

***Atropacarus* (*Hoplophorella*) (Acari: Oribatida: Phthiracaridae) from China, with descriptions of two new species**

DONG LIU¹ & JUN CHEN^{2*}

¹ Key Laboratory of Wetland Ecology and Environment, Northeast Institute of Geography and Agroecology, Chinese Academy of Sciences, Changchun 130102, P. R. China. E-mail: liudong@iga.ac.cn

² Key Laboratory of Zoological Systematics and Evolution, Institute of Zoology, Chinese Academy of Sciences, Beijing 100101, P. R. China.

*Corresponding author. E-mail: chenj@ioz.ac.cn

Abstract

The subgenus *Atropacarus* (*Hoplophorella*) (Acari: Oribatida: Phthiracaridae) was represented in China by only one known species prior to this work. In this paper, four species of *Atropacarus* (*Hoplophorella*) are identified, including two new species, *Atropacarus* (*Hoplophorella*) *inflatus* **sp. nov.** and *Atropacarus* (*Hoplophorella*) *minimus* **sp. nov.**, and a newly recorded species from China, *Atropacarus* (*Hoplophorella*) *vitrinus* (Berlese, 1913). Some new data and remarks on known and newly recorded species from China are presented. A key to all known species of *Atropacarus* (*Hoplophorella*) in China is given.

Key words: Soil mites, Oribatida, Phthiracaridae, *Atropacarus* (*Hoplophorella*), new species, new record, key, China

Introduction

Berlese (1923) proposed the subgenus *Phthiracarus* (*Hoplophorella*) with *Hoplophorella cucullatum* Ewing, 1909 as type species. Based on analysis of the morphological characters of Phthiracaroida, Niedbała (1986) treated *Hoplophorella* as a subgenus of *Atropacarus*. This subgenus is characterized by 15 pairs of notogastral setae and only two pairs of lyrifissures, *ia* and *im*, present; nine pairs of genital setae arranged in a single row and five pairs of anal and adanal setae present; setae *ad*₂ remote from the paraxial margin; setae *d* of tibiae IV minute and coupled with solenidia (Niedbała 2011).

The species of the subgenus *Atropacarus* (*Hoplophorella*) occur widely throughout the world except for the sub-Antarctic and Antarctic Regions. According to our tally, the subgenus currently has about 49 described species in the world. China is one of the earth's megadiverse countries and is known to be a hot spot for new mite species discovery in the last six years (Liu *et al.* 2013). However, only one species of this subgenus, *Atropacarus* (*Hoplophorella*) *cucullatus* (Ewing, 1909), has been recorded from China (Chen *et al.* 2010). During taxonomic study on Chinese ptyctimous mites, we identified four species of *Atropacarus* (*Hoplophorella*), including two new species and one newly recorded species from China. In this paper, detailed descriptions of these new species and a key to known Chinese species of *Atropacarus* (*Hoplophorella*) are given. Some new data and remarks on known and newly recorded species from China are provided.

Material and methods

Measurements and descriptions are based on specimens mounted in temporary cavity slides that were studied using a light microscope equipped with a drawing attachment.

Terminology generally follows Niedbała (1992, 2000, 2011). The unit of measurement is micrometre (μm).

Abbreviations for institutions. NIGA: Northeast Institute of Geography and Agroecology, Chinese Academy of Sciences, Changchun, China; NZMC: National Zoological Museum of China, Institute of Zoology, Chinese Academy of Sciences, Beijing, China.

Descriptions of new species

Atropacarus (Hoplophorella) inflatus sp. nov.

(Figs. 1–7)

Material examined: Holotype: adult (female, NIGA, in alcohol), China: Yunnan Province, Diqing, Xianggelila, Samage, from rotten wood, 23–24 vii 2012, leg. Xiao Yang. Paratypes: three adults (females, NIGA, in alcohol), from leaves, other data same as holotype.

Diagnosis. Median crista of prodorsum present; lateral carinae absent; median field long and narrow; prodorsal setae (*in*, *le*, *ro*) minute and fine, exobothridial setae vestigial; notogastral setae rigid; setae *l'* on genua IV absent, and setae *d* on femora I inserted near distal end of segments.

Description. *Measurements.* Holotype: Prodorsum: length 500, width 205, height 355, setae: *ss* 75, *ro* 27, *in* 25, *le* 12; notogaster: length 950, width 650, height 675; setae: *c*₁ 85, *d*₁ 82, *e*₁ 80, *h*₁ 75, *ps*₁ 75; genito-aggenital plate 235×200, ano-adanal plate 205×360. Paratypes: Prodorsum: length 370–515, width 265–380, height 155–200; notogaster: length 785–1025, width 470–780, height 480–750.

Integument. Light brown in colour. All surface covered with round foveoles.

