

ORIGINAL ARTICLE

First report of the genus *Orencostoma* Moriuti (Lepidoptera: Yponomeutidae) from China, with descriptions of two new species

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Abstract The genus *Orencostoma* Moriuti, 1971 is recorded for the first time in China. Two new species, *O. divulgatum* Wang **sp. nov.** and *O. semicirculum* Wang **sp. nov.**, are described. Photographs of adults, venations and male genitalia are provided.

Key words Yponomeutioidea, taxonomy, new record.

1 Introduction

Orencostoma, the monotypic genus of Yponomeutidae, was erected by Moriuti in 1971 for an Indian species, *O. bicornigerum* Moriuti, 1971. It is characterized by the filiform antenna slightly serrulated distally, the scape with slender pecten; the labial palpus with third palpomere longer than the second palpomere, the lanceolate forewing with 9 veins and the lanceolate hindwing with 7 veins (Fig. 1); in the male genitalia by the sub-quadrangle uncus produced postero-laterally, the broad socius with an apical spine, the gnathos with long lateral arms and a tongue-shaped or semicircular ventral plate, the developed costa with an elongate triangular or slender transtilla, the saccus dilated distally, the phallus with cornuti consisting of one or two stout spines, and the absence of coremata; in the female genitalia by the lamella postvaginalis being a pair of minute protuberances, the lamella antevaginalis being a narrow sclerotized transverse band, the very long ductus bursae entirely or partly spinous or granulous, and the ovate or pyriform corpus bursae with or without a signum.

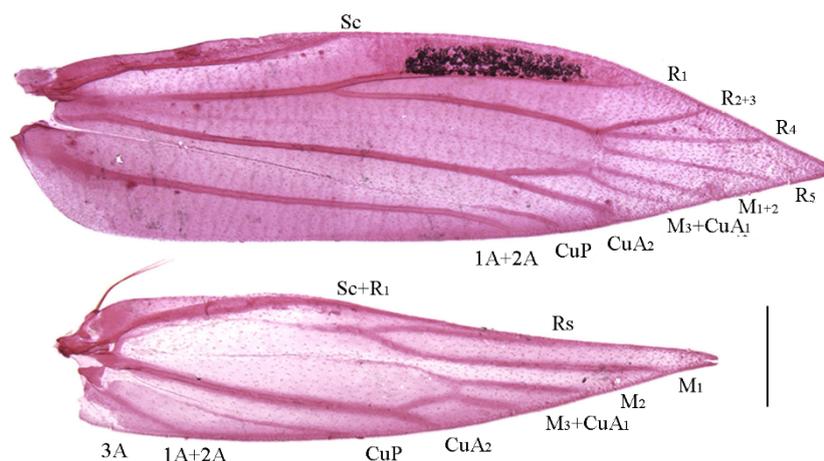


Figure 1. Wing venations of *Orencostoma divulgatum* Wang **sp. nov.**, slide No. JQ08267♀. Scales bar=0.5 mm.

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This paper reports *Orencostoma* for the first time in China and describes two new species, along with a map showing their localities (Fig. 2).

