Research Article

Contribution to the Knowledge of the Genus *Linda* Thomson, 1864 (Part I), with the Description of *Linda* (*Linda*) *subatricornis* n. sp. from China (Coleoptera, Cerambycidae, Lamiinae)

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Received 30 September 2011; Accepted 26 January 2012

Academic Editor: Martin H. Villet

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*Linda* (*Linda*) *subatricornis* n. sp is described from Sichuan (holotype locality), Fujian, Shaanxi, Hebei, Ningxia of China. It is separated from the most similar species *L. atricornis* Pic by differences in genitalia and antennal insertions. Detailed descriptions, photographs of habitus and genitalia, distribution of the two sibling species and short discussion on the related species are presented.

1. Introduction

*Linda* Thomson, 1864 [1], includes two subgenera, *Linda* and *Dasylinda*, mostly confined to China [2]. While studying more than 150 specimens of *Linda* (*Linda*) *atricornis* Pic from different localities, we were surprised to observe two very different kinds of male genitalia. We concluded that two superficially similar species have been historically misidentified as one species. We had examined the types of *L. atricornis*, *L. gracilicornis*, *L. major* (the three known species of subgenus *Linda* with elytra and antennae all black), and most of the other species of this genus. After careful observation and dissection, we separate *L. subatricornis* n. sp. and herein describe it as new to science.

2. Materials and Methods

Types and other material studied are deposited in the following institutions or private collections.

- **CCH**: Collection of Dr. Carolus Holzschuh, Villach, Austria.
- **CPS**: Collection of Dr. Carlo Pesarini and Dr. Andrea Sabbadini, Milano, Italy.
- **HBU**: Museum of Hebei University, Hebei, China.
- **IRSNB**: Institut royal des Sciences naturelles de Belgique, Bruxelles, Belgique.
- **IZAS**: Institute of Zoology, Chinese Academy of Sciences, Beijing, China.
- **MHNG**: Musée d’Histoire Naturelle de Genève, Switzerland.
- **SYSU**: Sun-Yatsen University, Guangzhou, China.

3. Results


*Linda* (*Linda*) *atricornis*; Löbl and Smetana, 2010 [2]: 293 (part).
Redescription. Male (Figures 1(a) and 1(b)): length: 14.0–16.5 mm, humeral width: 3.0–3.6 mm. Female (Figure 1(c)): length: 14.2–17.5 mm, humeral width: 3.2–4.0 mm. Head (except eyes, labrum and mandibles), prothorax, scutellum, ventral surface of body, basal third of femora, extreme bases of tibiae and tarsal claws reddish testaceous; antennae, elytra, eyes, labrum, mandibles and most of legs black; pale portions covered with fine silvery pubescence and erect hairs; bases of elytra and undersurfaces of antennae with sparse erect hairs. Head densely and rugulose punctuate; vertex shallowly grooved; antennae shorter than body, about 5/6 (female) to 6/7 (male) of body length, antennomere ratio: male: 13 : 3 : 16 : 15 : 14 : 13 : 12 : 11 : 10 : 10; female: 14 : 3 : 16 : 15 : 14 : 13 : 12 : 11 : 10 : 9 : 9. Prothorax much broader than long, swollen above and behind middle of each side; scutellum declivitous, truncate. Elytron slightly emarginate apically, with sutural and outer angles slightly projected. Last visible sternite with a broad and deep groove and apex with a small nick in middle (male, Figure 1(d)) or with a thin line and apex smoothly margined (female, Figure 1(e)).

Male Terminalia (Figures 2(a)–2(d)). Tegmen length about 3.0 mm; lateral lobes not so stout, each about 0.5 mm long and 0.2 mm wide, mostly covered with moderate long setae, with one short but broad basal lobe furnished with short setae (in ventral view, Figure 2(d)); median lobe plus median struts slightly curved (Figure 2(b2)), a little longer than tegmen (7:6); the median struts slightly longer than half of the whole median lobe in length; dorsal plate slightly shorter than ventral plate; apex of ventral plate pointed (Figure 2(d)); median foramen slightly elongated; internal sac about twice as long as median lobe plus median struts, with 3 pairs of basal armature, and 2 pair of rods of endophallus; 2 longer rods each about 1.5 mm, about one-half of tegmen length, the shorter pair about 0.6 mm. The ratio of short pair to long pair always bigger than 1/3.

Tergite VIII (Figure 2(a)) broader than long, apex truncated, rounded at side, with dense but short setae (hairs).

