

## Descriptions of four new species of *Chrysotimus* Loew from Tibet (Diptera: Dolichopodidae)

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The occurrence of the genus *Chrysotimus* Loew, 1857 in Tibet is confirmed for the first time. The following four species are described as new to science: *Chrysotimus bifurcatus* sp. n., *C. grandis* sp. n., *C. lii* sp. n. and *C. linziensis* sp. n. A key is given to distinguish the Chinese species of the genus.

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### 1. Introduction

The genus *Chrysotimus* Loew, 1857 belongs to the subfamily Peloropeodinae. The genus is generally characterized by the yellow or yellowish hairs and bristles, small first flagellomere, hind tarsomere 1 in most males bearing several short erect black ventral bristles at base, and mid tarsomere 1 in male at least as long as tarsomeres 2–4. 60 species were known to occur in the Holarctic and Oriental Realms. Previously, there were 8 species known from the Palaearctic (Negrobov 1991) and 2 species from the Oriental Realms (Becker 1922, Dyte 1975). So far 25 species have been known from China (Parent 1944, Wang *et al.* 2005, Yang 2001, Yang & Saigusa 2001a, 2001b, 2005, Zhang *et al.* 2003).

*Guzeriplia* Negrobov, 1968 embodies the characters of *Chrysotimus* Loew in the head and thorax with yellow hairs and bristles and biseriate acr. However, in *Guzeriplia*, the hypopygium is large (almost as long as abdomen), bearing the long surstylus and cercus. Bickel (2004) noted that it should be within the range of variation of the latter, probably as a synonymy.

In this paper, we describe four species new to science, all found from Tibet, an area lying in the Southwest of China, on the northern side of Himalayas, and bordered with Pakistan, India, Burma, Nepal, and Bhutan. The area belongs to the Palaearctic and Oriental Realms. Perhaps the high-altitude climate is responsible for the restricted occurrence of these four species. We also provide a key to *Chrysotimus* species males from China.

### 2. Material and methods

The specimens for this study were collected by Fasheng Li (Beijing) from Tibet in 1978 by sweep netting, and are deposited in the Entomological Museum of China Agricultural University (CAU), Beijing. All material is preserved in 75% alcohol.

Abbreviations are as follows: acr = acrostichal, ad = anterodorsal, av = anteroventral, dc = dorsocentral, LI = fore leg, LII = mid leg, LIII = hind leg, oc = ocellar, pd = postero-dorsal, ph = posthumeral, pv = posteroventral, v = ventral.

