

## Species of *Noduliferola* Kuznetsov (Lepidoptera: Tortricidae: Olethreutinae) in China

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**Abstract:** Two species of *Noduliferola* Kuznetsov are recorded. *Noduliferola insuetana* Kuznetsov is reported in China for the first time; *N. abstrusa* Kuznetsov is redescribed. A key to Chinese species is given. Photographs of adults and genitalia of the two species are provided. All the specimens examined are deposited in the Insect Collection, College of Life Sciences, Nankai University, Tianjin, China unless otherwise noted.

**Key words:** Ditrysia; Tortricoidea; taxonomy; key

中国节小卷蛾属 *Noduliferola* 记述 (鳞翅目: 卷蛾科: 新小卷蛾亚科)

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**摘要:** 记述节小卷蛾属 *Noduliferola* 2 种, 其中首次记述了越南节小卷蛾 *N. insuetana* Kuznetsov 在中国的分布, 重新描述了该属模式种节小卷蛾 *N. abstrusa* Kuznetsov。提供了 2 种的检索表、成虫图和外生殖器图。研究标本除特别提及外均保存在南开大学昆虫标本室。

**关键词:** 双孔次亚目; 卷蛾总科; 分类; 检索表

### Introduction

The genus *Noduliferola* was established by Kuznetsov in 1973. It currently contains ten species. *N. atriplaga* (Clarke, 1976), *N. phaeostropha* (Clarke, 1976) and *N. pleurogramma* (Clarke, 1976) are distributed in Micronesia. *N. hylica* (Diakonoff, 1984), *N. niphada* (Diakonoff, 1984) and *N. spiladorma* (Meyrick, 1932) are found in Indonesia. *N. abstrusa* Kuznetsov, 1973 is found in China. *N. insuetana* Kuznetsov, 1997 is in Vietnam. *N. neothela* (Turner, 1916) occurs in Australia and *N. marquesana* (Clarke, 1986) lives in the Marquesas Islands (Horak 2006; Baixeras, Brown & Gilligan 2003).

We report *N. insuetana* Kuznetsov, 1997 for the first time in China and newly describe *N. abstrusa* Kuznetsov. We provide a key to the Chinese species of *Noduliferola* based on characters of adult and male genitalia.

### Material and methods

This study is based on the examination of specimens collected by light traps from forests

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and mountains in China. Morphological terminology follows Brown & Powell (1991) as refined by Baixeras (2002). Genitalia dissection and slide-mounting methods follow Li (2002).

Images of the adults were taken with a Nikon D300 digital camera with a macro lens, and images of the genitalia were captured with an Olympus C-7070 digital camera attached to an Olympus BX51 microscope.

All specimens examined are deposited in the Insect Collection, College of Life Sciences, Nankai University, Tianjin, China unless otherwise mentioned.

## Taxonomy

### *Noduliferola* Kuznetsov, 1973

*Noduliferola* Kuznetsov, 1973, *Entomologicheskoe Obozrenie*, 52: 685.

*Duessia* Clarke, 1976, *Insects of Micronesia*, 9: 26.

*Microclita* Diakonoff, 1984, *Entomologica Basiliensia*, 9: 393.

Type species: *Noduliferola abstrusa* Kuznetsov, 1973.

General characters. Forewing with termen slightly concave below apex; costal margin gently curved throughout; chorda and M-stem absent; R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub> about equidistant, R<sub>4</sub> and R<sub>5</sub> stalked, R<sub>5</sub> to termen; male with a slender costal fold. Hindwing with Rs and M<sub>1</sub> stalked, base of M<sub>2</sub> bent to M<sub>3</sub>, M<sub>3</sub> and CuA<sub>1</sub> stalked or fused into a single vein that is connate with M<sub>2</sub>.

Male genitalia. Tegumen narrow. Uncus mound-like, triangular or bifid. Socius lateral or drooping, sometimes absent. Valva narrow at base, neck short; sacculus angle weak; cucullus large, sometimes bilobed, outer lobe membranous; a fold between tegumen and valva with large bundle of modified scales. Aedeagus short and simple, cornuti composed of a bunch of slender spines.

Female genitalia. Ostium large; sterigma broadly sclerotized ring-shaped, located near hind margin of sternum VII. Ductus bursae with a sclerotized plate, bifurcated and extending into corpus bursae; two signa present.