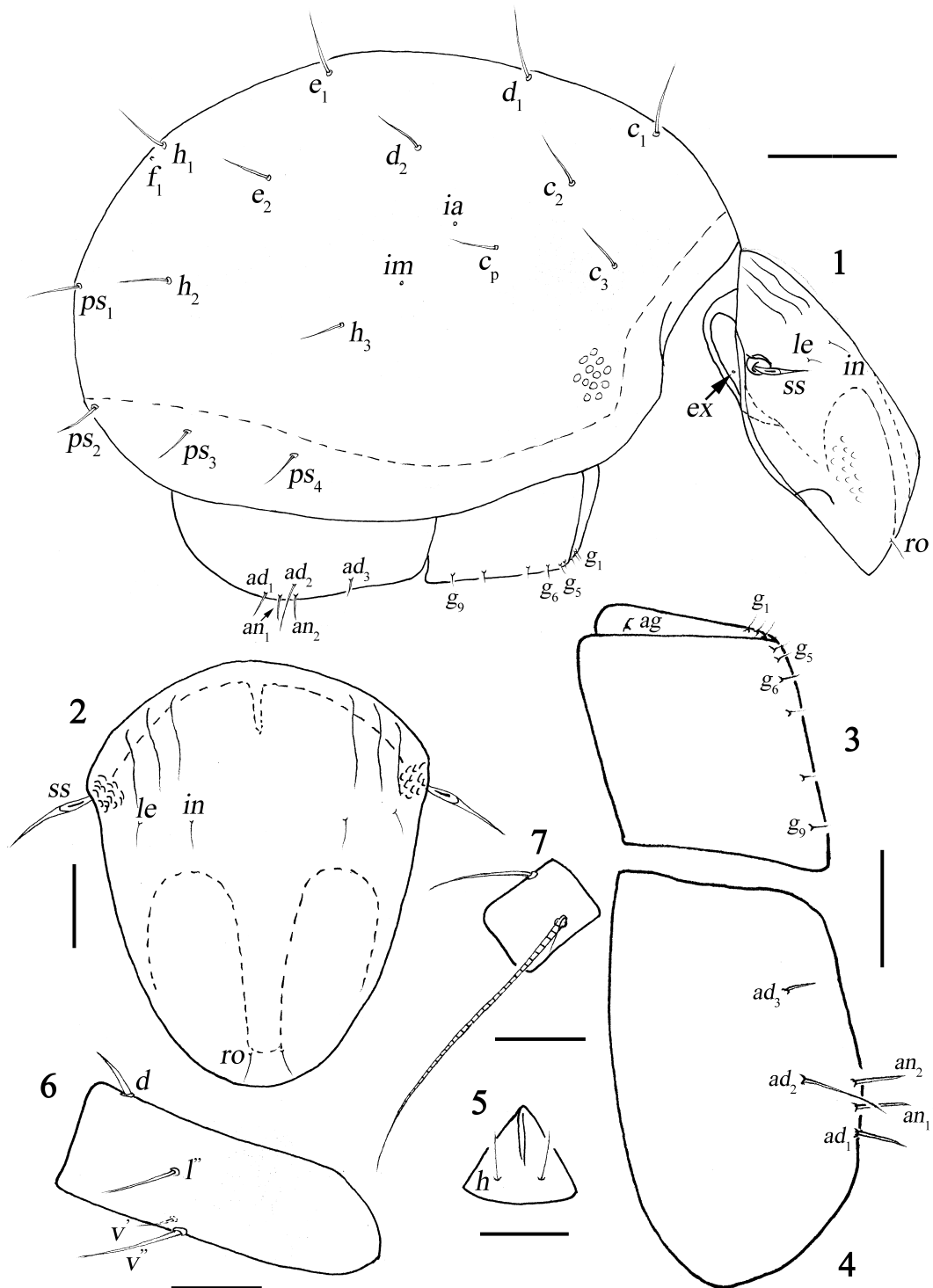
Prodorsum (Figs. 1–2). Median crista and posterior furrows present; lateral carinae absent; sigillar fields distinct, median field narrow, longer than lateral fields; sensilli (*ss*) inflated proximally and sharply tapering; other prodorsal setae (*in*, *le*, *ro*) minute and fine, except exobothridial setae (*ex*) vestigial; comparative length: $ss > ro > in > le$, $in-in/ro-ro \approx 4.8$.

Notogaster (Fig. 1). Notogaster without anterior collar; notogastral setae medium long ($c_1/c_1-d_1 \approx 0.51$), rigid, rough and pointed distally, setae *ps*₄ shortest; setae *c*₂ further away from anterior border than setae *c*₁ and *c*₃, setae *c*₃ closest; vestigial setae *f*₁ positioned posterior to setae *h*₁; two pairs of lyrifissures *ia* and *im* positioned as in Fig. 1.

Ventral region (Figs. 1, 3–5). Setae *h* of mentum longer than distance between them. Nine pairs of genital setae (*g*) arranged with formula: 6(4+2):3; ano-adanal plates each with five setae (*ad*, *an*), similar in shape as notogastral setae; setae *ad*₃ shortest, setae *ad*₂ longest, situated at level of setae *an*₂.

Legs (Figs. 6–7). Setal counts for leg segments (without tarsi): I: 1-4-2(2)-5(1)-17(3); II: 1-3-2(1)-3(1)-12(2), III: 2-2-1(1)-2(1)-10, IV: 2-0-1-2(1)-10; chaetotaxy of legs incomplete: setae *l'* on genua IV absent; setae *d* on femora I inserted anterior to level of setae *l''*, near distal end of segment; setae *s* on tarsi I and II present; setae *a''* on tarsi I and II and setae *ft''* on tarsi II hooked distally.

Etymology. The new specific name “*inflatus*” is from Latin, and refers to the sensilli being inflated proximally.



FIGURES 1-7. *Atropacarus (Hoplophorella) inflatus* sp. nov.: 1, lateral view of body (legs removed); 2, prodorsum, dorsal view; 3, right side of genito-agenital plate; 4, right side of ano-adanal plate; 5, mentum of infracapitulum; 6, femur I; 7, tibia IV. Scale bars: 1=200 μm; 2-5=100 μm; 6-7=50 μm.

Remarks. The new species differs from other members of the subgenus in the peculiar shape of sensilli. Furthermore, it can be distinguished by the following combination of features: median crista of prodorsum present; lateral carinae absent; median field long and narrow; prodorsal setae (*in*, *le*, *ro*) minute and fine, exobothridial setae vestigial; notogastral setae rigid; setae *l'* on genua IV absent, and setae *d* on femora I inserted near distal end of segments.