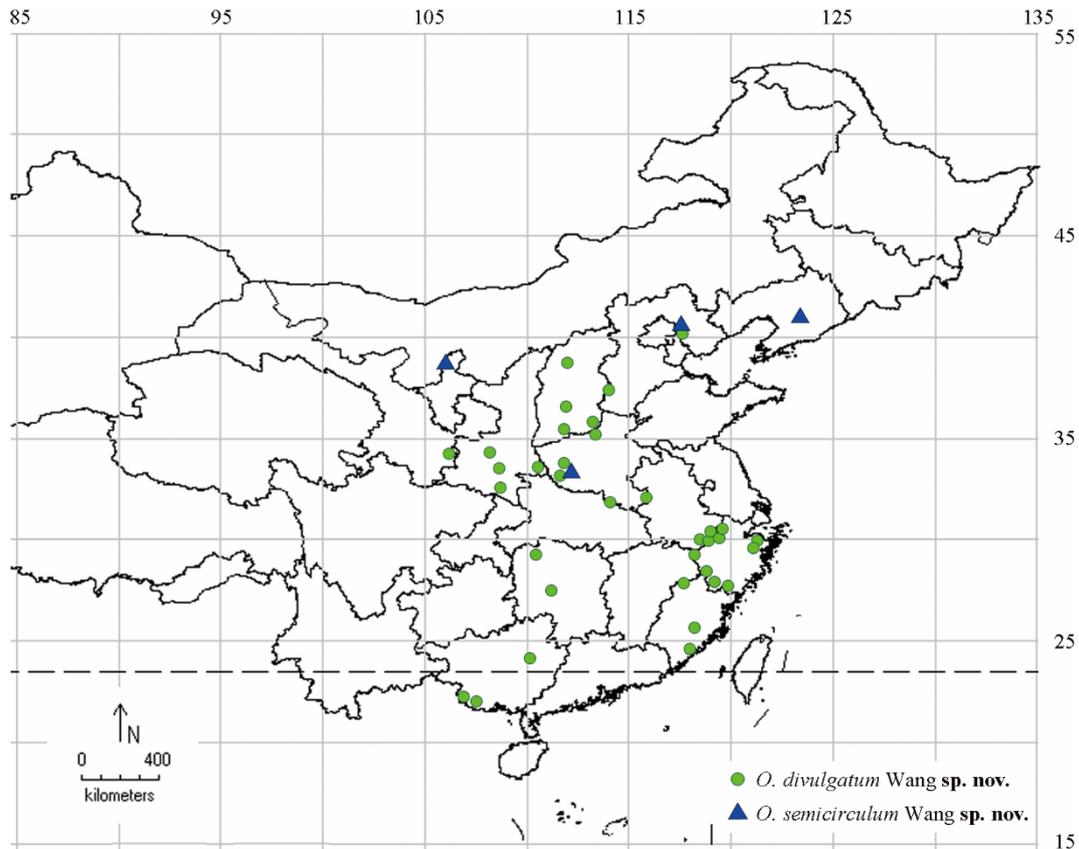


Figure 2. Distribution of Chinese *Orencostoma* spp.

2 Materials and methods

The examined specimens were collected by light trapping. Images of adults were taken by using a Leica M205A stereomicroscope, and images of genitalia and wing venations were prepared with a Leica DM750 microscope. Dissection and slide mounting of genitalia and wing venation followed the methods introduced by Li (2002).

All specimens studied are deposited in the Insect Collection, College of Life Science, Nankai University, Tianjin, China.

3 Taxonomy

Genus *Orencostoma* Moriuti, 1971

Orencostoma Moriuti, 1971: 253. Type species: *Orencostoma bicornigerum* Moriuti, 1971.

Diagnosis. *Orencostoma* is similar to *Ocnerostoma* Zeller, 1847, but differs in the uncus well-developed and the coremata absent in the male genitalia; the ductus bursae longer than the corpus bursae, entirely or partly with microspines or granules, and a signum present in the female genitalia. In *Ocnerostoma*, the male genitalia has the uncus ill-defined and the coremata present; the female genitalia has the smooth ductus bursae shorter than the corpus bursae and the signum absent.

Orencostoma divulgatum Wang sp. nov. (Figs 1, 3, 5–9)

Diagnosis. This species is similar to *O. bicornigerum* Moriuti, 1971. It can be distinguished by the uncus smoothly

concave on the posterior margin in the male genitalia and the presence of a signum in the female genitalia. In *O. bicornigerum*, the uncus is sinuate in W shape on the posterior margin and the signum is absent (Moruiti, 1971: 255, figs 4–5). Differences between *O. divulgatum* Wang **sp. nov.** and *O. semicirculum* Wang **sp. nov.** are given under the latter species.

Description. Adult (Fig. 3) wingspan 8.0–10.0 mm. Vertex rough, white except brown between antennae; face smooth, white mixed with pale brown. Antenna about 3/5 length of forewing, greyish brown except scape white on ventral surface, flagellum ringed with white on dorsal surface. Labial palpus greyish brown mixed with white. Thorax and tegula white mixed with grey. Forewing ground color creamy white, scattered with greyish brown, pale rufous and black scales; costal margin in some individuals with a faint spot before apex due to fewer dark scales; ill-defined pale rufous basal patch sub-rounded; wide pale rufous band at basal 2/5; cilia pale grey, tipped with blackish brown. Hindwing and cilia pale grey. Fore- and midlegs ventrally black, dorsally white except tarsi blackish brown at apex of each tarsomere; hindleg pale ochreous white, tarsus with scattered brown scales, each tarsomere ringed with black distally.

Male genitalia (Figs 5–9). Uncus sub-quadrate, shallowly concave or nearly straight at middle on posterior margin, produced to a sub-triangular or semicircular process posterolaterally. Socius widened or slightly widened medially, narrowed from about middle to apex, with a small spine apically; dorsal margin arched, ventral margin nearly straight. Gnathos with ventral plate semicircular or tongue shaped, spinous on ventral surface; lateral arms banded, almost uniform. Valva sub-rectangular or sub-triangular, slightly or distinctly narrowed to rounded apex, with length from 2.3 to 3.4 times of maximum width, ventral margin gently arched or produced beyond sacculus; costa banded, widened medially, narrowed toward both base and apex; transtilla elongate, narrowed to apex; sacculus small, sub-triangular, approximately 1/4 length of valva. Saccus about 2/3 length of socius, distinctly or slightly dilated distally. Phallus 3 times length of valva; cornuti being a few overlapped relatively larger spines followed by two rows of clustered microspines, placed distally.

Female genitalia (Figs 11–12). Intersegmental membrane between papilla analis and eighth sternum wide and short. Apophyses anteriores 2/3 length of apophyses posteriores, ventral branch extended to lamella postvaginalis. Lamella postvaginalis being a narrow sclerotized transverse band, produced triangularly toward both ends. Antrum short, uniform. Ductus bursae extremely long and slender, twisted, granulous, slightly thickened from distal 1/3 to 1/6; ductus seminalis arising from near base. Corpus bursae elongate ovate, granulous entirely; signum pyriform, densely covered with rowed denticles throughout.