**3. Key to species of *Chrysotimus* Loew from China (males)**

1. Hind tarsomere 1 at most with sparse black bristles at base 2  
Hind tarsomere 1 with bundle(s) of black ventral bristles at base 8
2. Hind tarsomere 1 without black ventral bristles at base (not known in *grandis*) 3  
Hind tarsomere 1 with black ventral bristles at base 5
3. Cercus divided into outer and inner lobes 4  
Cercus single. China. *sinensis* Parent, 1944
4. Acr absent; mid tarsomere 1 shorter than the tarsomeres 2–5; epandrium with nearly quadrate lateral process. Guangxi *guangxiensis* Yang & Saigusa, 2001  
Six to seven irregularly paired acr; mid tarsomere 1 longer than the tarsomeres 2–5; epandrium with long hook-like lateral process. Tibet. *grandis* sp. n.
5. Antenna with scape and pedicel yellow. Zhejiang *basiflavus* Yang, 2001  
Antenna wholly black. 6
6. Five dc; acr absent. Zhejiang *apicicurvatus* Yang, 2001  
Six dc; acr present 7
7. Four to five irregularly paired acr; hind tarsomere 1 with 6 sparse black ventral bristles on basal 1/4. Guangdong *acutatus* Wang, Yang & Grootaert, 2005  
Nine to ten irregularly paired acr; hind tarsomere 1 with 2 sparse black ventral bristles at base. Ningxia *ningxianus* Wang, Yang & Grootaert, 2005
8. Four or five dc; acr absent 9  
Six dc; acr present 14
9. Arista dorsal; hypandrium with broad lateral process. Zhejiang *dorsalis* Yang, 2001  
Arista sub-apical; hypandrium with thin finger-like lateral process 10
10. Hind tarsomere 1 with 3–4 short black spine-like ventral bristles at base. Beijing *songshanus* Wang, Yang & Grootaert, 2005  
Hind tarsomere 1 with about (or more than) 10 black ventral bristles at base 11
11. Hairs and bristles on thorax yellow 12  
Hairs and bristles on thorax brownish or brown 13
12. Fore tarsomere 1 with row of about 10 v; hind tarsomere 1 with 22 short black ventral bristles on basal 1/4; surstylus basally without inner process. Gansu *chikuni* Wang, Yang & Grootaert, 2005  
Fore tarsomere 1 without row of v; hind tarsomere 1 with less than 20 black ventral bristles on basal 1/4; surstylus basally with inner process. Hubei, Shaanxi, Yunnan *shennongjianus* Yang & Saigusa, 2001
13. Hind tarsomere 1 with about 12 short black ventral bristles; surstylus not furcated apically. Yunnan *bispinus* Yang & Saigusa, 2001  
Hind tarsomere 1 with 15–16 short black ventral bristles; surstylus furcated apically. Guangxi *xuae* Wang, Yang & Grootaert, 2005
14. Acr 2–4 pairs 15  
Acr more than 5 pairs 22
15. Hind tarsomere 1 with group of 8–12 black basal bristles at base (which are somewhat sparse), but without distinct v. 16  
Hind tarsomere 1 with 1 (or 2) bundles of black basal ventral bristles, and row of 7–8 pv 18
16. CuAx ratio about 0.2; lateral process on epandrium not concave near middle 17  
CuAx ratio 0.35; lateral process on epandrium concave near middle. Yunnan *yunlonganus* Yang & Saigusa, 2001
17. First flagellomere as long as wide; hind tibia without distinct v. Tibet *lii* sp. n.  
First flagellomere about 1.5 times wider than long; hind tibia with 2 pv. Tibet *linzhiensis* sp. n.
18. R4+5 and M parallel apically; hind tarsomere 1 with bundle of 4–5 black ventral bristles at base 19  
R4+5 and M slightly convergent apically; hind tarsomere 1 with 2 bundles of 3–4 black ventral bristles at base. Shaanxi *bifascia* Yang & Saigusa, 2005
19. Hairs and bristles on thorax yellow or pale; surstylus on epandrium not furcated apically 20  
Hairs and bristles on thorax brown; surstylus on epandrium furcated apically. Guangxi

*sanjiangyuanus* Wang, Yang  
& Grootaert, 2005

20. Fore tarsomere 1 without rowed v; hind tarsomere 1 with 4–5 black ventral bristles at base 21

Fore tarsomere 1 with row of 5–6 v; hind tarsomere 1 with 8 black ventral bristles at base. Guangdong

*guangdongensis* Wang, Yang  
& Grootaert, 2005

21. Hind femur with row of ad and pd; cercus long and narrow. Beijing

*xiaolongmensis* Zhang, Yang  
& Grootaert, 2003

Hind femur without distinctly d; cercus round. Shaanxi

*unifascia* Yang & Saigusa, 2005

22. Hind tarsomere 1 with row of about 10 pv. 23  
Hind tarsomere 1 without distinct v 26

23. Hind tarsomere 1 with 10–12 black ventral basal bristles; mid tibia without distinct v 24

Hind tarsomere 1 with about 20 black ventral basal bristles; mid tibia with 1 pv. 25

24. First flagellomere somewhat round, 2.0 times wider than long; cercus not furcated, dorsal lobe on surstylus thick and straight. Shaanxi

*qinlingensis* Yang & Saigusa, 2005

First flagellomere subtriangular, about as long as wide; cercus bifurcated, dorsal lobe on surstylus thin and curved. Tibet *bifurcatus* sp. n.