Distribution. Palearctic; Oriental; Australian Regions.

### Key to Chinese *Noduliferola* species

1. Forewing with median fascia indicated by a broad, oblique dark brown streak extending from middle of costa, then turning outward and reaching just beyond end of cell; uncus triangular with pointed tip; sacculus with a mound-like lobe on ventral edge of basal opening; cucullus armed with a cluster of spines near ventral angle..... *N. abstrusa*
- . Forewing without distinct median fascia; uncus mound-like; sacculus without mound-like lobe on ventral edge of basal opening; cucullus without a cluster of spines near ventral angle ..... *N. insuetana*

### 1. *Noduliferola abstrusa* Kuznetsov, 1973 (Figs. 1, 3, 5)

*Noduliferola abstrusa* Kuznetsov, 1973, *Entomologicheskoe Obozrenie*, 52: 685; Razowski, 1989, *Acta Zoologica Cracoviensia*, 32(7): 161; Razowski, 1999, *SHILAP Revista de Lepidopterología*, 27(108): 443; Kuznetsov, 2001, *Key to the Insects of Russian Far East*, 5(3): 338.

Adult (Fig. 1). Vertex with grayish brown scales, frons white. Antenna light brown. Labial palpus gray mixed with brown; terminal segment porrect, basal part concealed in the long scales of second segment. Thorax light brown, tegula with basal half brown and terminal

half gray. Forewing length 5.0–5.5 mm; ground color gray; costal fold in male slender, covering about costal half; basal and subbasal fasciae not forming a distinct basal patch, with many scattered brown dots; median fascia indicated by a broad, oblique dark brown streak extending from middle of costa, then turning outward and reaching just beyond end of cell; terminal fascia represented by a narrow brown streak extending from apex to middle of  $R_5$ ; a brown streak along termen. Costa with nine pairs of white strigulae from base to apex; each pair of strigulae with a short brown stria extending obliquely; first to fourth pairs between base of wing and the point where Sc meets costa; fifth and sixth pairs between Sc and  $R_1$  points; seventh, eighth and ninth pairs distributed between pairs of veins  $R_1$ - $R_2$ ,  $R_2$ - $R_3$ ,  $R_3$ - $R_4$  respectively; cilia gray except for brown on apex. Hindwing and cilia gray. Foreleg and midleg grayish brown, with brown scales on tarsi; hindleg gray.

Male genitalia (Fig. 3). Tegumen high and narrow, with a pair of small drooping horn-shaped sclerites; uncus triangular with pointed tip; socius lateral, with marginal hairs. Long scale-like hairs situated in lateral membrane of base of tegumen may be scent organ. Valva narrow at base; neck short, slightly narrower than base; sacculus with a mound-like lobe on ventral edge of basal opening; angle of sacculus obtuse-angled; cucullus bilobed; outer lobe membranous, extending distally; inner lobe hairy, armed with a cluster of spines near ventral angle, accompanied by a longer spine in its ventral area. Aedeagus broad and short; cornuti consisting of a bunch of spines.

Female genitalia (Fig. 5). Papilla analis narrow, setose; anterior apophysis about as long as posterior apophysis. Ostium large, trapeziform, surrounded by developed sterigma. Ductus bursae short, about 1/2 length of corpus bursae, with a sclerotized plate occupying anterior 2/3, bifurcated anteriorly and slightly extending into corpus bursae. Corpus bursae oval; two small spine-like signa present, with sclerotized basal plate.