Female Genitalia (Figure 2(e)). Spermathecal capsule having a strongly sclerotized rounded apical lobe (with a very short stalk) and a not so sclerotized basal stalk, spermathecal duct not very longer than spermathecal capsule. Spermathecal gland extended from a strongly sclerotized broad ring, which attach to duct directly. Tignum shorter than abdomen. In our observation, tignum 6.5 mm for an adult with a 7.8 mm abdomen in ventral view.

Diagnosis. Femera mostly black, body not over 20 mm, these two characters easily separate it from L. major and L. gracilicornis.

Host (mixed with host of L. subatricornis), Cydonia sp. (ROSACEAE), Juglans regia Linnaeus (JUGLANDACEAE), Malus sp. (ROSACEAE), Morus alba Linnaeus (MORACEAE), Populus davidiana Dode (SALICACEAE), Prunus armeniaca Linnaeus (ROSACEAE), Prunus mume Siebold and Zuccarini (ROSACEAE), Prunus persica Linnaeus (ROSACEAE), Prunus salicina Lindley (ROSACEAE), Rubus sp. (ROSACEAE), and Salix sp. (SALICACEAE).

Remarks. The records from 17 provinces of China by Hua [12] or Lobl and Smetana [2] need confirmation based on specimens. The following provinces may misidentifications of L. subatricornis: Ningxia, Shaanxi; the northern provinces may not have this species: Inner Mongolia, Gansu, Hebei; the others may have this species but specimens are required to confirm it: Henan, Hubei, Hunan, Guizhou, Yunnan.

Distribution (Based on Specimens). China: Jiangsu, Zhejiang, Jiangxi, Fujian, Guangdong, Guangxi, Sichuan.
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Figure 2: Genitalia of Linda atricornis Pic, 1924. (a) Tergite VIII and sternites VIII and IX. (b) Male genitalia. 1: ventral view; 2: lateral view; 3: dorsal view. Scale 1 mm. (c–e) not to scale. (c) Showing rods of endophallus. (d) Showing apex of ventral plate of median lobe and lateral lobes. (e) Spermatheca.

Type Specimens Examined. Type, male, Zi-ka-wei (MNHN, ex Coll. M. Pic).

Other Specimens Examined. Jiangsu: 1 female, Ihing, 1923. VII,16 (IZAS); 1 female, Shanghai, 1935.VII (IZAS); 1 female, Shanghai, 1939.VI.5, leg. O. Piel (IZAS).

Zhejiang: 1 female, T’ienmu Shan, 1935.VIII.1, leg. O. Piel (IZAS); 1 male 2 females, T‘ienmu Shan, 1935.VIII.4 (IZAS); 1 female, Huangyan, 1955.VI.26 (IZAS); 1 female, Chekiang, Mokanshan, env. 50 k de Hangtcheou, 1925, leg. A. Pichon (MNHN); 2 males, Chusan, 1931.VI.12, leg. O. Piel (IZAS).


Fujian: 1 female, Chongan, Xingcun, Guadun, alt. 900–1100 m, 1963.VII.6, leg. ZHANG Youwei (IZAS); 1 female, same data but alt. 840–1160 m, 1960.VI.14, leg. ZHANG Yiran; 1 male, Chongan, Xingcun, Sangang, alt. 740 m, 1960.VI.30, leg. MA Chenglin (IZAS); 1 male, Dehua, Chenguang, alt. 510–550 m, 1960.VI.1, leg. PU Fuji (IZAS); 1 male, Dehua, Shangyong, Guiwu, alt. 780–950 m, 1960.VI.18, leg. MA Chenglin (IZAS); 1 male, Fuzhou, Gushan, 1953.VI, leg. HUANG Jiabin (IZAS).

Guangxi: 4 males 2 females, Kouangsi, Region de Nanning, 1931 (MNHN, ex Coll. R. Oberthür, 1952); 9 males 4 females, same data but (IRSNB); 1 female, Prov. Kwangsi, Mts. Toyen-chan (MNHN, ex Coll. M. Pic); 1 female, Huangshahe, 1955.VIII.14 (IZAS).

Sichuan: 1 male, Pengshui, alt. 850 m, 1989.VII.11, leg. SUN Baowen (IZAS).

3.2. Linda (Linda) subatricornis n. sp. (Figures 3 and 4). Linda gracilicornis m. tatsienlui Breuning, 1954 [13]: 550 (Sichuan). (MHNG) infrasubspecies, nomen nudum.

Linda atricornis; Pu, 1992 [14]: 611 (misidentification).