***Atropacarus (Hoplophorella) minimus* sp. nov.**
(Figs. 8–13)

Material examined: Holotype: adult (female, NIGA, in alcohol), China: Tibet, Shigatse, Qumei, from litter and moss, 2 viii 2012, leg. Xiao Yang. Paratype: one adult (female, NIGA, in alcohol), same data as holotype.

Diagnosis. Median crista of prodorsum present; lateral carinae absent; dorsal field narrow and bifurcate distally; sensilli long, narrow, with fusiform and barbed head; prodorsal setae (*in*, *le*, *ro*) rigid; rostral setae procumbent; exobothridial setae fine; notogastral setae barbed and rigid; setae on ano-adanal plates minute and fine; setae *d* on femora I inserted medially and forked distally.

Description. Measurements. Holotype: Prodorsum: length 380, width 245, height 182, setae: *ss* 105, *ro* 42, *in* 78, *le* 40, *ex* 10; notogaster: length 645, width 430, height 470; setae: *c*₁ 85, *d*₁ 90, *e*₁ 85, *h*₁ 80, *ps*₁ 82; genito-aggenital plate 145×135, ano-adanal plate 110×210. Paratype: Prodorsum: length 395, width 260, height 170; notogaster: length 660, width 410, height 455.

Integument. Colour grey-brown. All surface covered with small foveoles.

Prodorsum (Figs. 8–9). Median crista and posterior furrows present; lateral carinae absent; sigillar fields distinct, median field narrow and bifurcate distally, longer than lateral fields; sensilli (*ss*) long, narrow, with fusiform and barbed head; interlamellar (*in*) and lamellar setae (*le*) rough, rigid and semi-erect, rostral setae (*ro*) procumbent; exobothridial setae (*ex*) minute and fine; comparative lengths: *ss*>*in*>*ro*>*le*>*ex*, *in*–*in*/*ro*–*ro*≈1.90.

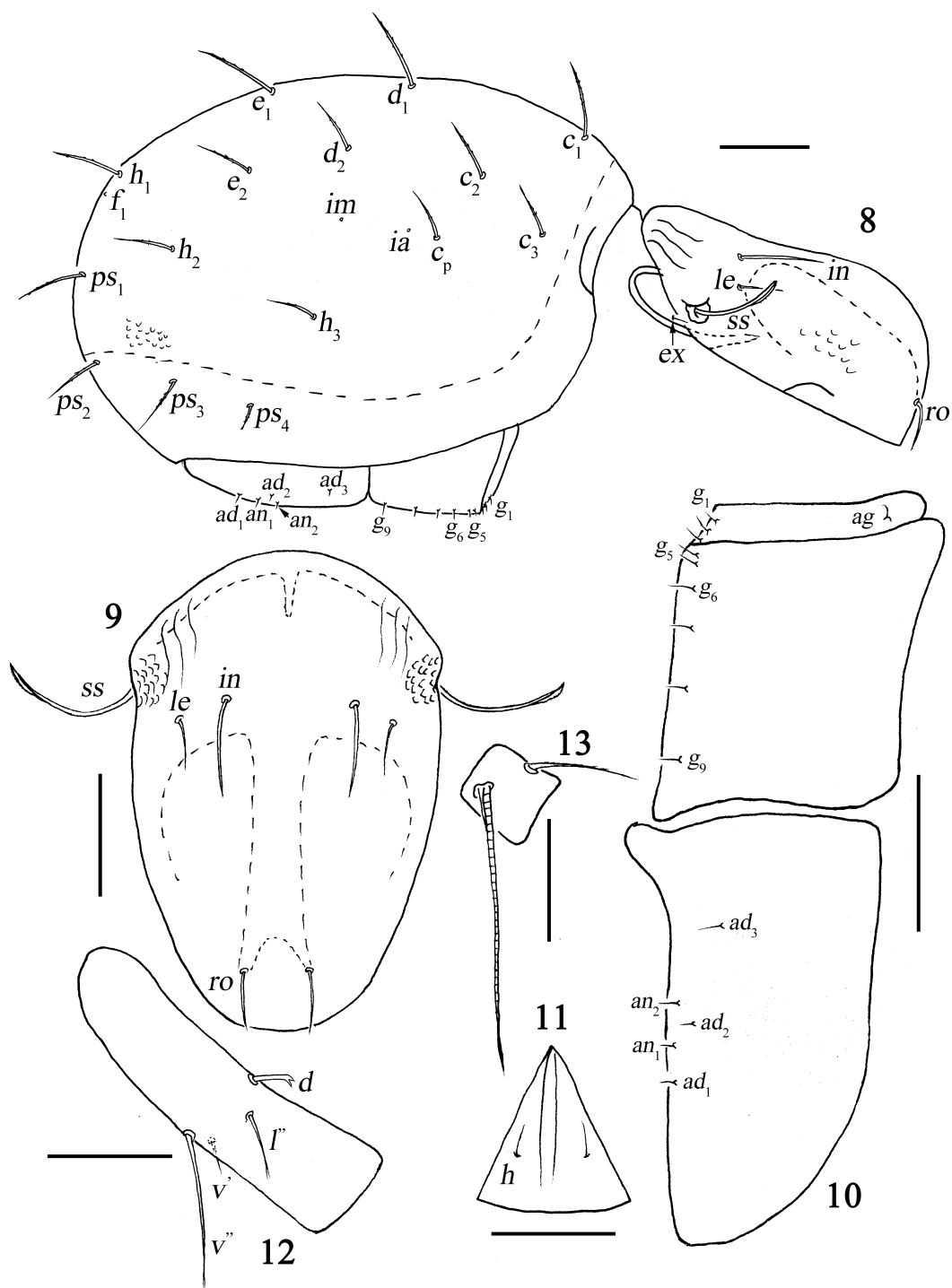
Notogaster (Fig. 8). Notogaster without anterior collar; notogastral setae medium long (*c*₁/*c*₁–*d*₁≈0.43), rigid and pointed distally, with small spines in distal half, setae *ps*₄ shortest; setae *c*₂ further away from anterior border than setae *c*₁ and *c*₃, setae *c*₃ closest to anterior border; vestigial setae *f*₁ positioned posterior to setae *h*₁; two pairs of lyrifissures *ia* and *im* positioned as in Fig. 8.