**Specimens examined.** 3♂4♀, **China**, Henan, Jiyuan, 35.04°N, 112.35°E, 700 m, 03–04-VI-2000, Haili YU; 2♂, Meicai WEI, other data same as the former; 3♂, Henan, Huixian, 35.27°N, 113.47°E, 780 m, 12–13-VII-2002, Xinpu WANG; 1♂, Henan, Tongbai, 32.21°N, 113.24°E, 300 m, 11-IX-2000, Houhun LI, O Karsholt; 2♂1♀, Henan, Gushi, 32.10°N, 115.41°E, 120 m, 16-V-1995, Guangyun YAN; 2♂1♀, Hunan, Xiangtan, 27.47°N, 112.55°E, 20-VII-2004, Yunli XIAO; 1♂, Hunan, Taojiang, 28.32°N, 112.08°E, 27-VII-2004, Yunli XIAO; 1♀, Tianjin, Jixian, 40.02°N, 117.24°E, 180 m, 10-VI-2004, Houhun LI *et al.*; 1♀, Hebei, Yixian, 39.20°N, 115.30°E, 18-VII-2000, Haili YU (Genitalia slide Nos. ZAH03614♀, ZAH03615♂, ZAH03812♂, ZAH04228♂, LJM04015♂, LJM04144♂). And 10♂1♀, Shanxi, Manghe, Yangcheng, 35.29°N, 112.25°E, 14–17-VII-2012, Haiyan BAI & Chao CHEN (Genitalia slide Nos. ZAH00151♂, ZAH00152♀, deposited in Beijing University of Agriculture).

Distribution. China (Tianjin, Hebei, Shanxi, Jiangsu, Henan, Hunan); Japan.

Host plant. Verbenaceae: *Vitex rotundifolia* L. f (Nasu, Komai & Murase, 2005).

Remarks. Holotype ♂, Type locality: China, Kiangsu (Jiangsu), Lungtang (Longtan), near Nanking (Nanjing), deposited in MGAB (Muzeul de Istorie Naturala, “Grigore Antipa”, Bucuresti, Romania) (Brown 2005). Nasu, Komai & Morase (2005) described this species, with description of the adult female and immature stages and a biological note for the first time. We collected specimens from Tianjin and four provinces of China. There are some differences on adult forewing pattern among the specimens from China and Japan. In Chinese

specimens median fascia is indicated by a broad, oblique dark brown streak extending from middle of costa, then turning outward and reaching just beyond end of cell; terminal fascia are represented by a narrow brown streak extending from apex to middle of  $R_5$ . In Japanese specimens, a conspicuous dark brown semicircular patch is on the middle of forewing.

This species can be distinguished from other *Noduliferola* species by the sacculus with a mound-like lobe on the ventral edge of the basal opening and inner lobe of the cucullus accompanied by a longer spine in the ventral area. In the type specimen, the inner lobe of the cucullus is armed with two longer spines in its ventral area and other characters are the same. So we treat these little differences as variation among specimens from different geographical regions.

## 2. *Noduliferola insuetana* Kuznetsov, 1997 (Figs. 2, 4), new record to China

*Noduliferola insuetana* Kuznetsov, 1997, *Entomological Review*, 77(6): 725.

