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Reticularisus Wu, Wu & Han, a new subgenus of the genus *Rhamnosa* Fixsen, 1887 from China, with description of a new species (Lepidoptera: Limacodidae)

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Abstract

A new subgenus, *Reticularisus* Wu, Wu & Han, subgen. n., with type species *Rhamnosa henanensis* Wu, 2008, of the genus *Rhamnosa* Fixsen, 1887 is described and illustrated. For the sake of contrast, the type species of the other two subgenera in this genus have been given, including adults and male genitalia. *Rhamnosa* (*Reticularisus*) *shierbeihoua* Wu, Wu & Han, sp. n., a Limacodidae collected from the southwest of China is described as new to science. Also, the new species is illustrated with images of the adult and male genitalia and compared with the similar species *Rh. henanensis*.
KEY WORDS: Lepidoptera, Limacodidae, *Reticularisus*, new subgenus, new species, taxonomy, China.

***Reticularisus* Wu, Wu & Han, un nuevo subgénero del género *Rhamnosa* Fixsen, 1887 de China, con descripción de una nueva especie (Lepidoptera: Limacodidae)**

Resumen

Se describe e ilustra un nuevo subgénero, *Reticularisus* Wu, Wu & Han, subgen. n., con la especie tipo *Rhamnosa henanensis* Wu, 2008, del género *Rhamnosa* Fixsen, 1887. Para contrastar, se da la especie tipo de los otros dos subgéneros en este género, incluyendo los adultos y la genitalia del macho. Se describe como nueva para la ciencia a *Rhamnosa (Reticularisus) shierbeihoua* Wu, Wu & Han, sp. n., un Limacodidae capturado del suroeste de China. También la nueva especie es ilustrada con imágenes del adulto y genitalia del macho y comparada con la especie similar *Rh. henanensis*.
PALABRAS CLAVE: Lepidoptera, Limacodidae, *Reticularisus*, nuevo subgénero, nueva especie, taxonomía, China.

Introduction

The genus *Rhamnosa* Fixsen, 1887, was based on the type species *Rh. angulata* Fixsen, 1887 from Korea. Before 1933, at least 8 species of this genus were described, all of which came from Asia, including China, Korea and India (FIXSEN, 1887; HERING, 1931, 1933; MATSUMURA, 1931). However, in the next 80 years, no new species of this genus have been described. In 2008, Wu described a species: *Rh. henanensis* Wu, 2008 from Henan Province, China; in the second year, Wu and Fang reviewed the species of *Rhamnosa* from China and reported 8 species distributed in China, including 2 new species: *Rh. bifurcivalva* Wu & Fang, 2009, syn. n. (male = *Thosea sinensis* (Walker, 1855), female = *Rhamnosa uniformoides* Wu & Fang, 2009) and *Rh. uniformoides* Wu & Fand, 2009 (WU, 2008; WU & FANG, 2009).

SOLOVYEV & WITT (2009) divided this genus into two subgenera based on the characteristics of the appearance and male genitalia: *Rhamnosa* Fixsen, 1887 and *Caniodes* Matsumura, 1927; at the same time, he improved the taxonomic status of the subspecies *Rh. angulata kwangtungensis* Hering, 1931 to make it an independent species *Rh. kwangtungensis* Hering, 1931. Afterwards, SOLOVYEV & DUBATOLOV (2015) designated *Rh. angulata kwangtungensis* Hering, 1931 as a synonym for *Rh. hatita* (Druce, 1896). Among 'The catalog of the Limacodidae moths of Taiwan', Solovyev making *Caniodes takamukui* Matsumura, 1927, *Cania notodonta* Hampson, 1897 and *Rh. uniformis rufina* Hering, 1931 as a synonym of *Rh.* (*Caniodes*) *uniformis* (Swinhoe, 1895) (SOLOVYEV, 2017).

Currently, the genus includes eight species, ranging from India to China, Vietnam, Korea and Russia, seven of which are distributed in China. In this study, a new species collected from the southwest of China was described. However, after careful comparison, this new species and its similar one, *Rh. henanensis* Wu, 2008, cannot completely match the currently known subgenera in appearance and male genitalia. Therefore, we formally establish the third subgenus *Reticularisus* based on these two species herein.