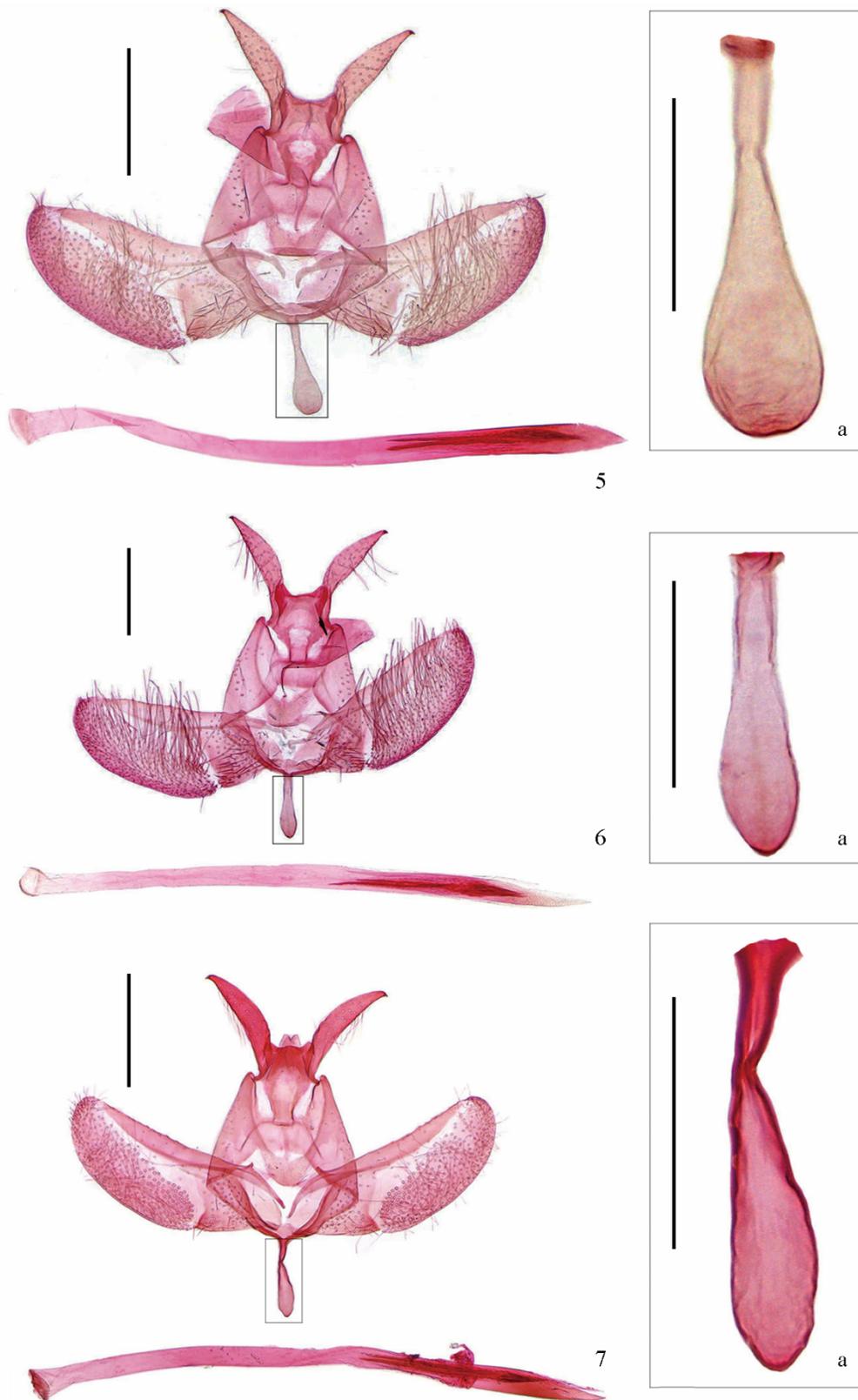
Type material. Holotype ♂, Mt. Baxian (40.19°N, 117.55°E), Ji County, Tianjin, 600 m, 23.IX.2006, coll. Houhun Li *et al.* slide No. CPX15028♂. Paratypes (305♂169♀). Tianjin: 2♂4♀, Limutai, Ji County, 300 m, 11.VI.2004–1.VII.2007, coll. Houhun Li *et al.*, slide No. JQ08265♂; 10♂10♀, Mt. Jiulong, Ji County, 130–200 m, 5.IX.2001–27.VI.2004, coll. Houhun Li *et al.*, genitalia slide Nos. XYL03411♂, FXM07021♂, FXM07022♂, BHY06074♀, JQ08267♀; 16♂11♀, Mt. Baxian, Ji County, 500–600 m, 7.IX.2001–23.IX.2006, coll. Houhun Li *et al.*, genitalia slide Nos. LK16001♂, CPX15075♀, JQ10105♂, JQ10106♀; 15♂5♀, Heishuihe, Mt. Baxian, Ji County, 550 m, 19.VI–16.IX.2009, coll. Bingbing Hu, Jing Zhang, Zhipin Liang; 3♂, Heishuihe, Mt. Baxian, Ji County, 600 m, 23.VIII–12.IX.2010, coll. Yinghui Mou, Mingrui Zhang, Shurong Liu. Hebei: 9♂13♀, Mt. Wuling, Xinglong County, 1000 m, 15–16.VI.2014, coll. Shurong Liu *et al.*, genitalia slide Nos. CPX15057♂, CPX14166♂, CPX15076♂, LK15051♂, LK15050♂, CPX15087♂, CPX15088♂, CPX15082♂, CPX15078♂, LK15065♀, CPX14176♀, LK15067♀, CPX15089♀, CPX15077♀, CPX15081♀; 1♂, Mt. Wuling, 800 m, 30.VI.2012, coll. Houhun Li, Shuxia Wang *et al.*, genitalia slide No. CPX15056; 2♂1♀, Shuangyuanfeng, Mt. Wuling, Xinglong County, 800 m, 16.VII–6.IX.2012, coll. Houhun Li, Yanpeng Cai, Qiang Gao, genitalia slide Nos. LK15048♂, LK15049♂, LK15068♀. Shanxi: 5♂2♀, Xizhashui Village, Lingchuan County, 900 m, 12–15.VII.2010, coll. Haiyan Bai, Linlin Yang, genitalia slide