies greatly in total body length (12.0–14.5 mm for males *versus* 13.3–17.1 mm for females), dorsal body colouration (pronotum is partially to uniformly green in some specimens (Fig. 5), main elytral colouration varies from light green to almost blue, elytral longitudinal costae appear paler than green rest of elytra due to optical effect of reflection, legs and antennae variably dark in some specimens); anterior margin of pronotum



Figures 1–2. *Chlorophila gemma* sp. nov., habitus, dorsal view. 1 – Paratype male from China, Sichuan, E Niubaoshan; 2 – Paratype female from China, Yunnan, Yulongshan Mts., 27°13'N 100°16'E [not to scale]

broadly emarginate in some paratypes. Abdominal ventrites I–IV metallic green in several specimens, ochre with only vague green lustre in other specimens. In some male specimens antenna is comparatively shorter and not extending towards metacoxa.

Differential diagnosis. A rather distinctive species among all known congeners primarily due to the presence of the low, longitudinal elytral costae, the rather broad and short, dorsally irregularly wrinkled pronotum, the pale-coloured

pronotum (consider intraspecific variability!), the length and the ratio of the male and female terminal antennomere, and the shape of the male aedeagus.

The new species was been compared with the type material of the following congeners:

Chlorophila apicicornis Pic, 1913. Syntype 1 male MNHN: 451 [handwritten] // Lao Kay [handwritten] // type [handwritten] // exchange't d'Borchmann [handwritten] // *Chlorophila*



Figs. 3–4. *Chlorophila gemma* sp. nov. 3 – Paratype male from China, Yunnan, Yulongshan Mts., Baishui Village, aedeagus in ventral (A), dorsal (B), and lateral (C) view; 4 – Microsculpture of elytra, magnification ~90× (consider presence of both dense micropunctures and larger, ordinary punctures) [not to scale]

apicicornis Pic [handwritten]; Syntype 1 female MNHN: Info Chine [handwritten] // Type [handwritten] // TYPE [printed, label red] // apicicornis Pic [handwritten] // Muséum Paris Coll. M. Pic [printed, black frame]; Syntype 1 male MNHN: SYNTYPE [printed, label red] // Lao Kay [handwritten] // Juin 1912 (Viutalis) [handwritten] // Muséum Paris Coll. M. Pic [printed, black frame]; Syntype 1 female MNHN: SYNTYPE [printed, la-

bel red] // apicicornis Pic (Indochine) [handwritten] // Muséum Paris Coll. M. Pic [printed, black frame].

Chlorophila cyanea Pic, 1915. Syntype 1 female MNHN: 99. [printed] // Fokien [handwritten] // type [handwritten] // TYPE [printed, label red] // cyanea Pic [handwritten] // Muséum Paris Coll. M. Pic [printed, black frame].

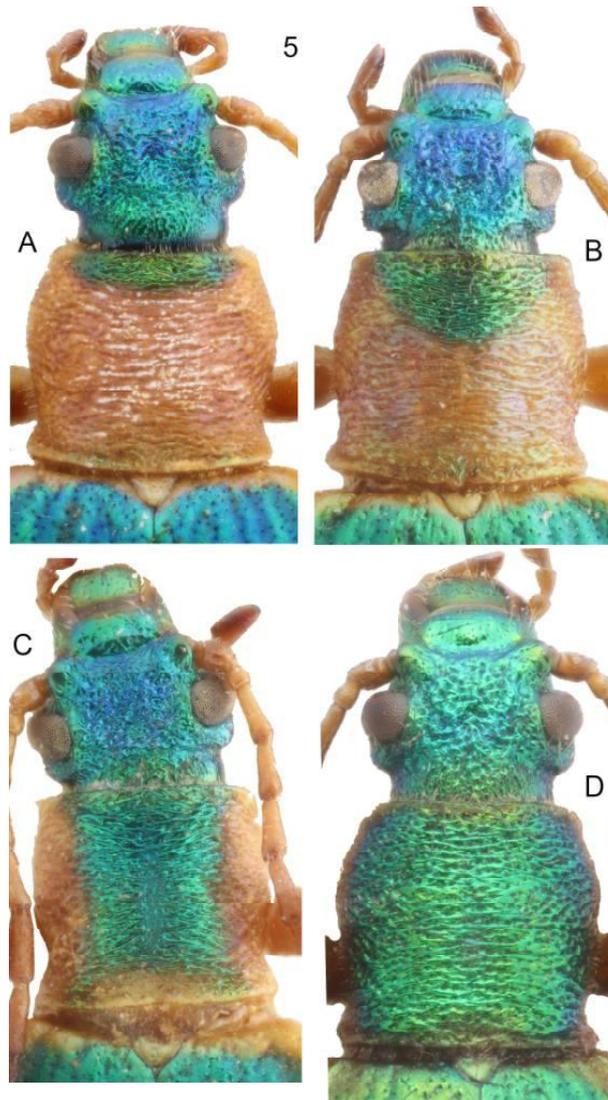


Fig. 5. *Chlorophila gemma* sp. nov., male paratypes from China, Yunnan, Yulongshan Mts., 27°13'N 100°16'E (A), Shajiamia environs (B), Yulongshan Mts., Baishui Village (C), and Lijiang, Mount Yu Long (D), showing variability in pronotal colouration, dorsal view [not to scale]

Chlorophila davidi Fairmaire, 1898. Syntype 1 female MNHN: Chlorophila Davidi Fairm. Moupin [handwritten] // Moupin A. David. [handwritten].

Chlorophila portschinskii (Semenov, 1891). Lectotype male ZIN: Kan-ssu 1885 G. Patanin [printed] 15 VII [handwritten, on reverse side] // Lagria (*Chlorophila*) polychlora m. male, A. S. X. 89 [handwritten].

Chlorophila semenowi Fairmaire, 1899. Syntype 1 male MNHN: TYPE [printed, text red] // Chlorophila Semenovi Frm nsp [handwritten] // Muséum Paris Collection Léon Fairmaire 1906 [printed, black frame].

Ecology. The known specimens were sampled in upper montane forest zone between 2700 and 4200 m altitude, but mainly at 3000–3500 m.

Distribution. So far known from Sichuan and Yunnan, mainland China.

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