Ventral region (Figs. 8, 10–11). Setae *h* of mentum shorter than distance between them. Nine pairs of genital setae (*g*) arranged with formula: 6(4+2):3; ano-adanal plates each with five setae (*ad*, *an*), minute and fine, similar in shape as genital setae; setae *ad*₂ situated between the levels of setae *an*₁ and *an*₂.

Legs (Figs. 12–13). Setal counts for leg segments (without tarsi): I: 1-4-2(2)-5(1)-17(3); II: 1-3-2(1)-3(1)-12(2), III: 2-2-1(1)-2(1)-10, IV: 2-1-1-2(1)-10; setae *d* on femora I inserted medially, forked distally; setae *a''* on tarsi I straight, and on tarsi II hooked distally; setae *ft''* on tarsi II straight.

Etymology. The new specific name “*minimus*” is from Latin and refers to the minute setae on ano-adanal plates.

Remarks. The new species differs from other congeneric species in the presence of barbed and rigid notogastral setae, but with setae on ano-adanal plates minute and fine. Furthermore, it can be distinguished by the following combination of features: median crista of prodorsum present; lateral carinae absent; dorsal field narrow and bifurcate distally; sensilli long, narrow, with fusiform and barbed head; prodorsal setae (*in*, *le*, *ro*) rigid; rostral setae procumbent; exobothridial setae fine; setae *d* on femora I inserted in the middle and forked distally.



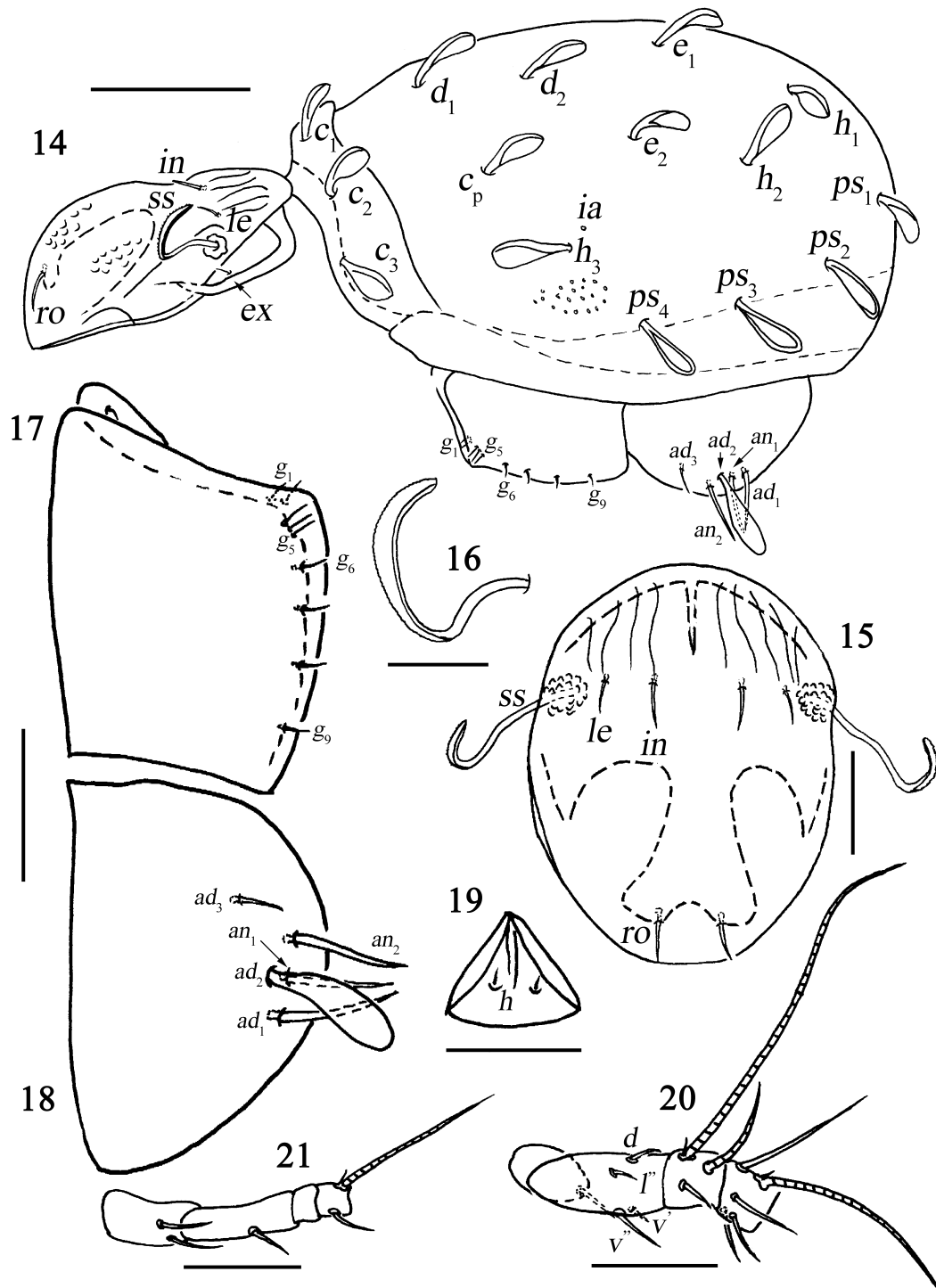
FIGURES 8–13. *Atropacarus (Hoplophorella) minimus* sp. nov.: 8, lateral view of body (legs removed); 9, prodorsum, dorsal view; 10, left side of ventral plate; 11, mentum of infracapitulum; 12, femur I; 13, tibia IV. Scale bars: 8–10=100 μ m; 11–13=50 μ m.