25. Fore and mid tarsomere 1 without distinct v; epandrium basally with short process. Shaanxi *setosus* Yang & Saigusa, 2005

Fore and mid tarsomere 1 each with row of 5–6 v; epandrium basally with long broad process. Guangdong

*xiaohuangshanus* Wang, Yang  
& Grootaert, 2005

26. Hind tarsomere 1 with 1 bundle of short black ventral bristles; surstylus rather wide and thick; hypandrium with small apical incision 27

Hind tarsomere 1 with 2–3 bundles of 14–15 black ventral bristles on basal 1/6 (which contains 1–2 small tight bundles and 1 large loose bundle); surstylus narrow finger-like; hypandrium without apical incision. Yunnan *digitatus* Yang & Saigusa, 2001

27. Hairs and bristles on thorax pale or yellow 28  
Hairs and bristles on thorax dark brown; hind

tarsomere 1 with 15–16 black ventral bristles. Yunnan *pingbianus* Yang & Saigusa, 2001

28. Hind tarsomere 1 with 12 short black ventral bristles; 8 irregularly paired acr; cercus with round apex; palpus dark brown. Yunnan.

*incisus* Yang & Saigusa, 2001

Hind tarsomere 1 with 7–8 short black ventral bristles; 6 irregularly paired acr; cercus with acute apex; palpus yellow. Yunnan

*lijianganus* Yang & Saigusa, 2001

#### 4. Descriptions of new species

##### *Chrysotimus bifurcatus* sp. n. (Fig. 1)

*Material examined.* Holotype ♂: China: Tibet, Bomi, Jieda, 3050m a.s.l., 16.VII.1978, leg. F. Li (Beijing).

*Diagnosis.* All coxae yellow. 6–7 irregularly paired acr short and hair-like. Hind tarsomere 1 with group of 10–12 short black ventral bristles on basal 1/5, and row of 8–9 pv. Cercus bifurcated.

*Description.* Male. Head metallic green with

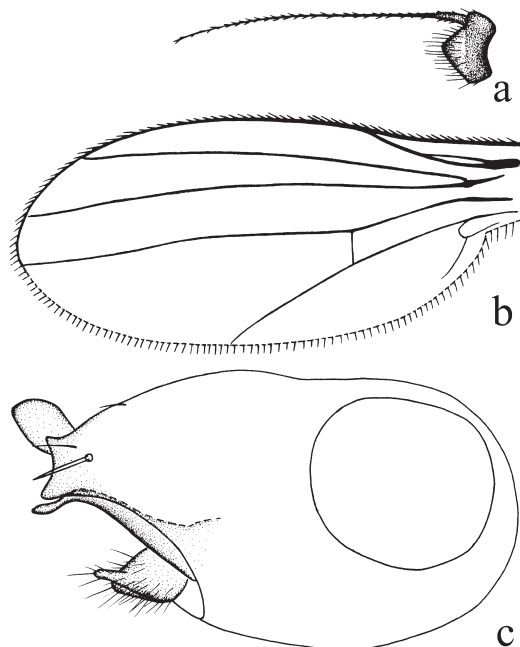


Fig. 1. *Chrysotimus bifurcatus* sp. n., male. a. First flagellomere, lateral view. b. Wing. c. Genitalia, lateral view.

pale gray pollen. Hairs and bristles on head yellow. Ocellar tubercle weak, with 2 very long oc and 2 very short posterior hairs. Antenna brown; pedicel with circle of brown apical hairs; first flagellomere subtriangular (Fig. 1a), about 0.6 times as long as wide; arista dorsal, brown, with very short pubescence. Proboscis blackish, with brownish hairs; palpus yellow, with yellow hairs and 2 yellow apical bristles.