Nos. CPX15026♂, LK15077♂, LK15078♂, LK15075♂, LK15079♂, CPX15027♀, LK15076♀; 1♀, Mt. Lingkong, Qinyuan County, 1560 m, 31.VII.2013, coll. Tengting Liu, Peixin Cong, genitalia slide No. LK15074; 1♀, Mt. Luya, Ningwu County, 1450 m, 19.VI.2011, coll. Shulian Hao, Jiayu Liu, genitalia slide No. CPX15005; 1♂, Dahe Forest Farm, 1340 m, 12.VII.2012, coll. Qiang Gao, Na Chen, genitalia slide No. LK15080; 1♀, Mt. Mian, Jiexiu County, 1370 m, 16.VII.2014, coll. Tengting Liu, Meiqing Yang, Sihan Lu. Zhejiang: 1♂, Laodian, Kaishan, Mt. Tianmu, 1140 m, 17.VIII.1999, coll. Houhun Li *et al.*, genitalia slide No. CPX15050; 24♂9♀, Qingliangfeng, Linan City, 900 m, 8–11.VIII.2005, coll. Yunli Xiao, genitalia slide Nos. LK16004♂, LK16005♂, CPX15048♂, CPX15049♀; 1♂1♀, Wuyanling, Taishun County, 400–930 m, 31.VII–1.VIII.2005, coll. Yunli Xiao; 1♂, Mt. Fengyang, Longquan, Lishui City, 1470 m, 26.VII.2007, coll. Qing Jin; 1♂, Chishui Village, Zhangshui Town, Yinzhou District, Ningbo City, 450 m, 26.VII.2015, coll. Aihui Yin, Kang Lou, Tao Wang; 1♀, Tianmushan Village, Mt. Tianmu, 335 m, 1.VII.2014, coll. Aihui Yin, Xuemei Hu, Qingyun Wang; 8♂1♀, Qianqingtang, Qingliangfeng, 1100 m, 15–16.V.2012, coll. Linlin Yang, Zhenguo Zhang, genitalia slide Nos. CPX15080♂, LK15063♂, LK15064♂, LK15066♂, LK15069♂, LK15071♂, LK15072♂, CPX15029♀; 1♂, Shunxiwu, Qingliangfeng, 390 m, 19.V.2012, coll. Linlin Yang, Zhenguo Zhang, genitalia slide No. LK15070; 2♂2♀, Yulingguan, Qingliangfeng, 220 m, 23.VII.2014, coll. Aihui Yin, Xuemei Hu, Qingyun Wang, genitalia slide Nos.