New data and remarks on known and newly recorded species from China

Atropacarus (Hoplophorella) cucullatus (Ewing, 1909)

(Figs. 14–21)

New localities: *Palaeartic Region:* Beijing: one adult (NZMC, in alcohol), Tiantan, from soil under grass, 12 iv 1990, leg. unknown; one adult (NZMC, in alcohol), Yuanmingyuan, from litter under willow, 15 vii 2001, leg. Jun Chen; two adults (NZMC, in alcohol, CJ-02-36), Huairou, School of Management, UCAS, from litter under cypress, 25 v 2002, leg. Jun Chen; one adult (NZMC, in alcohol, CJ-05-6), Miyun, Jiudaowan, Xiangshuishi, from litter under *Castanea* sp., 13 v 2005, leg. Jun Chen. Hebei Province: two adults (NZMC, in alcohol, W-91-12), Chengde City, from leaves, 13 x 1991, leg. Guo-Fan Deng. Shandong Province: five adults (NZMC, in alcohol, LD-07-145), Konglin, from litter, 15 xi 2007, leg. Bin Cao. *Oriental Region:* Jiangsu Province: one adult (NZMC, in alcohol, W-89-38), Nanjing, eastern suburbs, from leaves under bamboo forest, 11 v 1989, leg. Hui-Fu Wang; two adults (NZMC, in alcohol, W-89-41), 12 v 1989, other data same as W-89-38; four adults (NZMC, in alcohol, W-89-44), from leaves under *Cedrus* sp., other data same as W-89-41; one adult (NZMC, in alcohol, W-91-4), Nanjing, Zhongshanling, from litter, 30 v 1991, leg. Fu-Sheng Huang; four adults (NZMC, in alcohol, W-91-5), same data as W-91-4; one adult (NZMC, in alcohol, L-06-18), Nanjing, Zhongshanling, from litter under *Photinia* sp., 28 v 2006, leg. Zheng Liu. Anhui Province: three adults (NZMC, in alcohol, Wan 92-5-6), Ningguo, other data unknown. Fujian Province: one adult (NZMC, in alcohol, W-89-11), Wuyishan Mt., Dawangfeng, from leaves near rocks and stream, 24 iv 1989, leg. Hui-Fu Wang; 12 adults (NZMC, in alcohol, W-89-13), from leaves under shrub, other data same as W-89-11; one adult (NZMC, in alcohol, W-89-14), from leaves of pine needle and fern, other data same as W-89-11; one adult (NZMC, in alcohol, W-89-46), Wuyishan Mt., Yunwo, from soil under bamboo and grass, 25 iv 1989, leg. Hui-Fu Wang; 13 adults (NZMC, in alcohol, W-89-48), from leaves under fir-tree, other data same as W-89-46; two adults (NZMC, in alcohol, W-89-52), Wuyishan Mt., Tianyou, from litter under bamboo and arbor, 25 iv 1989, leg. Hui-Fu Wang; two adults (NZMC, in alcohol, W-89-54), Wuyishan Mt., from litter, 25 iv 1989, leg. Hui-Fu Wang; one adult (NZMC, in alcohol, W-89-55), same data as W-89-54; three adults (NZMC, in alcohol, W-89-56), same data as W-89-54; six adults (NZMC, in alcohol, Tu286), Jiangle County, Longqishan Mt., Shipaichang, from moss, 22 vi 1991, leg. Xiao-Mei Zhang. Hubei Province: one adult (NZMC, in alcohol, W-89-116), Lichuan County, Maoba, Xingdoushan Mt., from leaves, 24 vii 1989, leg. Yun-Qi Cui; one adult (NZMC, in alcohol, W-96-13), Wuhan City, Luojiashan Mt., from soil under grass, 1 iv 1996, leg. Hui-Fu Wang. Guangdong Province: one adult (NZMC, in alcohol, W-94-1), Dinghushan Mt., from litter, v 1994, leg. Jian-Quan Lu; 10 adults (NZMC, in alcohol, W-97-3), Dinghushan Mt., from leaves under *Ficus* sp., 21 x 1997, leg. Hui-Fu Wang; one adult (NZMC, in alcohol, W-97-6), from leaves under broad-leaved forest, other data same as W-97-3; one adult (NZMC, in alcohol, W-97-7), from leaves under *Gnetum montanum*, 20 x 1997, other data same as W-97-3. Guangxi Province: 16 adults (NZMC, in alcohol, W-88-57), Guilin City, from leaves, 4–8 vii 1988, leg. Cen-Xuan Pan; one adult (NZMC, in alcohol, Yao-28), Guilin City, from litter, 25 vii 1982, leg. Wen-Bing Yao; one adult (NZMC, in alcohol, Yao-30), same data as Yao-28; one adult (NZMC, in alcohol, W-90-6), Guilin City, Qixing Park, from soil under broad-leaved forest, 8 v 1990, leg. Cen-Xuan Pan; one adult (NZMC, in alcohol, W-90-11), Guilin City, Pingfengshan Mt., other data same as W-90-6; two adults (NZMC, in alcohol, W-90-12), Guilin City, Pingfengshan Mt., other data same as W-90-11; two adults (NZMC, in alcohol, CG009), Fangchenggang City, Fangcheng District, Banbaxiang, 320M, from litter under *Illicium verum*, 3 vi 2000, leg. Jun Chen; two adults (NZMC, in alcohol, CG032), Fangchenggang City, Fangcheng District, Dali, Shiwanshan, Huaqiao forest farm, 260M, from litter under broad-leaved