Material and methods

The specimens were collected using the illumination of a 220V/450W mercury light and DC black light in Guizhou Province and Chongqing Municipality, China. Standard methods for dissection and preparing of the genitalia slides were used (described by KONONENKO & HAN, 2007). The specimens were photographed using a Nikon D700 camera while the genitalia slides were captured using an Olympus photo microscope aided by Helicon Focus software and then further processed using Adobe Photoshop CS6. The type material of the new species is deposited in the collection of the Northeast Forestry University (NEFU), Harbin, China.

Taxonomic account

Genus *Rhamnosa* Fixsen, 1887
Rhamnosa Fixsen, 1887. *In* Romanoff, *Mem. Lepid.*, **3**: 339
Type species: *Rhamnosa angulata* Fixsen, 1887
Caniodes Matsumura, 1927. *J. Coll. Agri. Hokkaido imp. Univ*., **19**: 91
Type species: *Caniodes takamukui* Matsumura, 1927
Rnamnopsis Matsumura, 1931. *Ins. Mats.*, **5**: 101
Type species: *Rhamnopsis arizanella* Matsumura, 1931

The genus is similar in appearance to the genus *Cania* Walker, 1855 by the forewing has two distinct lines running from the costal margin to the inner margin, but in *Rhamnosa* Fixsen, 1887, the male antennae bipectinated almost till the apex, the middle of the inner margin has a dentiform tuft with an incision near the turnus; the base of the R_1 is strongly curved, and the terminal 2/3 is close to the Sc; R_5 and R_3+R_4 are stalked. The M_1 and Rs of the hindwing is stalked; Sc+ R_1 originate from the base of the discal cell. The male genitalia are characterized by slender phallus; the vesica contains a long row of hair-like cornuti with large apical area of cornuti.

Descriptions of new subgenus and new species

***Reticularisus* Wu, Wu & Han, subgen. n.** (Figs 2-5)
Type species: *Rhamnosa henanensis* Wu, 2008, here designated.

Description: The subgenus characterized by the ground color of forewing is pale yellow, covering with reddish-brown scales on the surface. The antemedial and postmedial lines are entire, not parallel, straight, dark, running from the wing margin near the apex to the inner margin. The venation of forewing is obvious dark brownish red to brown. The hindwing is usually paler. The apical areas in

both wings are dark (Figs 2, 4). The male genitalia are diagnostic with the apical part with massive tiny spines, the basal part flat, with the sclerotized lateral process or not. The saccus is short. The valva is without basal process (Figs 3, 5).

Etymology: The name *Reticularisus* refers to the lines on the forewings that are reticulated, from Latin *"reticularis*".

Distribution: China.

Diagnosis: The subgenus is distinguished from other known subgenera by the unparallel antemedial and postmedial lines, and obvious dark brownish red to brown venation of forewing in the adults; by the apical part of juxta with massive tiny spines, and the valva without basal process in the male genitalia. In the subgenus *Rhamnosa*, the antemedial and postmedial lines of forewing are entire, almost parallel (Fig. 6); the male genitalia with long and strong, up-curved basal process; the saccus is long; the juxta with long medial and shorter, horn-shaped lateral process (Fig. 7). In the subgenus *Caniodes*, the antemedial and postmedial lines of forewing are not entire, dotted, almost parallel (Fig. 8); the male genitalia with short and hairy apically basal process; the saccus is short; the juxta with long lateral process bearing a long, slender, curved process (Fig. 9).

***Rhamnosa* (*Reticularisus*) *shierbeihoua* Wu, Wu & Han, sp. n.** (Figs 2, 3)

Material: Holotype ♂, China, Guizhou Province, Zunyi City, Shierbeihou scenic spots, Shuanghe village, 3-5-VIII-2020, H. L. Han, J. Wu leg., genitalia No. WuJ-301-1, coll. NEFU. Paratypes: 2 ♂♂, same data as for holotype, coll. NEFU; 1 ♂, China, Chongqing Municipality, Mt. Simian, 23-VII-6-VIII-2018, G. X. Wang, W. J. Li leg., genitalia No. WuJ-277-1, coll. NEFU; 1 ♂, Chongqing Municipality, Mt. Simian, 24-VII-4-VIII-2019, T. T. Zhao, S. C. Deng leg., genitalia No. WuJ-278-1, coll. NEFU.