LK15053♂, LK15054♂; 1♂4♀, Longxushan Village, Mt. Longxu, 778 m, 20–21.VIII.2014, coll. Aihui Yin, Qingyun Wang, Suran Li, genitalia slide Nos. LK15052♂, CPX14168♀; 1♂, Pinggang, Mt. Longxu, 754 m, 25.VIII.2014, coll. Aihui Yin, Qingyun Wang, Suran Li, genitalia slide No. LK15062; 8♂2♀, Jiufu Village, Mt. Longtang, 520 m, 25.VII–31.VIII.2014, coll. Aihui Yin, Qingyun Wang, Suran Li, genitalia slide Nos. LK15055♂, LK15056♂, LK15057♂, LK15058♂, LK15059♂, LK15060♂, LK15061♂, LK15063♂, CPX15059♂, CPX15058♀; 2♂, Ganzhuling, Simingshan Town, Yuyao City, 853 m, 24–25.VII.2015, coll. Aihui Yin, Kang Lou, Tao Wang; 1♂1♀, Huangtanyu, Mt. Jiulong, 467 m, 3–6.VII.2013, coll. Aihui Yin, Xiuchun Wang, genitalia slide Nos. CPX14170♂, LK15073♀; 68♂15♀, Jiutangshan Forestry station, Qingliangfeng, Linan City, 550 m, 14.V.2017, coll. Shuonan Qian, Ga-Eun Lee, genitalia slide No. LJ17398♀; 12♂15♀, Longtangshanzhuang, Qingliangfeng, Linan City, 500 m, 12–15.V.2017, coll. Shuonan Qian, Ga-Eun Lee, genitalia slide No. LJ17362♂; 2♂4♀, Mt. Gutian, Kaihua County, Quzhou City, 310 m, 16–20.V. 2017, coll. Shuonan Qian, Ga-Eun Lee, genitalia slide No. LJ17361♂. Fujian: 1♀, Daiyun Village, Mt. Daiyun, Dehua County, 850 m, 15.IX.2002, coll. Xinpu Wang; 1♂, Sangang, Mt. Wuyi, 740 m, 19.V.2004, coll. Haili Yu; 7♂2♀, Mt. Tianzhu, Xiamen City, 220 m, 13.VIII–10.IX.2010, Bingbing Hu, Jing Zhang, Yinghui Sun, genitalia slide Nos. LK15081♂, LK15082♂, LK15083♂, LK15084♂, LK15085♂, LK15086♂, LK15087♂, CPX15031♀; 2♂1♀, Tongmu Village, Mt. Wuyi, 2.V.2014, coll. Xiaofei Yang, genitalia slide Nos. CPX15034♂, LK15088♂. Henan: 5♂12♀, Liulou, Zushi Town, Gushi County, 120 m, 11–20.V.1995, coll. Guangyun Yan, genitalia slide Nos. XYL03410♂, CPX15041♂, CPX15042♀, FXM07019♂, FXM07020♀, XYL03409♀; 1♀, Mt. Jigong, Xinyang City, 700 m, 9.VII.1997, coll. Houhun Li; 2♂1♀, Mt. Baiyun, Song County, 1500 m, 8.IX.2000, coll. Houhun Li, Karsholt, genitalia slide No. JQ10066♀; 1♂, Mt. Baiyun, Luoyang City, 1560 m, 23.VII.2001, coll. Dandan Zhang; 1♀, Mt. Baiyun, Song County, 1580 m, 24.VII.2002, coll. Xinpu Wang; 1♂, Shiziping, Lushi County, 1000 m, 30.V.2000, coll. Meicai Wei; 1♀, Qihe, Lushi County, 1150 m, 30.V.2000, coll. Meicai Wei; 1♀, Xiaguan, Neixiang County, 650 m, 10.VII.1998, coll. Houhun Li; 64♂15♀, Baotianman, Neixiang County, 1200 m, 25.V–2.VI.2006, coll. Jinmei Lv, Xu Zhang, genitalia slide Nos. CPX15074♂, CPX15039♂, JQ10065♂, LK16002♂, CPX15040♀, CPX15065♀, LK17128♀, LK17129♀, LK17130♀, LK17131♀, LK17132♀; 4♂, Xiuwu Forest Farm, Mt. Yuntai, Jiaozuo City, 1028 m, 10–12.VIII.2014, coll. Peixin Cong, Sha Hu, Linjie Liu, genitalia slide No. CPX14169. Hunan: 1♂, Zhangjiajie, 650 m, 17.VIII.2001, coll. Houhun Li, Xinpu Wang, genitalia slide No. XYL03583; 1♀, Cangxi Town, Xinhua County, 8.VIII.2004, coll. Yunli Xiao. Guangxi: 1♀, Jinxiu County, 600 m, 24.IV.2008, coll. Hui Zhen, Li Zhang, genitalia slide No. JQ07383; 3♂4♀, Shaoping Forest Farm, Pingxiang County, 280 m, 31.III.2012–13.IV.2013, coll. Xiaofei Yang, genitalia slide Nos. CPX15054♂, LK15089♂; 1♂, Milv, Nanping, Shangsi County, 770 m, 3.IV.2002, coll. Shulian Hao, Huaijun Xue. Sichuan: 1♂2♀, Shuzheng, Jiuzhaigou, 2300–2400 m, 16–17.VIII.2002, coll. Shulian Hao, genitalia slide Nos. CPX15030♂, CPX15061♀, CPX15062♀; 1♀, Wolong, 2008 m, 26.VII.2005, coll. Haili Yu. Chongqing: 1♂, Laosimianshan, Mt. Simian, 1280 m, 13.VII.2012, coll. Yinghui Sun, Aihui Yin, genitalia slide No. LK16006. Guizhou: 4♂8♀, Suoluo, Chishui City, 240 m, 21–22.IX.2000, coll. Haili Yu, genitalia slide Nos. CPX15043♂, CPX15044♂; 1♂1♀, Huguoshi, Mt. Fanjing, 1390 m, 28–29.V.2002, coll. Xinpu Wang; 1♀, Lijiaba, Mayanghe, 700 m, 29.IX.2007, coll. Hui Zhen, genitalia slide No. CPX15055♀. Yunnan: 2♂, Mt. Weibao, 2205 m, 30.VII–1.VIII.2014, coll. Wei Guan, Xiuchun Wang, Shurong Liu, genitalia slide No. CPX15053♂; 1♂2♀, Natong Village, Bingzhongluo Country, Gongshan County, Nujiang, 1767 m, 15–16.VI.2017, coll. Kaijian Teng *et al.*, genitalia slide No. LJ17360♂. Shaanxi: 1♂, Shangdong, Ziyang County, 350 m, 21.V.1994, coll. Jin Zhou, genitalia slide No. XYL03437; 2♀, Tiejupu, Danfeng County, 680 m, 28–29.V.1994, coll. Jin Zhou, genitalia slide Nos. XYL03412♀, CPX15047♀; 1♀, Xunyangba, Ningshan County, 1360 m, 1.VII.2007, coll. Haili Yu. Gansu: 4♂, Dangchuan Forest Farm, Tianshui City, 1331–1342 m, 28–29.VII.2006, coll. Xinpu Wang, Xiangfeng Shi, genitalia slide No. CPX15051.



