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Li-Mei Li, Ya-Qing Qi, Yan Li, Hao-Yu Liu*. A CONTRIBUTION TO MORPHOLOGY OF THE FEMALE REPRODUCTIVE ORGANS OF FIVE CRICKET SPECIES (ORTHOPTERA: GRYLLOIDEA). – Far Eastern Entomologist. 2016. N 323: 7-13.

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Summary. The female reproductive organs of five cricket species, *Loxoblemmus doenitzi* Stein, 1881, *L. equestris* Saussure, 1877, *Teleogryllus occipitalis* (Serville, 1838), *Dianemobius fascipes nigrofasciatus* (Matsumura, 1904) and *Oecanthus rufescens* Serville, 1838, are described in detail and provided with photos.

Key words: Orthoptera, Grylloidea, morphology, female reproductive organs.

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Резюме. Впервые приведены фотографии и детальные описания репродуктивной системы самок 5 видов сверчков: *Loxoblemmus doenitzi* Stein, 1881, *L. equestris* Saussure, 1877, *Teleogryllus occipitalis* (Serville, 1838), *Dianemobius fascipes nigrofasciatus* (Matsumura, 1904) и *Oecanthus rufescens* Serville, 1838.

INTRODUCTION

The primary aim of the present work is to illustrate in detail the female reproductive organs of *Loxoblemmus doenitzi* Stein, 1881, *L. equestris* Saussure, 1877, *Teleogryllus occipitalis* (Serville, 1838), *Dianemobius fascipes nigrofasciatus* (Matsumura, 1904) and *Oecanthus rufescens* Serville, 1838. Three years ago, their male reproductive organs are described and illustrated (Liu *et al.*, 2013). The structure of the female reproductive organs of Orthoptera in general has been described by Walker (1919), Snodgrass (1933, 1935), and Qadri (1940). Though extensive studies have been done on the reproductive organs among the various orthopeterous insects, yet only a few focuses on the reproductive organs of Grylloidea (Spann, 1934; Gupta, 1948; Rakshpal, 1961; Narula, 1968; Nandchahal, 1972; Wu & Zhao, 2001).

MATERIAL AND METHOD

The insects were collected from Baoding (Mancheng) and Shijianzhang (Jinxian), Hebei Province, China. The studied materials are deposited in the Museum of Hebei University, Baoding, China (MHBU). The alive specimens were killed in 75% alcohol and then immediately submerged with enough 5% saline. The specimens were dissected and measured in less than 10 min. The dissections and measurements of the various organs of the insect were carried out under the stereomicroscope Nikon SMZ 1500. All photos were taken using a Leica M 205A microscope and edited in the Adobe Photoshop 8.0.1. Values are mean (\pm SE) number of 5 specimens, which are analyzed by SPSS 13.0. (Liu, Li & Yang, 2013).

The abbreviations used in the photos are as follows: ovary (O), lateral oviduct (Lo), common oviduct (Co), spermatheca (Sp), spermathecal tube (St), accessory gland (Ag), ovipositor (Ov).

DESCRIPTIONS OF FEMALE REPRODUCTIVE ORGANS

The female reproductive organs of crickets comprise a pair of ovaries, a pair of lateral oviducts, a common oviduct, a bunch of accessory gland tubules, a spermatheca, a spermathecal tubule and an ovipositor. Each ovary consists of many cylindrical ovarioles, lying both sides of the alimentary canal. Basal portion of each ovary opened into a slender lateral oviduct, two lateral oviducts converged into a short and thick common oviduct. The dorsal side of common oviduct provided with a bunch of accessory gland tubules, tubules differ in length and thickness. Accessory gland tubules extended into a long and thin spermathecal tube, in the end of which connected with a spermatheca. Ovipositor located in the bottom and strongly sclerotized.