Thorax metallic green with pale gray pollen, mesonotum and scutellum brilliant. Hairs and bristles on thorax yellow; 6 strong dc, 6–7 irregularly paired acr, short and hair-like; scutellum with 2 pairs of bristles. Propleuron with 1 yellowish hair and 1 yellowish bristle on lower portion.

Legs yellow, all 5th tarsomeres brown. Hairs and bristles on legs yellow; coxae with yellowish hairs and bristles; fore coxa with 6–8 yellow bristles, mid coxa with 2–4 anterior bristles, hind coxa with 1 yellow outer bristle near middle. Fore femur with 2 av apically, mid and hind femora each with 1 av and 1 pv apically. First tibia with row of short pd, apically with 3 short bristles; mid tibia with 2 ad and 2–3 pd, apically with 4 bristles; hind tibia with 1 ad and 2 pd, apically with 3 bristles. Mid tarsomere 1 with 2–3 v, hind tarsomere 1 with group of 10–12 short black ventral bristles on basal 1/5, and row of 8–9 pv. Relative lengths of tibia and 5 tarsomeres of legs LI 2.8 : 1.5 : 0.6 : 0.5 : 0.3 : 0.4; LII 3.5 : 1.8 : 0.7 : 0.6 : ? : ? (the question marks mean broken segments); LIII 3.8 : 1.4 : 0.9 : 0.6 : 0.3 : 0.4.

Wing hyaline (Fig. 1b); veins brownish, R4+5 and M parallel apically; CuAx ratio (length of m-cu / length of distal portion of CuA) 0.24. Squama brownish yellow with pale hairs. Halter yellow.

Abdomen metallic green with pale gray pollen, dorsum brilliant. Hairs and bristles on abdomen yellow.

Male genitalia (Fig. 1c). Epandrium distinctly longer than wide, with round leaf-like lateral process; surstylus slender, with acute apex; cercus somewhat round, bifurcated apically, one branch short and round, another branch long finger-like; hypandrium short and broad.

Size. Body 1.3 mm, wing 1.7 mm.

Female. Unknown.

*Remarks.* *Chrysotimus bifurcatus* sp. n. is similar to *Chrysotimus qinlingensis* Yang & Saigusa from Qinling in having row of pv and

about 10 black basal ventral bristles on hind tarsomere 1, but can be separated from the latter by the epandrium with slender surstylus and bifurcated cercus. In *qinlingensis*, the surstylus is thick and straight, and the cercus is not furcated (Yang & Saigusa 2005).

*Distribution.* Known only from Tibet.

### *Chrysotimus grandis* sp. n. (Fig. 2)

*Material examined.* Holotype ♂: Tibet: Bomi, Jieda, 3700m a.s.l., 12.VIII.1978, leg. F. Li (Beijing).

*Diagnosis.* Palpus blackish. 6 strong dc, 6–7 irregularly paired acr short and hair-like. Mid tarsomere 1 longer than the total length of corresponding tarsomeres 2–5. Surstylus of epandrium with large swollen apex.

*Description.* Male. Head metallic green with pale gray pollen. Hairs and bristles on head yellow.