FIGURES 14–21. *Atropacarus (Hoplophorella) cucullatus* (Ewing, 1909) (specimen from Beijing): 14, lateral view of body (legs removed); 15, prodorsum, dorsal view; 16, sensillus, dorsal view; 17, right side of genito-genital plate; 18, right side of ano-adanal plate; 19, mentum of infracapitulum; 20–21, trochanter, femur, genu and tibia: 20, leg I; 21, leg IV. Scale bars=50 μ m.

forest, 9 vi 2000, leg. Jun Chen; one adult (NZMC, in alcohol, CG035), Shangsi, Nanping, from litter under shrub, 10 vi 2000, leg. Jun Chen; one adult (NZMC, in alcohol, CG057), Longzhou, Nonggang, 310M, from litter under broad-leaved forest, 15 vi 2000, leg. Jun Chen. Sichuan Province: two adults (NZMC, in alcohol), from litter, other data unknown. Guizhou Province: one adult (NZMC, in alcohol, LD-07-149), Qianxibei, high altitude of Jiucaiping, 18 xi 2007, leg. Wei Wei. Hainan Province: nine adults (NZMC, in alcohol, LD-07-2), Lingao County, Gaoshanling Reserve, 165M, from litter, 27 vii 2007, leg. Dong Liu; three adults (NZMC, in alcohol, LD-07-3), same data as LD-07-2; five adults (NZMC, in alcohol, LD-07-7), from soil under shrub, other data same as LD-07-2; two adults (NZMC, in alcohol, LD-07-53), Dongfang City, Datian Polu Reserve, 70M, from soil under arbor, 5 viii 2007, leg. Dong Liu; 10 adults (NZMC, in alcohol, LD-07-55), from litter under rotten wood, other data same as LD-07-53; 10 adults (NZMC, in alcohol, LD-07-56), from soil under shrub, other data same as LD-07-53; one adult (NZMC, in alcohol, LD-07-57), from soil under *Sophora* sp., other data same as LD-07-53; 18 adults (NZMC, in alcohol, LD-07-60), Dongfang City, Datian, Datian Village, Houshan, 144M, from litter under *Ficus* sp., 6 viii 2007, leg. Dong Liu.

Measurements (Specimens from Beijing). Prodorsum: length 170–190, width 140–150, height 80–110, setae: *ss* 80, *ro* 20–30, *in* 25, *le* 15–20, *ex* 5; mutual distance: *in-in* 40, *ro-ro* 25; notogaster: length 335–405, width 275–315, height 225–260; setae: *c*₁ 50, *c*_p 35, *d*₁ 50, *e*₁ 50, *h*₁ 35, *ps*₁ 35, *ps*₄ 50, *c*₁–*d*₁ 90; ventral region: *an*₁ 30, *an*₂ 35, *ad*₁ 30, *ad*₂ 50, *ad*₃ 15; genito-aggenital plate 110×95, ano-adanal plate 120×90.

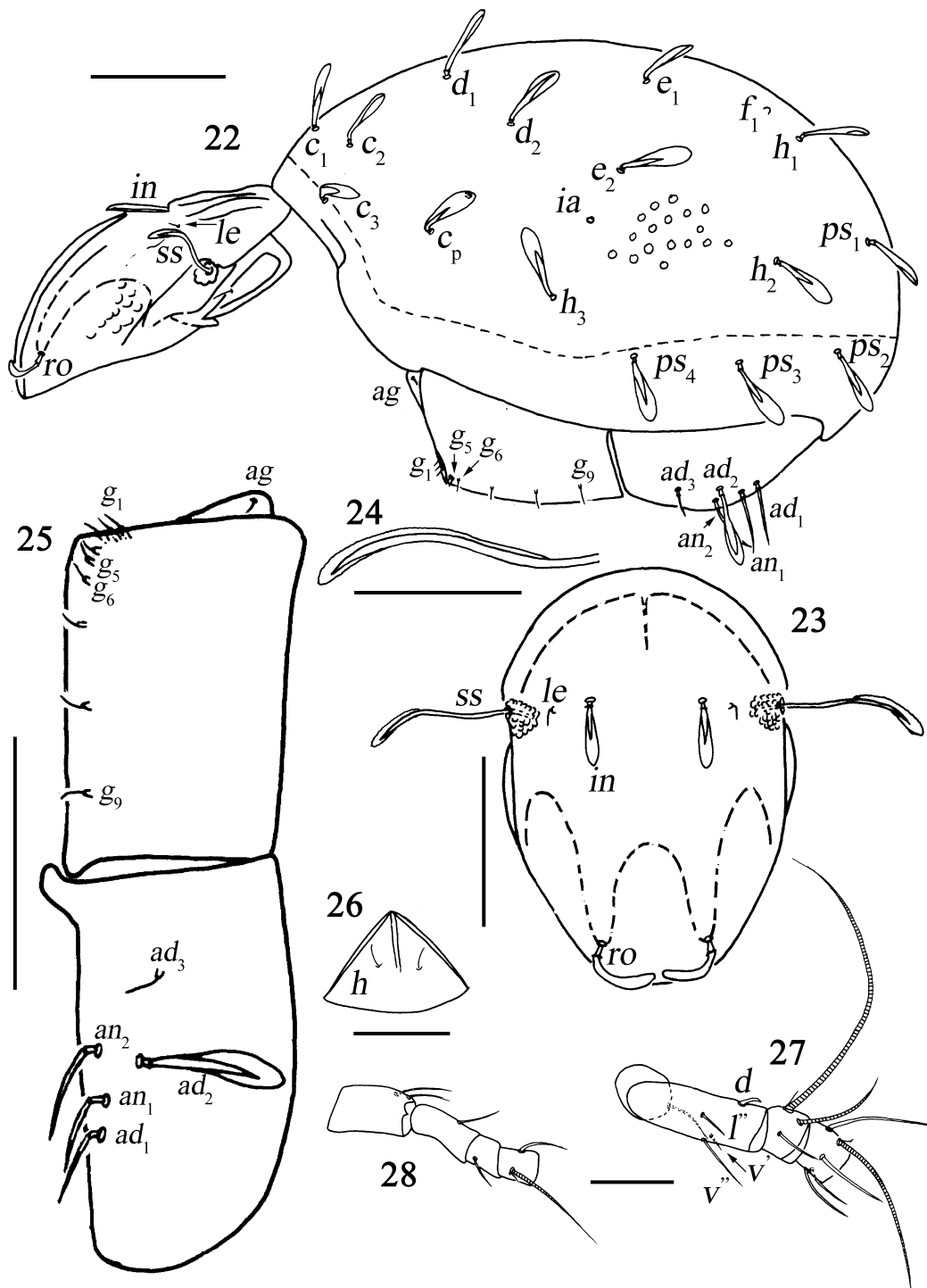
Remarks. This species has semicosmopolitan distribution (Niedbala 2011) and is widely distributed in China. The specimens from Beijing are slightly different in having setae *c*₂ closer to anterior margin of notogaster (versus removed from anterior margin in other specimens), setae *ad*₂ situated close to *an*₁ (versus far away from and at the same level of setae *an*₂).