***Loxoblemmus doenitzi* Stein, 1881**

Fig. 1

Ovaries funnel-shaped, consist of several cylindrical ovarioles, ovarioles light yellow, long-cylindrical, each ovary measures 5.16 ± 0.51 mm in length and 4.0 ± 0.36 mm in breadth. Basal portion of each ovary opened into a slender lateral oviduct, lateral oviduct milky white, long and thin, each lateral oviduct measures 1.75 ± 0.31 mm in length. Two lateral oviducts converged into a slightly short and thick common oviduct, which lies in accessory gland tubules and measures 1.41 mm in length. Spermatheca milky white, axiolitic, surrounded with a transparent membranous sheath and connected with a slender milky white spermathecal tube, which opened into accessory gland tubules. Basal portion of ovipositor extended into a bunch of accessory gland tubules, the tubules vary from 0.47 mm to 1.18 mm in length, 0.05 mm to 0.21 mm in breadth. Ovipositor spear-shaped.

***Loxoblemmus equestris* Saussure, 1877**

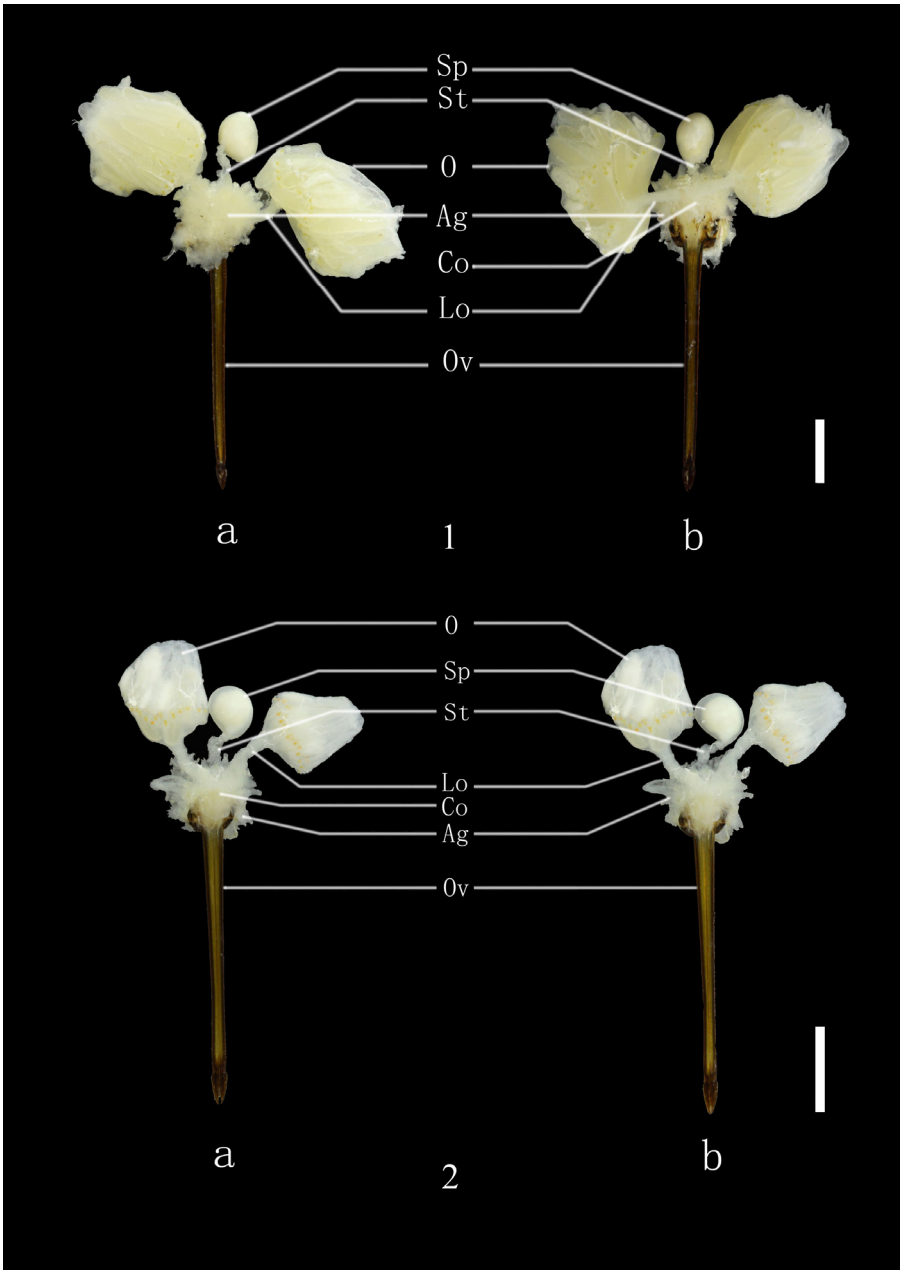