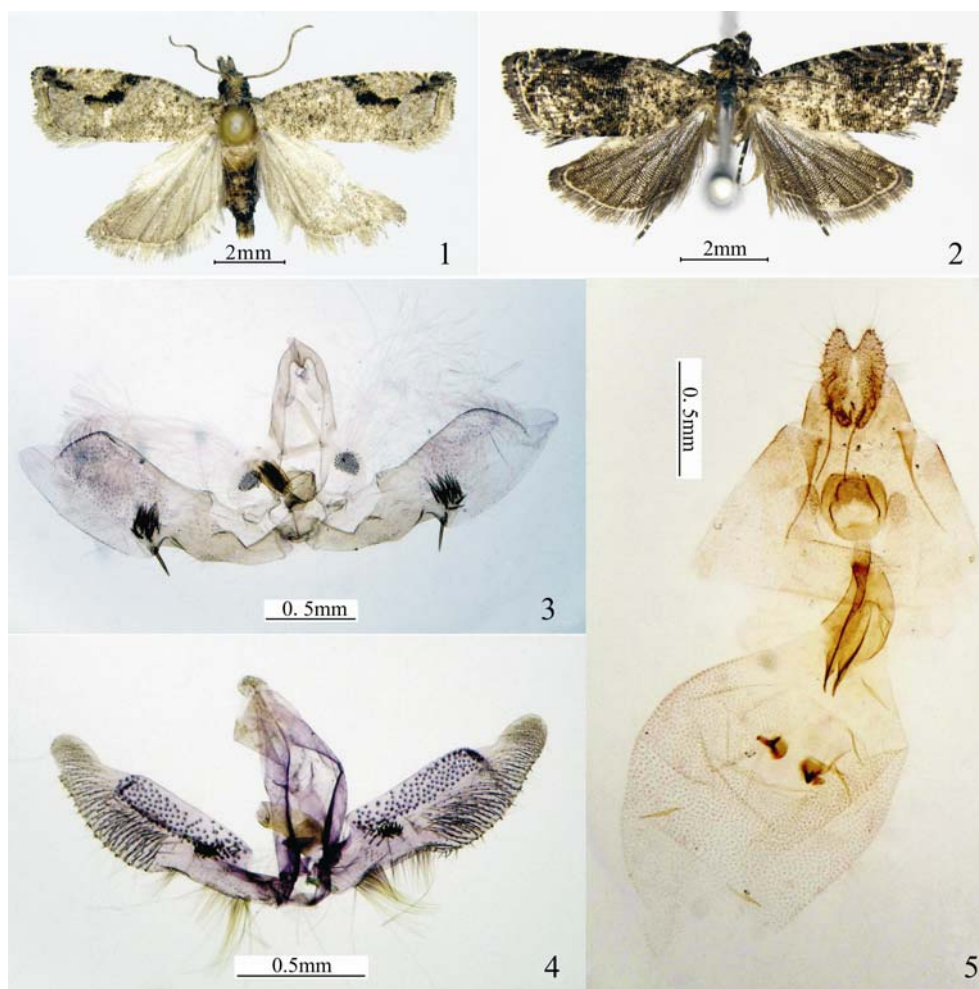
Adult (Fig. 2). Vertex with grayish brown scales, frons white. Antenna light brown. Labial palpus gray mixed with brown, terminal segment porrect, basal part concealed in the long scales of second segment. Thorax light brown, tegula with basal half brown and terminal half gray. Forewing length 4.0–5.0 mm; ground color dark gray, without distinct basal patch and median fascia; costal fold in male covered about half; forewing with basal 1/3 light brown, scattered with many brown dots; a dark brown triangular patch located below distal half of costa; ocellus elongated, silver-gray, surrounded by gray scales; costa with nine pairs of white strigulae from base to apex; first to fourth pairs between base of wing and the point where Sc meets costa; fifth and sixth pairs between Sc and  $R_1$  points, composed of only one short stria respectively, just like one pair of strigulae; distal three pairs distributed between pairs of veins  $R_1$ - $R_2$ ,  $R_2$ - $R_3$ ,  $R_3$ - $R_4$  respectively, confluent with each other and extending to termen; cilia dark gray. Hindwing and cilia dark gray. Foreleg and midleg grayish brown, with brown scales on tarsi; hindleg gray.

Male genitalia (Fig. 4). Uncus mound-like, haired; socius degenerate. Valva narrow at base, broad at about basal 1/3 ventrally; basal opening small, weakly developed; group of small spines located outer margin of basal opening; angle of sacculus absent; cucullus with row of chaetae and marginal spines and with a long distal lobe accompanied by hairs. Aedeagus relatively broad and short; cornuti deciduous.

**Specimens examined.** 3♂, **China**, Hainan, Bawangling, Changjiang, 19.16°N, 109.03°E, 600 m, 09–10-VI-2007, Zhiwei ZHANG & Weichun LI (Genitalia slide Nos. ZAH07005♂, ZAH10021♂).

Distribution. China (Hainan); Vietnam.

Remarks. Holotype ♂, with label: S. Vietnam, Prov. Gialai-Kontum, Tramlap, 20 km N Buenluoi, 900 m, 25-XI-1988, leg. V. Kuznetsov. Paratypes: 2♂, same locality, 25 and 27-XI-1988; deposited in ZMAS (Zoological Institute, Russian Academy of Sciences, St. Petersburg (Leningrad), Russia) (Brown, 2005). In the male genitalia, uncus a broad mound, with some hairs, socius rudimentary, group of small spines located at outer margin of basal opening, cucullus large, with row of spines and with long distal lobe. This species is reported from China for the first time.



Figures. 1–5. Adults and genitalia of *Noduliferola* spp. 1. *N. abstrusa*, ♀; 2. *N. insuetana*, ♂; 3. *N. abstrusa*, slide no. ZAH03615, ♂; 4. *N. insuetana*, slide no. ZAH10021, ♂; 5. *N. abstrusa*, slide no. ZAH03614, ♀.

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