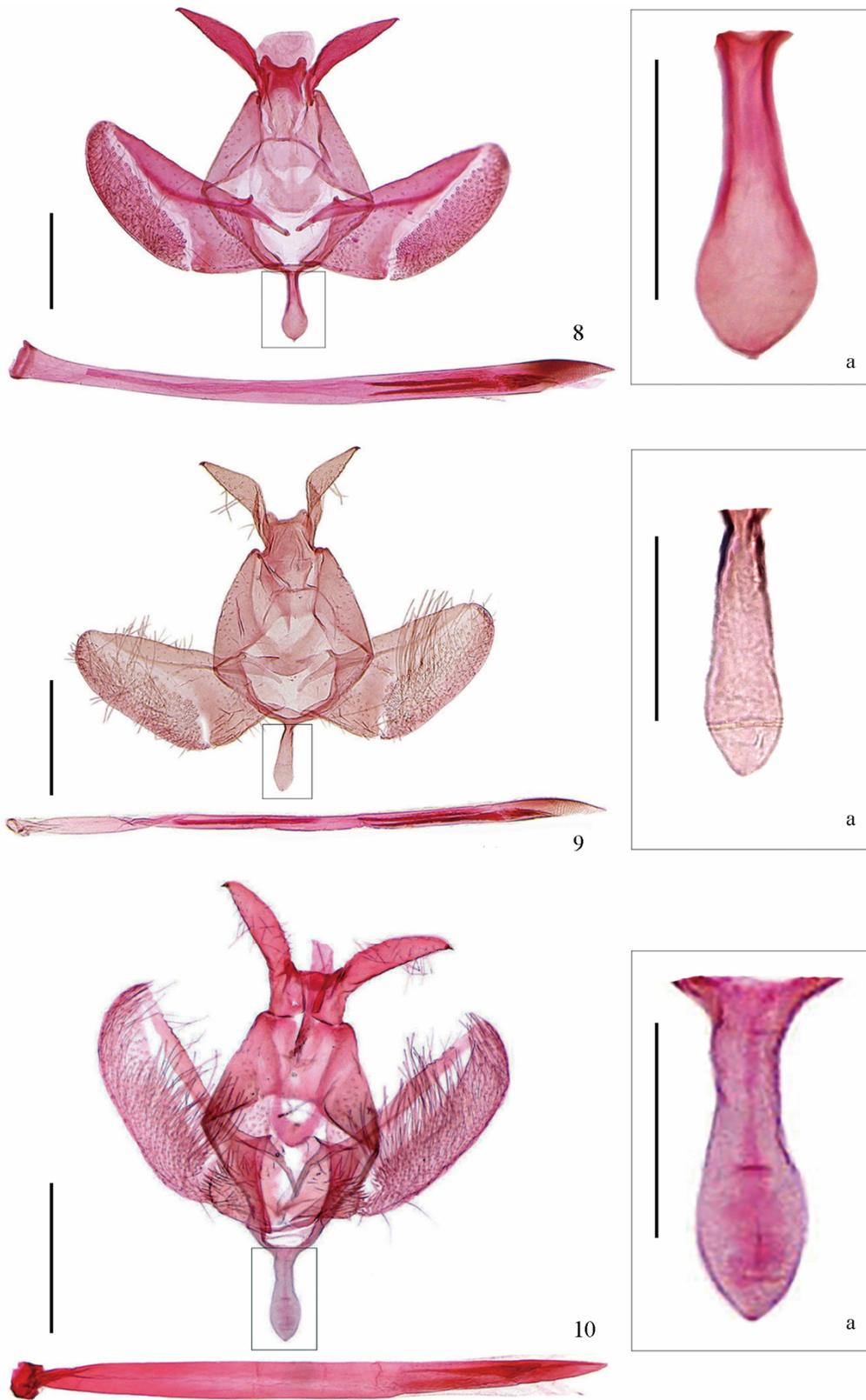
Figures 3–4. *Orencostoma* spp. 3. *O. divulgatum* Wang **sp. nov.**, ♂, holotype. 4. *O. semicirculum* Wang **sp. nov.**, ♂, holotype. Scale bars = 2.0 mm.