Fig. 2

Ovaries funnel-shaped, consist of several cylindrical ovarioles, ovarioles light yellow, long-cylindrical, each ovary measures 4.42 ± 0.91 mm in length and 3.10 ± 0.48 mm in breadth. Basal portion of each ovary opened into a slender lateral oviduct, lateral oviduct milky white, long and thin, each lateral oviduct measures 1.68 ± 0.27 mm in length. Two lateral oviducts converged into a slightly short and thick common oviduct, which lies in accessory gland tubules and measures 1.22 mm in length. Spermatheca milky white, axiolitic, surrounded with a transparent membranous sheath and connected with a slender milky white spermathecal tube, which opened into accessory gland tubules. Basal portion of ovipositor extended into a bunch of accessory gland tubules, which vary from 0.26 mm to 0.80 mm in length, 0.07 mm to 0.30 mm in breadth. Ovipositor spear-shaped.

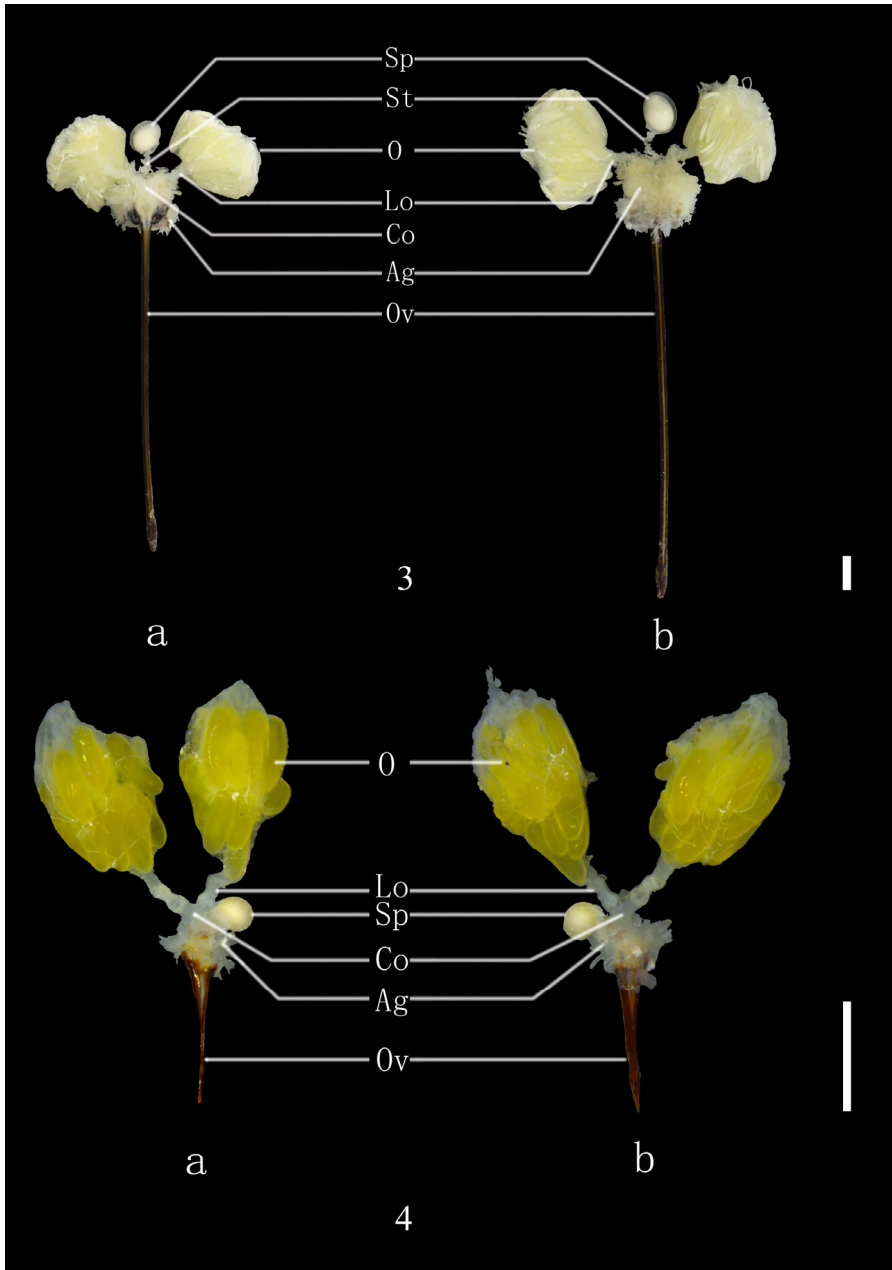
***Teleogryllus occipitalis* (Serville, 1838)**