Linda (s. str.) atricornis; Pic, 1935 [15]: 12 (misidentification); Gressitt, 1942 [7]: 10 (part); 1947 [9]: 548 (part); Gressitt, 1951 [10]: 605 (part); Wang and Chiang, 1988 [16]: 144 (misidentification); Hua, 2002 [12]: 213 (part).

Linda (Linda) atricornis; Löbl and Smetana, 2010 [2]: 293 [part].

Description. Male (Figures 3(a) and 3(b)), length: 13.5–16.0 mm, humeral width: 2.8–3.4 mm. Female (Figure 3(e)–3(g)), length: 15.4–18.5 mm, humeral width: 3.2–4.2 mm. Head (except eyes, antennal tubercles, labrum, and mandibles), prothorax, scutellum, ventral surface of body, basal thirds of femora, and tarsal claws reddish testaceous; antennae, antennal tubercles, elytra, eyes, labrum, mandibles, and most of legs black; pale portions covered with fine silvery pubescence and erect hairs; bases of elytra
Figure 3: Habitus, *Linda subbicornis* n. sp. (a) Holotype, male, from Sichuan. (b) Paratype, male, from Beijing. (c–f) Paratype, female, from Sichuan. (g) Holotype of *Linda* (*Linda*) *gracilicornis* m. *tatsienlui* Breuning, 1954, female, from Sichuan. Scale 2 mm. (h) head, in frontal view. (c–d) and (h) showing last visible sternite, not to scale. (c–d) Male. (h) Female.

and undersurfaces of antennae with sparse erect hairs. Head densely and rugulose punctuate; vertex shallowly grooved; antennae shorter than body, about 4/5 (female) to 9/10 (male) of body length, antennomere ratio: male: 13 : 2 : 16 : 14 : 13 : 12 : 11 : 10 : 9 : 10; female: 15 : 3 : 19 : 16 : 15 : 14 : 13 : 12 : 11 : 10 : 11. Prothorax much broader than long, swollen (three) above and behind middle of each side; scutellum declivitous, truncate. Elytron slightly emarginate apically, with sutural and outer angles slightly projected. Last visible sternite with a moderate broad and deep groove and apex with a small groove in middle (male, Figure 3(c) and 3(d)) or with a thin line and apex smoothly emarginated (female, Figure 3(h)).

**Male Terminalia (Figures 4(a)–4(f)).** Tegmen length about 3.0 mm; lateral lobes stout, each about 0.5 mm long and 0.25 mm wide, mostly covered with moderate long setae, with one short but broad basal lobe furnished with short setae (in ventral view, Figure 4(d)); median lobe plus median struts slightly curved (Figure 4(b2)), a little longer than tegmen (6 : 5); the median struts slightly longer than half of the whole median lobe in length; dorsal plate slightly shorter than ventral plate; apex of ventral plate narrowly rounded (Figure 4(c)); median foramen elongated; internal sac less than twice of median lobe plus median struts in length, with 3 pairs of basal armature, and 2 pairs of rods of endophallus; 2 longer rods each about 1.9 mm, longer than one-half of tegmen, the shorter pair about 0.6 mm. The ratio of short pair to long pair always smaller than 1/3. Tergite VIII (Figure 4(a)) broader than long, apex truncated, rounded at side, with dense but short setae (hairs).

**Female Genitalia (Figures 4(g)–4(j)).** Spermathecal capsule having a strongly sclerotized rounded apical lobe (with
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Figure 4: Genitalia of Linda subatricornis n. sp. (a) Tergite VIII and sternites VIII and IX. (b) Male genitalia. 1: ventral view; 2: lateral view; 3: dorsal view. Scale 1 mm. (c–d) Showing apex of ventral plate of median lobe and lateral lobes. (e–f) Showing rods of endophallus. (c) From Sichuan. (f) From Beijing. (g–j) Female genitalia. (g–h) From Sichuan. (i) From Sichuan. (j) From Beijing.

a short to long stalk) and a not so sclerotized basal stalk, spermathecal duct not very longer than spermathecal capsule. Spermathecal gland extended from a strongly sclerotized broad ring, which attach to duct directly. Tignum shorter than abdomen. In our observation, tignum 6.8 mm for an adult with a 9.0 mm abdomen in ventral view.

Diagnosis. Differs from L. atricornis by antennal insertions black, extreme bases of tibiae black, groove of last visible sternite of male not so broad, last antennomere longer than tenth antennomere, rods of endophallus slender and the ratio of short pair to long pair smaller than 1/3, lateral lobes stouter, and so forth.