Description: Wingspan 25-27mm in male. Head vertex densely covered with reddish-brown scales; labial palpus brown; the male antenna bipectinated almost to the apex. Thorax mainly reddish-brown covered with pale yellow scales; tegula pale yellow. The forewing base color is pale yellow, mixed massive reddish-brown scales; the costal and outer margin near the apex is reddish-brown to black; there are two oblique, dark lines running from the outer margin where near the apex, to the inner margin, one of which is to the 1/3, and another to the 2/3 from the wing base; venation of forewing obvious, dark brown; terminal line distinct, dark brown to yellowish-brown; fringe long, dark brown at the apex and gradually turn pale yellow towards the turnus; the dentiform tuft is located between the two oblique dark lines at the inner margin of the forewing, mixed pale yellow and reddish-brown. The hindwing ground color is pale yellow without pattern; the terminal line and fringe at the apex is dark brown. The abdomen dorsally pale yellow to grayish-white, with yellow annular hairs between the abdomere.

Male genitalia: Uncus with an acute and strongly sclerotized apex; gnathos burly, hook-shaped; tegumen long. Valva long, the middle part is the widest, and there are a large number of hairs on the whole surface; costa simple, straight, subterminal slightly concave; sacculus curved in an arc-shaped, slightly sclerotized at the base, with an unobvious process, without sacculus process; cucullus rounded. Juxta obviously divided into two parts, the apical part Y-shaped, with massive tiny spines; the basal part flat, sclerotized. Vinculum ring-shaped. Saccus inconspicuous. Phallus slender, longer than valva, strongly bent and forms almost a right angle at the 1/3 near the caecum; caecum thick, gradually thinner towards the terminal, end of phallus with a ring composed of long spines.

Female: Unknown.

Diagnosis: The new species is very similar to *Rh. henanensis* in appearance but can be distinguished from the latter by the position of the two oblique dark lines on the forewing. In *Rh. shierbeihoua*, these two lines are touching at the outer margin near the apex, but in *Rh. henanensis*, which touching at the costal margin near the apex. The difference between these two species is particularly obvious in the male genitalia. The new species can be separated from *Rh. henanensis* by the following characters (*Rh. henanensis* details are between parentheses): the gnathos is smooth (suddenly narrowed near the apex); the apical part of juxta is Y-shaped with massive tiny spines, the

basal part without lateral plate (the apical part is not Y-shaped, the lateral side of the basal part is strongly sclerotized, with a saw-toothed plate at the terminal of the sclerotized area); phallus strongly bent and forms almost a right angle at the 1/3 near the terminal, end of phallus with a ring composed of long spines (slightly curved near the caecum, the end of phallus without any spines).

Distribution: China (Guizhou, Chongqing) (Fig. 1).

Etymology: The species is named for its type-locality in Shierbeihou scenic spots, Zunyi City, Guizhou Province, China.

Fig 1.– Distribution map of *Rh.* (*Reticularisus*) *shierbeihoua* Wu, Wu & Han, sp. n.: Guizhou Province (triangle) and Chongqing Municipality (circle), China.

Bionomics: The moths fly in July and August. The specimens were collected with a light trap close to a mixed broadleaf-conifer forest and subtropical mixed forest (Figs 10-11).

Discussion

Currently, the genus contains 9 species, which are belong to three subgenera, but the taxonomic position of some of them is still unclear. The subgenus *Rhamnosa* includes 5 species: *R. angulata* Fixsen, 1887, *R. dentifera* Hering & Hopp, 1927, *R. hatita* (Druce, 1896), *R. convergens* Hering, 1931 and *R. arizanella* (Matsumura, 1931). The subgenus *Caniodes* includes 2 species: *C. uniformis* (Swinhoe, 1895) and *C. uniformoides* Wu & Fang, 2009. The new subgenus *Reticularisus* includes 2 species: *R. henanensis* Wu, 2008 and *R. shierbeihoua* Wu, Wu & Han, sp. n. Although, at present this genus is known to be only distributed in Asia, it has a wide range of distribution, with records from India to China, Vietnam, Korea and Russia.