Fig. 3

Ovaries funnel-shaped, consist of several cylindrical ovarioles, ovarioles light yellow, long-cylindrical, each ovary measures 4.82 ± 0.42 mm in length and 5.72 ± 0.83 mm in breadth.



Figs. 1–2. Female reproductive organs (a – dorsal view; b – ventral view). 1 – *Loxoblemmus doenitzi* Stein, 1881; 2 – *L. equestris* Saussure, 1877. Scale bars: 2.0 mm.



Figs. 3–4. Female reproductive organs (a – dorsal view; b –ventral view). 3 –*Teleogryllus occipitalis* (Serville, 1838); 4 – *Dianemobius fascipes nigrofasciatus* (Matsumura, 1904). Scale bars: 2.0 mm.

Basal portion of each ovary opened into a slender lateral oviduct, lateral oviduct milky white, long and thin, each lateral oviduct measures 2.11 ± 0.30 mm in length. Two lateral oviducts converged into a slightly short and thick common oviduct, which lies in accessory gland tubules and measures 1.17 mm in length. Spermatheca milky white, axiolitic, surrounded with a transparent membranous sheath and connected with a slender milky white spermathecal tube, which opened into accessory gland tubules. Basal portion of ovipositor extended into a bunch of accessory gland tubules, which vary from 0.39 mm to 2.17 mm in length, 0.07 mm to 0.26 mm in breadth. Ovipositor spear-shaped.

***Dianemobius fascipes nigrofasciatus* (Matsumura, 1904)**

Fig. 4

Ovaries funnel-shaped, consist of several cylindrical ovarioles, ovarioles orange, short-cylindrical, each ovary measures 2.82 ± 0.23 mm in length and 1.79 ± 0.14 mm in breadth. Basal portion of each ovary opened into a slender lateral oviduct, lateral oviduct milky white, long and thin, each lateral oviduct measures 1.12 ± 0.19 mm in length. Two lateral oviducts converged into a slightly short and thick common oviduct, which lies in accessory gland tubules and measures 0.69 mm in length. Spermatheca grayish yellow, spheroidal, connected with a slender milky white spermathecal tube, which opened into accessory gland tubules. Basal portion of ovipositor extended into a bunch of accessory gland tubules, which vary from 0.31 mm to 0.75 mm in length, 0.07 mm to 0.12 mm in breadth. Ovipositor sword-like.