Atropacarus (Hoplophorella) vitrinus (Berlese, 1913)

—Newly recorded species from China

(Figs. 22–28)

New localities: *Oriental Region:* Fujian Province: one adult (NZMC, in alcohol), Hua'an, from soil, 21 x 1996, leg. Jian-Zhen Lin; three adults (NZMC, in alcohol, CJ-05-83), Fuzhou City, Xihu Hotel, from rotten wood, 30 x 2005, leg. Jun Chen. Guangdong Province: one adult (NZMC, in alcohol, Gx9410LFS3), Maoming, Xiaoliang, from litter, x 1994, leg. unknown; six adults (NZMC, in alcohol, W-97-6), Zhaoqing, Dinghushan Mt., from leaves under broad-leaved forest, 21 x 1997, leg. Hui-Fu Wang. Guangxi Province: one adult (NZMC, in alcohol, CG034), Shangsi, Nanping, from rotten wood, 10 vi 2000, leg. Jun Chen; one adult (NZMC, in alcohol), Longzhou, from litter, 14 vi 2000, leg. Jun Chen. Hainan Province: one adult (NZMC, in alcohol), from litter, other data unknown; one adult (NZMC, in alcohol, LD-07-1), Lingao County, Gaoshanling Reserve, 165M, from litter, 27 vii 2007, leg. Dong Liu; two adults (NZMC, in alcohol, LD-07-2), same data as LD-07-1; three adults (NZMC, in alcohol, LD-07-6), from rotten wood (ant caves), other data same as LD-07-1; two adults (NZMC, in alcohol, LD-07-7), from soil under shrub, other data same as LD-07-1; five adults (NZMC, in alcohol, LD-07-53), Dongfang City, Datian Polu Reserve, 70M, from soil under arbor, 5 viii 2007, leg. Dong Liu; one adult (NZMC, in alcohol, LD-07-55), from litter under rotten wood, other data same as LD-07-53; one adult (NZMC, in alcohol, LD-07-57), from soil under *Sophora* sp., other data same as LD-07-53; two adults (NZMC, in alcohol, LD-07-58), Dongfang City, Datian, Datian Village, Houshan, 144M, from soil under arbor, 6 viii 2007, leg. Dong Liu; four adults (NZMC, in alcohol, W-89-155), Ledong county, Jianfengling, Research Insti-



FIGURES 22–28. *Atropacarus (Hoplophorella) vitrinus* (Berlese, 1913) (specimen from Hainan Province): 22, lateral view of body (legs removed); 23, prodorsum, dorsal view; 24, sensillus, dorsal view; 25, left side of ventral plate; 26, mentum of infracapitulum; 27–28, trochanter, femur, genu and tibia: 27, leg I; 28, leg IV. Scale bars: 22–23, 25, 27–28=100µm; 24, 26=50 µm.

tute of Forestry, from litter under *Solanum muricatum*, 14 xii 1983, leg. Ming-Sheng Zhu; one adult (NZMC, in alcohol, HS9406L1a), Ledong County, Jianfengling, from leaves, vi 1994, leg. Chong-Hui Liao; six adults (NZMC, in alcohol, LD-07-62), Ledong county, Jianfengling, Research Institute of Forestry, 64M, from soil under *Sophora* sp., 7 viii 2007, leg. Dong Liu; one adult (NZMC, in alcohol, LD-07-73), Ledong county, Jianfengling, Research Institute of Forestry, 64M, from soil under fir tree, 9 viii 2007, other data same as LD-07-62; one adult (NZMC, in alcohol, LD-07-90), Wuzhishan city, Shuimanxiang, Chongmentou, 707M, from roadside litter under *Ficus* sp., 15 viii 2007, leg. Dong Liu; one adult (NZMC, in alcohol, LD-07-123), Ding'an County, Huangzhu Town, 136M, from soil under *Areca catechu*, 21 viii 2007, leg. Dong Liu. Yunnan Province: one adult (NZMC, in alcohol, W-94-106), Menglun Town, from leaves under bamboo forest, 31 iii 1994, leg. Xiao-Mei Zhang and Long-Long Yang; two adults (NZMC, in alcohol, W-94-112), from leaves under tropical rain forest, 30 iii 1994, other data same as W-94-106; three adults (NZMC, in alcohol, W-94-113), Menglun Town, Longshan, Man'e, from leaves, 2 iv 1994, leg. Xiao-Mei Zhang and Long-Long Yang; one adult (NZMC, in alcohol, W-94-117), from litter, 1 iv 1994, other data same as W-94-113; one adult (NZMC, in alcohol, W-94-118), same data as W-94-117; five adults (NZMC, in alcohol, W-94-124), Menglun Natural Reserve, from litter, 1 iv 1994, leg. Xiao-Mei Zhang and Long-Long Yang; two adults (NZMC, in alcohol, W-94-127), Menglun, Longshan, Chengzi, from litter, 1 iv 1994, leg. Xiao-Mei Zhang and Long-Long Yang; two adults (NZMC, in alcohol, W-94-131), Menglun, Manyang, Longshan, from litter, 6 iv 1994, leg. Xiao-Mei Zhang and Long-Long Yang; two adults (NZMC, in alcohol, CJ-07-30), Puer City, from litter *Buxus sinica* near road, 26 vii 2007, leg. Jun Chen; one adult (NZMC, in alcohol, CJ-07-104), Xishuangbanna, Mengla, Bubang, Wangtianshu, 718M, from litter under broad-leaved forest, 27 xi 2007, leg. Feng Yuan.