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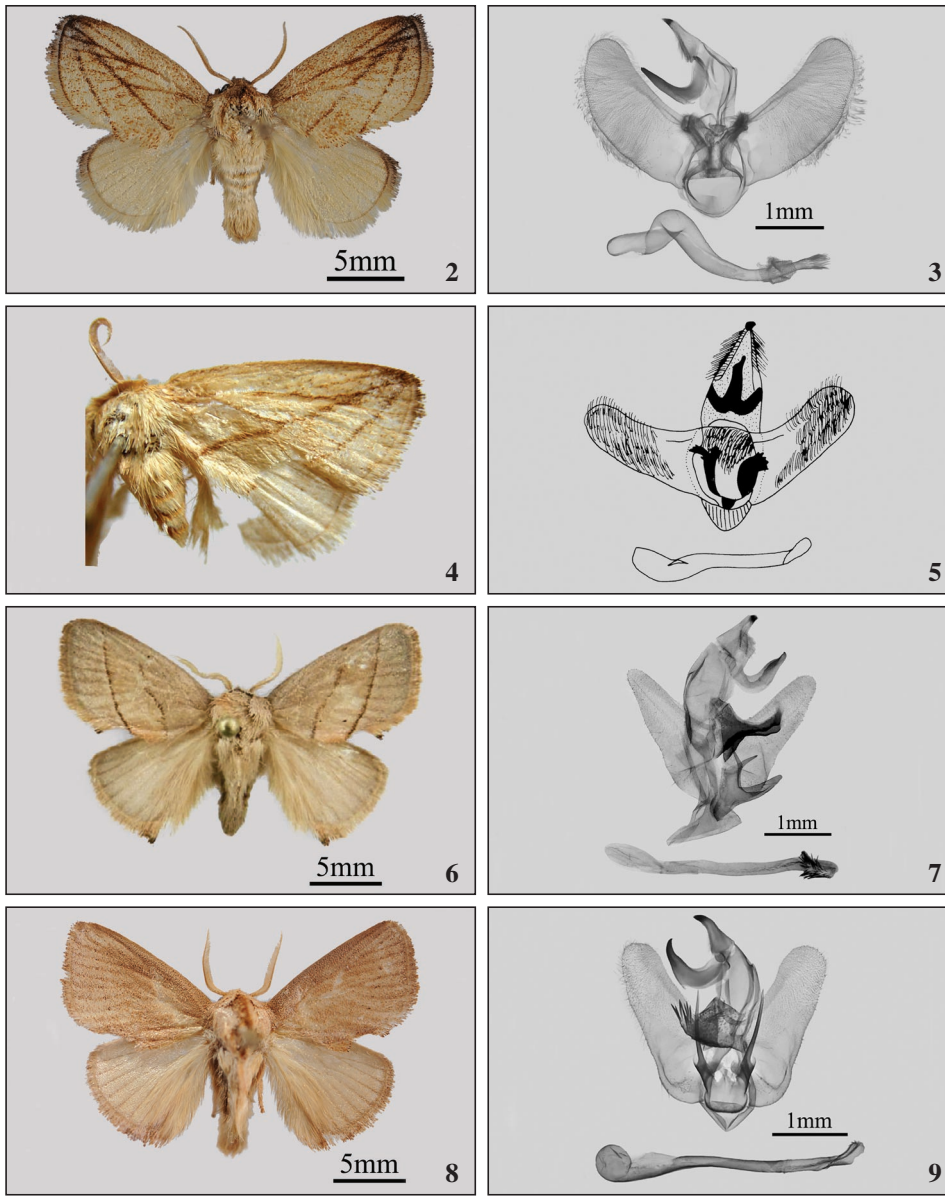

Figs 2-9.– 2-5. *Rhamnosa* (*Reticularisus*) spp., adults and male genitalia. **2-3.** *Rh.* (*Reticularisus*) *shierbeihoua* Wu, Wu & Han, sp. n., male, holotype. **4-5.** *Rh.* (*Reticularisus*) *henanensis* Wu, 2008, male, holotype. **6-9.** Type species of known subgenera of *Rhamnosa*, adults and genitalia, male. **6-7.** *Rh.* (*Rhamnosa*) *angulata* Fixsen, 1887 (after SOLOVYEV & DUBATOLOV, 2015). **8-9.** *Rh.* (*Caniodes*) *uniformis* (Swinhoe, 1895), Prov. Guangdong, China, genitalia No. WuJ-362-1. Scale bars: adults, 5 mm; male genitalia, 1 mm.

Figs 10-11.- 10. Guizhou Province, Zunyi City, Shierbeihou scenic spots, Shuanghe village: collecting site close to a mixed broadleaf-conifer forest with patches of grassland. **11.** Chongqing Municipality, Mt. Simian: collecting site close to a subtropical forest with massive shrubs growing in the ground cover layer of the forest.