***Oecanthus rufescens* Serville, 1838**

Fig. 5

Ovaries funnel-shaped, consist of several cylindrical ovarioles, ovarioles orange, long-cylindrical, each ovary measures 4.57 ± 0.19 mm in length and 2.44 ± 0.21 mm in breadth. Basal portion of each ovary opened into a slender lateral oviduct, lateral oviduct milky white, long and thin, each lateral oviduct measures 1.55 ± 0.07 mm in length. Two lateral oviducts converged into a slightly short and thick common oviduct, which lies in accessory gland tubules and measures 0.58 mm in length. Spermatheca brilliant yellow, spheroidal, connected with a slender milky white spermathecal tube, which opened into accessory gland tubules. Basal portion of ovipositor extended into a bunch of accessory gland tubules, which vary from 0.67 mm to 1.10 mm in length, 0.07 mm to 0.16 mm in breadth. Ovipositor paralleled.

DISCUSSION

The results show that the form and structure of the female reproductive organs of the five crickets are similar to each other, but they differ in the length and breadth of ovaries, lateral oviducts, common oviduct and accessory gland tubules. Besides, the shape of spermatheca of *Loxoblemmus doenitzi*, *L. equestris* and *Teleogryllus occipitalis* are all milky white, axiolitic, surrounded by membranous sheaths, while, *Dianemobius fascipes nigrofasciatus* is grayish yellow, spheroidal and *Oecanthus rufescens* is brilliant yellow, spheroidal, the latter two are not sheathed by membrane. Moreover, the ovipositor of *Loxoblemmus doenitzi*, *L. equestris* and *Teleogryllus occipitalis* are spear-shaped, but *Dianemobius fascipes nigrofasciatus* is sword-like, and *Oecanthus rufescens* is paralleled. Additionally, a long and thick accessory gland tubule present in *Oecanthus rufescens*, while similar thin accessory gland tubules exist in other studied species.

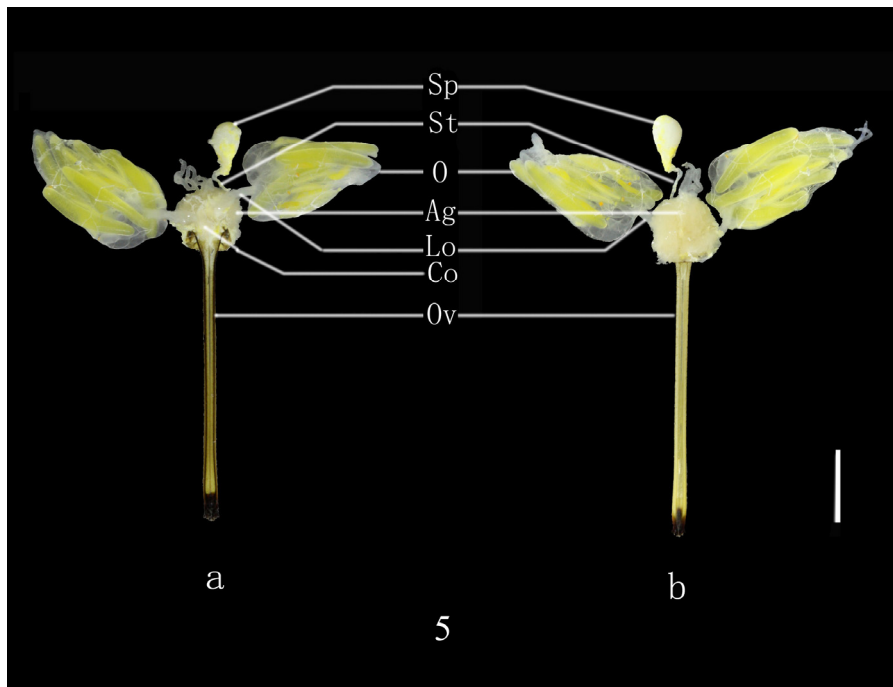


Fig. 5. Female reproductive organs of *Oecanthus rufescens* Serville, 1838. (a – dorsal view; b – ventral view). Scale bar: 2.0 mm.

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