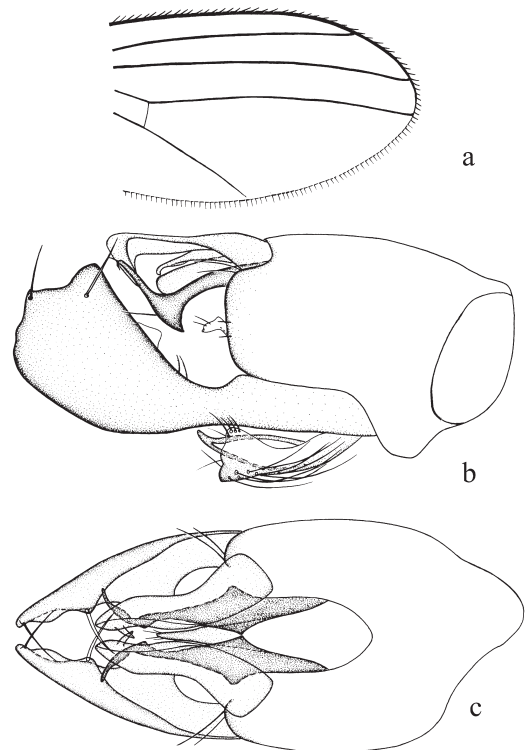


Fig. 2. *Chrysotimus grandis* sp. n., male. a. Apical half of wing. b. Genitalia, lateral view. c. Genitalia, ventral view.

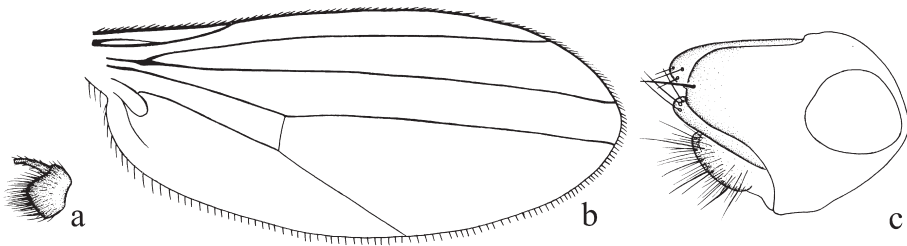


Fig. 3. *Chrysotimus lii* sp. n., male. a. First flagellomere (not including apical segment of arista), lateral view. b. Wing. c. Genitalia, lateral view.

low. Ocellar tubercle weak, with 2 long oc and 2 short posterior hairs. Antenna broken. Proboscis blackish, with brownish hairs; palpus blackish, with yellow hairs.

Thorax metallic green with pale gray pollen, mesonotum and scutellum brilliant. Hairs and bristles on thorax yellow; 6 strong dc, 6–7 irregularly paired acr short and hair-like; scutellum with 2 pairs of bristles. Propleuron with 1 yellowish hair and 1 yellowish bristle on lower portion.

Legs [fore tarsus, hind tibia and tarsus broken] yellow; mid tarsomere 5 brown. Hairs and bristles on legs yellow; coxae with yellowish hairs and bristles; fore coxa with 4–6 yellow bristles, mid coxa with 2–4 anterior bristles, hind coxa with 1 yellow outer bristle near middle. Mid femur with 1 av and 1 pv at apex. Mid tibia with 2 ad and 3 pd, apically with 4 bristles. Mid tarsomere 1 longer than the total length of corresponding tarsomeres 2–5. Relative lengths of tibia and 5 tarsomeres of legs LI 3.2 : ? : ? : ? : ? : ?; LII 4.0 : 2.7 : 1.0 : 0.6 : 0.3 : 0.5.

Wing hyaline (Fig. 2a), veins brownish, R4+5 and M parallel apically; CuAx ratio 0.2. Squama brownish yellow with pale hairs. Halter yellow.

Abdomen metallic green with pale gray pollen, dorsum brilliant. Hairs and bristles on abdomen yellow.

Male genitalia (Figs 2b–c). Epandrium distinctly longer than wide, somewhat square, with long hook-like lateral process; surstylus with large dorsal lobe, thick base and distinctly swollen apex, and long curved ventral lobe; cercus long and bifurcated, outer lobe with apex wider than base, with several (about 7–8) pale long soft apical hairs, inner lobe long and acute; hypandrium thin and short, symmetrical in ventral view.

Size. Body 1.3 mm, wing 1.6 mm.

Female. Unknown.

*Remarks.* *Chrysotimus grandis* sp. n. is somewhat similar to *Chrysotimus ningxianus* Wang, Yang & Grootaert from Ningxia in having the long mid tarsomere 1, but can be separated from the latter by the following features: 6–7 irregularly paired acr, mid tarsomere 1 longer than tarsomeres 2–5, and surstylus large with swollen apex; in *ningxianus*, 9–10 irregularly paired acr, mid tarsomere 1 nearly as long as tarsomeres 2–5, and surstylus slender (Wang *et al.* 2005).