Distribution. China (Tianjin, Hebei, Shanxi, Henan, Shaanxi, Gansu, Zhejiang, Hunan, Fujian, Guangxi, Sichuan, Chongqing, Guizhou, Yunnan).



Figures 5–7. Male genitalia (left) and enlarged saccus (right) of *Orencostoma divulgatum* Wang **sp. nov.** 5. Holotype, slide No. CPX15028, from Zhejiang. 6. Paratype, slide No. CPX15041, from Henan. 7. Paratype, slide No. LK15049♂, from Hebei. Scale bars: 5–7=0.25 mm; 5a–7a=0.1 mm.

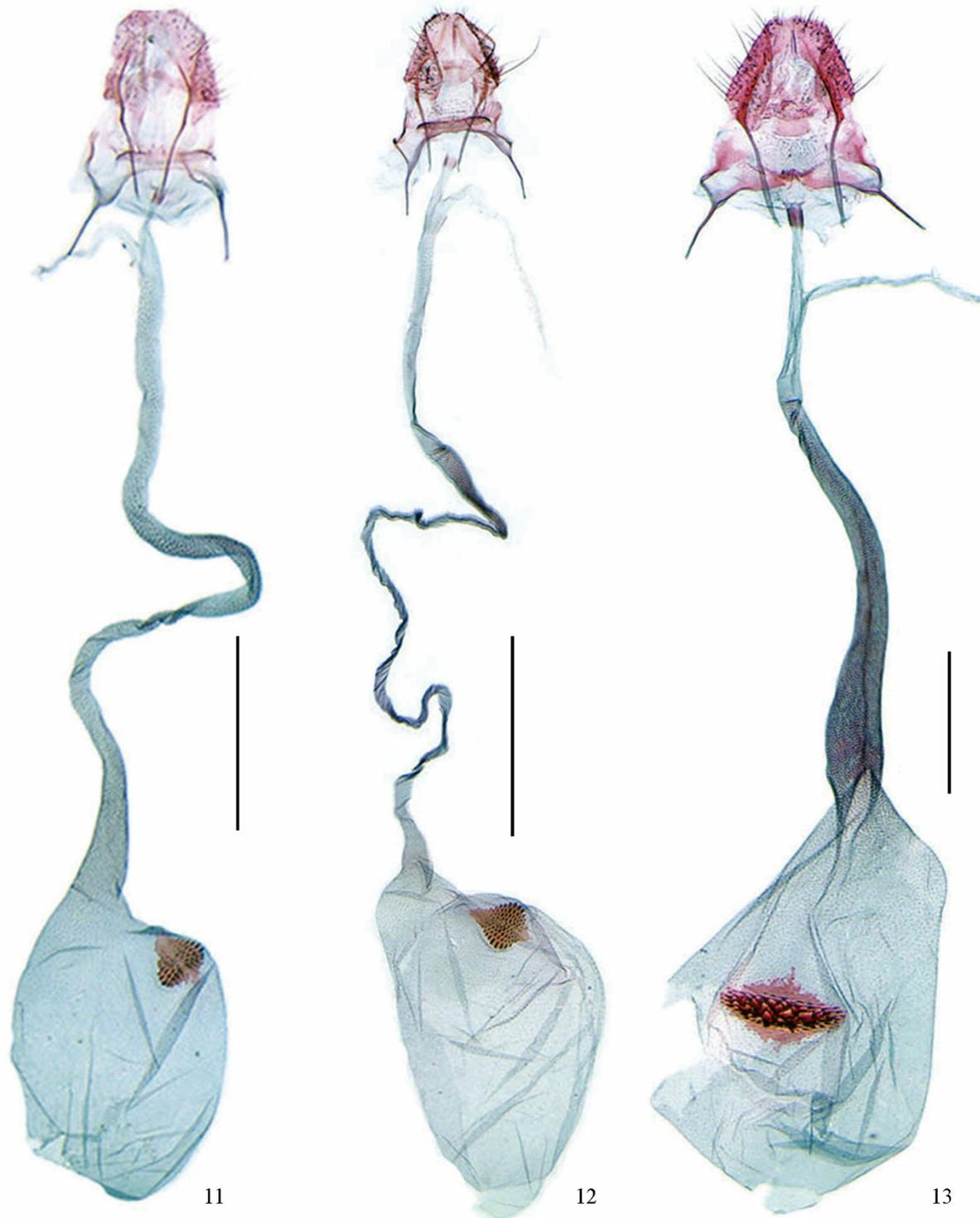
Etymology. The specific epithet is derived from the Latin *divulgatus*, meaning widespread, referring to this species is widespread in China.



Figures 8–10. Male genitalia (left) and enlarged saccus (right) of *Orencostoma* spp. 8–9. *O. divulgatum* Wang **sp. nov.**, paratype. 8. Slide No. LK16004, from Zhejiang; 9. slide No. CPX15030, from Sichuan. 10. *O. semicirculum* Wang **sp. nov.**, paratype, slide No. CPX15064, from Ningxia. Scale bars: 8–10=0.25 mm; 8a–10a=0.1 mm.