Measurements (Specimens from Hunan Province). Prodorsum: length 205–255, width 150–175, height 85–116, setae: *ss* 86, *ro* 40, *in* 50, *le* 7.5, *ex* 14; mutual distance: *in-in* 70, *ro-ro* 70; notogaster: length 360–510, width 270–300, height 195–328; setae: *c*₁ 50, *c*_p 50, *d*₁ 55, *e*₁ 50, *h*₁ 50, *ps*₁ 50, *ps*₄ 55, *c*_{1-d}₁ 106; ventral region: *an*₁ 40, *an*₂ 45, *ad*₁ 50, *ad*₂ 59, *ad*₃ 20; genito-aggenital plate 145×120, ano-adanal plate 165×95.

Remarks. This species has a pantropical and subtropical distribution (Subías 2014). In specimens from Hainan Province, *in-in*>*ro-ro* (versus *in-in*<*ro-ro* in specimens from Brazil), rostral setae much broader (versus narrower), vestigial setae *f*₁ situated anterior to setae *h*₁ (versus posterior), setae *c*₂ further away from anterior border than setae *c*₁ and *c*₃ (versus setae *c*₁ further away than *c*₂ and *c*₃), setae *h*₂ situated slightly lower than setae *ps*₁ (versus much lower).

Key to species of *Atropacarus* (*Hoplophorella*) known from China

- 1 Notogastral setae phylliform 2
- Notogastral setae setiform 3
- 2 Notogaster with anterior collar *A. (H.) cucullatus*
- Notogaster without anterior collar *A. (H.) vitrinus*
- 3 Setae on ano-adanal plate much longer and thicker than genital setae *A. (H.) inflatus* **sp. nov.**
- Setae on ano-adanal plate minute and fine, similar in shape as genital setae *A. (H.) minimus* **sp. nov.**

Acknowledgements

We are very grateful to all the collectors of specimens reported in this paper. This work was supported by the Funds for The Excellent Youth Scholars of “NEIGAE, CAS” (DLSYQ2012004), the Knowledge Innovation Programs of the Chinese Academy of Sciences (KSCX2-EW-Z-8), the

Major Program of National Natural Science Foundation of China—Fauna Sinica (31093430), the financial support from the China Scholarship Council, the Science and Technology Development Plan of Jilin Province of China, the key research program of the Chinese Academy of Sciences (Grant No. KZZD-EW-TZ-16), and the National Natural Science-Foundation of China (Grant No. 31101617).

References

- Berlese, A. (1923) Centuria sesta di Acari nuovi. *Redia*, 15, 237–262.
- Chen, J., Liu, D. & Wang, H.F. (2010) Oribatid mites of China: a review of progress, with a checklist. *Zoosymposia*, 4, 186–224.
- Liu, D., Yi, T.-C., Xu, Y. & Zhang, Z.-Q. (2013) Hotspots of new species discovery: new mite species described during 2007 to 2012. *Zootaxa*, 3663(1), 1–102.
<http://dx.doi.org/10.11646/zootaxa.3663.1.1>
- Niedbala, W. (1986) Système des Phthiracaroida (Oribatida, Euptyctima). *Acarologia*, 27(1), 61–84.
- Niedbala, W. (1992) *Phthiracaroida (Acari, Oribatida)*. *Systematic Studies*. PWN-Polish Scientific Publishers, Warszawa, 612 pp.
- Niedbala, W. (2000) The ptyctimous mites fauna of the Oriental and Australian Regions and their centres of origin (Acari: Oribatida). *Genus*, supplement, 1–493.
- Niedbala, W. (2011) Ptyctimous mites (Acari, Oribatida) of the Palaearctic Region. Systematic part. *Fauna Mundi*, 4, 1–472.
- Subías, L.S. (2014) Listado sistemático, sinonímico y biogeográfico de los ácaros oribátidos (Acariformes: Oribatida) del mundo (Excepto fósiles). *Graellsia*, 60(número extraordinario), 3–305 (2004) (Actualizado en junio de 2006, en abril de 2007, en mayo de 2008, en abril de 2009, en julio de 2010, en febrero de 2011, en abril de 2012, en mayo de 2013 y en febrero de 2014). [Internet]. [cited 2014 May. 12]; Available from: http://escalera.bio.ucm.es/usuarios/bba/cont/docs/RO_1.pdf

Accepted by Zhi-Qiang Zhang: 13 May 2014; published 27 Jun. 2014