Differs from L. major and L. gracilicornis by antennal insertions black, femera mostly black, and body not over 20 mm. Differs from all the other species of subgenus Linda by antennae and elytra all black.

Etymology. Named after misidentification as L. atricornis in the collections.

Remarks. The female genitalia is difficult to separate species. In this species, the stalk attached to the strongly sclerotized rounded apical lobe is quite variable in length (Figure 4(h)–4(j)).

L. (L.) gracilicornis m. tatsienlui Breuning, 1954 [13] is a nomen nudum of this species, while L. (L.) gracilicornis m. rufofemorata Breuning, 1954 [13] should be a nomen nudum of Linda femorata (Chevrolat, 1852).

Host (mixed with host of L. atricornis). Cydonia sp. (ROSACEAE), Juglans regia Linnaeus (JUGLANDACEAE), Malus sp. (ROSACEAE), Morus alba Linnaeus (MORACEAE), Populus davidiana Dode (SALICACEAE), Prunus armeniaca Linnaeus (ROSACEAE), Prunus mume Siebold and Zuccarini (ROSACEAE), Prunus persica (Linnaeus) Batsch (ROSACEAE), Prunus salicina Lindley (ROSACEAE), Rubus sp. (ROSACEAE), Salix sp. (SALICACEAE).

Distribution. Sichuan, Fujian, Shaanxi, Hebei, Ningxia.

Type specimens examined. Holotype. male, Sichuan, Luding, Moxi, alt. 1600 m, 1983.VI.20, leg. CHAI Huaicheng (IZAS). Paratypes. Sichuan: 13 males 9 females, Luding, Moxi, alt. 1500 m, 1983.VI.20, leg. ZHANG Xuezhong (IZAS); 1 male 4 females, same data but alt. 1600–1650 m, 1983.VI.18–19, leg. WANG Shuyong; 1 female, same data but 1982.IX.14, leg. WANG Shuyong; 10 males 7 females, Luding, Xinxing, alt. 1800–2100 m, 1983.VI.13–19, leg. WANG Shuyong, ZHANG Xuezhong, CHEN Yuanqing (IZAS); 1 male, Luding county, Moxi env., 1994.V.22–VI.10, leg. V. Beneš (CCH); 1 male, Abazhou, Nanping, Jiuzhaigou, alt. 2000 m, 1991.VI.8–13, leg. C. Holzschuh (CCH); 9 males, Emeishan, Baoguosi, 1957.V.5, leg. HUANG Keren (IZAS); 3 males, same data but 1957.V.12; 6 males 2 females, Emeishan, Baoguosi, alt. 550–750 m, 1957.V.3–VI.5, leg. HUANG Keren, ZHU Fuxing, LU Youcai (IZAS); 1 male, Emeishan, Qingyinge, alt. 800–1000 m, 1957.VI.1, leg. ZHU Fuxing (IZAS); 1 male, Emeishan, 1957.VI.11, leg. LU Youcai (IZAS); 4 females, Emeishan, 1955.VI.13–14, leg. HUANG Keren, JIN Gentao (IZAS); 1 female, Emeishan, alt. 1100–1800 m, 1955.VI.23, leg. GE Zhonglin (IZAS); 1 female, Mt. Emei, alt. 1050 m, 1990.VII.18, leg. L. & M. Bocák (CCH); 2 males, Wenchuan, Yingxiu, alt. 900 m, 1983.VII.8, leg. WANG Shuyong (IZAS); 1 male, jintang, 1943.V.9, leg. K. O, V. Lieu (IZAS); 1 female, Guanxian, Qingchengshan, alt. 700–1600 m, 1963.V.4, leg. ZHANG Xuezhong (IZAS); 1 female, Fengjiexian, 1980.VI.30, leg. QIAN Yuanzhi (IZAS);
**Figure 5:** Habitus, holotype. (a) *Linda gracilicornis* Pic, 1907, male, from Yunnan. (b) *Linda major* Gressitt, 1942, female, from Anhui. 1. dorsal view. 2. lateral view. h: head, in frontal view. Scale 2 mm.

**Figure 6:** Habitus, *Oberea holatripennis* Breuning, 1982. (a) Holotype, female, from Beijing. (b) “Paratype,” male, from Beijing, may be *Linda atricornis* Pic, 1924. 1: dorsal view; 2: lateral view; h: head, in frontal view. Scale 2 mm.