*Distribution.* Known only from Tibet.

### *Chrysotimus lii* sp. n. (Fig. 3)

*Material examined.* Holotype ♂: Tibet: Bomi, Jieda, 3050m a.s.l., 16.VII.1978, leg. F. Li. Paratypes 2 ♂♂: Tibet: Linzhi, 1.–3.VI.1978, leg. F. Li (Beijing).

*Diagnosis.* First flagellomere subtriangular, as long as wide. Hind tarsomere 1 with group of 10–11 short black ventral bristles on basal 1/6.

*Description.* Male. Head metallic green with pale gray pollen. Hairs and bristles on head yellow. Ocellar tubercle weak, with 2 long oc and 2 short posterior hairs. Antenna brown; pedicel with circle of brownish apical hairs; first flagellomere subtriangular (Fig. 3a), as long as wide; arista [apical segment broken] dorsal, brownish, with very short pubescence. Proboscis blackish, with brownish hairs; palpus pale yellow, with yellow hairs and 2 brownish apical bristles.

Thorax metallic green with pale gray pollen, mesonotum and scutellum brilliant, pleuron brown with pale pollen. Hairs and bristles on thorax yellow; 6 strong dc, 3–4 irregularly paired acr short and hair-like; scutellum with 2 pairs of bris-



gles. Propleuron with 1 yellowish hair and 1 yellowish bristle on lower portion.

Legs yellow, all 5th tarsomeres brown. Hairs and bristles on legs yellow; coxae with yellowish hairs and bristles; fore coxa with 2 yellow bristles, mid coxa with 2–4 anterior bristles, hind coxa with 1 yellow outer bristle at middle. Mid and hind femora each with 1 av and 1 pv at apex. Mid tibia with 2 ad and 2 pd; hind tibia with 2 ad. Hind tarsomere 1 with group of 10–11 short black ventral bristles on basal 1/6. Relative lengths of tibia and 5 tarsomeres of legs LI 3.7 : 2.0 : 0.9 : 0.6 : 0.4 : 0.5; LII 4.7 : 2.6 : 1.0 : 0.7 : 0.4 : 0.4; LIII 5.0 : 2.3 : 1.1 : 0.8 : 0.5 : 0.5.

Wing hyaline (Fig. 3b); veins brownish, R4+5 and M parallel apically; CuAx ratio 0.22. Squama brownish yellow with pale hairs. Halter yellow.

Abdomen metallic green with pale gray pollen, dorsum brilliant. Hairs and bristles on abdomen yellow.

Male genitalia (Fig. 3c). Epandrium distinctly longer than wide, with wide lateral process; surstylus with round apex, with 3 long apical bristles; cercus long and rather narrow apically; hypandrium short and broad with round apex.

Size. Body 1.6 mm, wing 2.5 mm.

Female. Unknown.

*Remarks.* *Chrysotimus lii* sp. n. is similar to *Chrysotimus bifascia* Yang & Saigusa from Qinling in having the pale yellow palpus and brown 5th tarsomere, but can be separated from the latter by the hind tarsomere 1 with 10–11 black ventral bristles at base and the first flagellomere as long as wide. In *bifascia*, the hind tarsomere 1 just has 3–4 black ventral bristles, and the first flagellomere is about 0.6 times as long as wide (Yang & Saigusa 2005).

*Distribution.* Known only from Tibet.

#### ***Chrysotimus linzhiensis* sp. n. (Fig. 4)**

*Material examined.* Holotype ♂: Tibet: Linzhi, 3050m a.s.l., 3.VI.1978, leg. F. Li (Beijing).

*Diagnosis.* Palpus pale yellow. Legs yellow with 5th tarsomeres brown. Hind tarsomere 1 with group of 13 short black ventral bristles on basal 1/6.