Variations. This species is widely distributed in China, with minor variations. The valva is sub-rectangular or sub-triangular, length varying from 2.3 to 3.4 times of maximum width; the saccus is dilated to different degrees distally (Figs 5a–9a); and the ductus bursae is 3 times (Fig. 11) or 4.5 times (Fig. 12) the length of the corpus bursae.

Orencostoma semicirculum Wang sp. nov. (Figs 4, 10, 13)



Figures 11–13. Female genitalia of *Orencostoma* spp. 11–12. *O. divulgatum* Wang sp. nov., paratype. 11. Slide No. CPX15043, from Guizhou; 12. slide No. CPX15047♀, from Shaanxi. 13. *O. semicirculum* Wang sp. nov., paratype, slide No. CPX15046, from Ningxia. Scale bars=0.5 mm.

Diagnosis. This species is similar to *O. divulgatum* Wang **sp. nov.** It can be distinguished by the semicircular sacculus, the smooth ventral plate of the gnathos, and the phallus with one cornutus in the male genitalia; the ductus bursae approximately 1.5 times of the length of the corpus bursae and the rhombic signum with dense denticles mediohorizontally in the female genitalia. In *O. divulgatum* Wang **sp. nov.**, the sacculus is sub-triangular, the ventral plate of the gnathos is spinous on ventral surface, and the cornuti consist of a few relatively large spines followed by two rows of microspines; the ductus bursae is 3.0–4.5 times the length of the corpus bursae, and the pyriform signum bears dense denticles throughout.

Description. Adult (Fig. 4) wingspan 8.0–10.0 mm. Vertex rough, white, mixed with pale brown between antennae; face smooth, creamy white mixed with pale brown. Antenna about 2/3 length of forewing, creamy white on ventral surface, dark brown annulated with creamy white on dorsal surface. Labial palpus blackish brown ventrally, white dorsally, pointed apically. Thorax and tegula creamy white, mixed with greyish brown scales. Forewing with ground color creamy white, densely covered with brown scales, forming an ill-defined blackish brown patch at middle of fold; cilia greyish white, tipped with blackish brown. Hindwing and cilia pale dim yellowish grey. Fore- and midlegs ventrally black, dorsally creamy white except tarsi blackish brown at apex of each tarsomere; hindleg creamy white, tibia with brown scales, tarsus with each tarsomere ringed with black distally.

Male genitalia (Fig. 10). Uncus sub-quadrate, shallowly concave sinuate on posterior margin, produced to a short horn posterolaterally. Socius slightly widened beyond middle, then narrowed to apex, with an apical spine; dorsal margin arched, ventral margin straight. Gnathos with ventral plate short tongue shaped or triangular; lateral arms narrowed banded. Valva sub-rectangular, length 3 times of width, obliquely blunt at apex, densely setose on ventral half; costa narrow, banded; transtilla slender, more than 1/3 length of costa; sacculus very short, semicircular, densely setose. Saccus shorter than socius, subparallel or distally dilated elliptically. Phallus about 2.2 times length of valva, with microspines distally; cornutus being one stout spine, triangular basally.

Female genitalia (Fig. 13). Intersegmental membrane between papilla analis and eighth sternum wide and short. Apophyses anteriores 5/6 length of apophyses posteriores, ventral branch extended to lamella postvaginalis. Lamella postvaginalis not well-defined, very narrow, more or less V shaped. Antrum columnar, uniform; ductus bursae about 1.5 times of corpus bursae, becoming thicker from basal 1/3 toward corpus bursae, basal 1/3 smooth, distal 2/3 densely spinuous; ductus seminalis arising from near base. Corpus bursae pyriform, with granules; signum rhombic, horizontally with dense denticles along median area.

Type material. Holotype ♂, Mt. Qian, Anshan City, 5.VII.2010, coll. Jiayu Liu, Yanpeng Cai, slide No. LK16003. Paratypes (10♂5♀). Ningxia: 4♂4♀, Suyukou (38.5°N, 106.1°E), Mt. Helan, 2000 m, 2.VII.2006, coll. Feng Yang, Qi He, slide Nos. CPX15045♂, CPX15064♂, CPX15046♀, CPX15063♀, LK17133♀W; 1♂, 3.VI.2006, coll. Xinpu Wang *et al.*, other data same as for holotype. Hebei: 1♂, Mt. Wuling, Xinglong County, 1000 m, 16.VI.2014, coll. Shurong Liu *et al.*, genitalia slide No. CPX15086. Liaoning: 1♂, Mt. Qian, Anshan City, 5.VII.2010, coll. Jiayu Liu, Yanpeng Cai, genitalia slide Nos. CPX15033. Henan: 3♂1♀, Baotianman, Neixiang County, 1200 m, 25–30.V.2006, coll. Xu Zhang, Jinmei Lv, genitalia slide Nos. LK17134♂, LK17134W♂, LK17129♀.

Distribution. China (Liaoning, Hebei, Henan, Ningxia).

Etymology. This epithet is derived from the Latin prefix *semi-* and the Latin *circulus*, referring to the semicircular sacculus of the male genitalia.

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