1 female, Yuechi, 1981.VIII.7, leg. LUO Dongming (IZAS); 1 female, Kangding, alt. 2500 m, 1983.VI.26, leg. WANG Shuyong (IZAS); 1 male, Kangding, 10 km North, alt. 2600 m, 1992.VII.9, leg. G. C. Bozano (CPS); 1 female, Xingou, 180 km S.W of Chengdou, alt. 1600 m, 1991.VII.16, leg. E. Giacomazzo (CPS); 2 females, Su-Tchuen, Si`ao-Lou, 1897 (MNHN, ex Coll. R. Oberthür, 1952); 2 females, Si`ao-Lou, 1901/1904, leg. Chasseurs du P. Dejean (MNHN, ex Coll. R. Oberthür, 1952); 2 females, Si`ao-Lou-Lou-Chan, 1897, leg. Chasseurs Thibétaux (MNHN, ex Coll. R. Oberthür, 1952); 1 male 1 female (holotype of *Linda gracilicornis* m. *tatsienlui* Breuning, 1954), Szetschuan, Tatsienlu (MHNG, ex Coll. S. Bruning, ex Coll. Reitter); 3 males 4 females, Su-Tchuen, 1903, leg. Chasseurs Indignes (MNHN, ex Coll. R. Oberthür, 1952).

**Fujian:** 1 male, Foochow (MHNG).

**Shaanxi:** 1 male, Qinlingshan, 6 km East of Xunyangba, alt. 1000–1300 m, 2000.V.23–VI.13, leg. C. Holzschuh (CCH); 1 male, Danfeng, NE env., alt. 900–1500 m, 1995.V.28–29, leg. L. & R. Businsky (CCH); 1 male, Shaanxi (IZAS).

**Hebei:** 2 males, Beijing, Sanpu, 1964.VII.9, leg. LIAO Subai (IZAS); 1 female, Beijing, Sanpu, alt. 550 m, 1972.VII.4, leg. JIANG Shengqiao (IZAS); 1 male, Beijing,
4. Discussion

Including the new species described above, there are four species of subgenus Linda with elytra and antennae all black. They are Linda atricornis, L. subatricornis, L. gracilicornis, and L. major. L. gracilicornis Pic, 1907[17], was described based on one male from Yunnan. The holotype (Figure 5(a1), 5(a2), and 5(a)h deposited in MNHN) is in bad condition, with mud covering the punctures. It is very difficult to conclude if L. major Gressitt, 1942[18] (Figure 5(b1), 5(b2), and 5(b)h deposited in SYSU) is a synonym of L. gracilicornis or a separate species. In the keys by Gressitt [7, 9, 10], L. gracilicornis “Elytra irregularly punctured; body slender; antennae relatively slender and as long as body,” while L. major “Elytra subregularly punctured, body more or less stout; antennae relatively thick and shorter than body; elytra with round punctures; femora entirely testaceous and length over 20 mm,” descriptions which did not well match with the types. Before enough material are available for further study, we consider them as two different species and L. major differs from L. gracilicornis by pronotum quite smooth, without accidented tubercles, elytral punctures denser, and more irregular. One male from Sichuan (Figure 7(a)) and one female from Guangxi (Figure 7(b) and 7(b)h) are identified as L. cf. gracilicornis, while one female from Zhejiang (Figure 7(c)) as L. cf. major according to above consideration. We wait for more material especially specimens from the type localities to make a better conclusion.

Based on the holotype (MNHN, ex Coll. J. Thomson, 1952, ex Musaeo ARM. DAVID, 1900), Oberea holatripennis Breuning, 1982[19], from Beijing (Figure 6(a1), 6(a2), 6(a)h) is similar to L. atricornis but can be separated by the denser and irregular elytral punctures, and the pronotum with three visible swollen. The “paratype” (Figure 6(b1) and 6(b)h, determined by Breuning, deposited in MHNG, ex Musaeo Arm. David, 1900) is possibly a male of L. atricornis. More material and genitalia dissections are needed for further study.

Acknowledgments

The authors are grateful to Gérard Tavakilian and Olivier Montreuil (MNHN), Carolus Holzschuh (CCH, Villach, Austria), Alain Drumont and Patrick Grootaert (IRSNB), Carlo Pesarini (CPS), Giulio Cuccodoro and Bernard Landry (MHNG), Hong Pang, Lizhong Hua, Fenglong Jia, and Binglan Zhang (SYSU) for providing access to the collections and loan of specimens. They thank Laurence Livermore (The Natural History Museum, London, UK) for improving the English language. This research was supported by a Grant (no. O529YX5105) from the Key Laboratory of the Zoological Systematics and Evolution of the Chinese Academy of Sciences, and by NSFC Program J0930004 and 31000967.

References