*Description.* Male. Head metallic green with pale gray pollen. Hairs and bristles on head yellow.

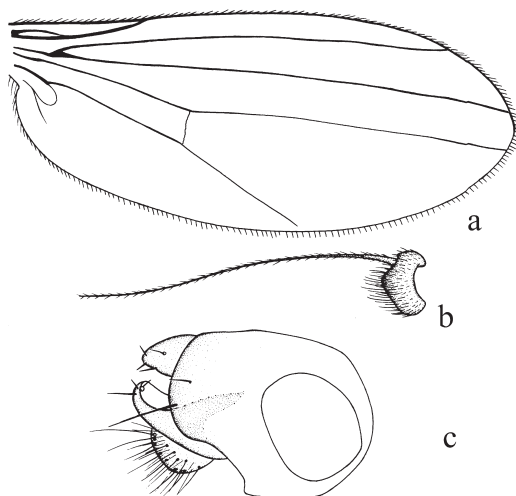


Fig. 4. *Chrysotimus linzhiensis* sp. n., male. a. Wing. b. First flagellomere, lateral view. c. Genitalia, lateral view.

low. Ocellar tubercle weak, with 2 very long oc and 2 very short posterior hairs. Antenna brown; pedicel with circle of brown apical hairs; first flagellomere rather wide (Fig. 4b), about 1.5 times wider than long; arista dorsal, brown, with short pubescence. Proboscis blackish, with brownish hairs; palpus pale yellow, with yellow hairs and 2 yellow apical bristles.

Thorax metallic green with pale gray pollen, mesonotum and scutellum brilliant, pleuron brown with pale pollen. Hairs and bristles on thorax yellow; 6 strong dc (the first dc shorter), 4 irregularly paired acr, short and hair-like; scutellum with 2 pairs of bristles. Propleuron with 1 yellowish hair and 1 yellowish bristle on lower portion.

Legs yellow, all 5th tarsomeres brown. Hairs and bristles on legs yellow; coxae with yellowish hairs and bristles; fore coxa with 4 yellow bristles, mid coxa with 2–4 anterior bristles, hind coxa with 1 yellow outer bristle at middle. Mid and hind femora each with 1 av and 1 pv apically. Mid tibia with 2 ad and 1 pd; hind tibia with 1–2 ad, 1 pd and 2 pv. Hind tarsomere 1 with group of 13 short black ventral bristles on basal 1/6. Relative lengths of tibia and 5 tarsomeres of legs LI 4.0 : 2.1 : 1.0 : 0.6 : 0.4 : 0.5; LII 4.7 : 2.7 : 1.1 : 0.8 : 0.4 : 0.4; LIII 4.8 : 2.1 : ? : ? : ? : ?.

Wing hyaline (Fig. 4a), veins brownish, R4+5 and M parallel apically; CuAx ratio 0.25. Squama

brownish yellow with pale hairs. Halter yellow.

Abdomen metallic green with pale grey pollen, dorsum brilliant. Hairs and bristles on abdomen yellow.

Male genitalia (Figs. 4c). Epandrium distinctly longer than wide with wide lateral process; surstylus curved downward, round apically, with 3 apical bristles; cercus round with yellow marginal bristles and hairs; hypandrium short and broad.

Size. Body 1.8 mm, wing 2.6 mm.

Female. Unknown.

*Remarks.* *Chrysotimus linzhiensis* sp. n. is similar to *Chrysotimus yunlonganus* Yang & Saigusa from Yunnan in having the short first flagellomere and 3–4 paired acr, but can be separated from the latter by the hind tarsomere 1 with 13 black ventral bristles at base and curved surstylus. In *yunlonganus*, the hind tarsomere 1 just has 8 sparse black ventral bristles, and the surstylus is not curved (Yang & Saigusa 2001b).

*Distribution.* Known only from Tibet.

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