

The Revision of the Genus *Estagrotis* NYE, 1975 (Lepidoptera, Noctuidae, Xylenini)

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Abstract. The genus *Estagrotis* NYE, 1975 is reviewed and three new genera (*Chinagrotis* gen. nov., *Plantagrotis* gen. nov. and *Dilagrotis* gen. nov.), one new subgenus (*Altagrotis* subgen. nov.), six new species (*Estagrotis romani* spec. nov., *Chinagrotis cinnamona* spec. nov., *Plantagrotis dvoraki* spec. nov., *Plantagrotis zubaciki* spec. nov., *Plantagrotis eno* spec. nov. and *Dilagrotis stumpfi* spec. nov.) and one new subspecies (*Dilagrotis stumpfi plyta* subspec. nov.) from China are described. The male genitalia of *Plantagrotis gemina* (HREBLAY & RONKAY, 1995) comb. nov. and the female genitalia of *Chinagrotis tibori* (HREBLAY & RONKAY, 1998) comb. nov. are described and illustrated. A checklist of all included genera is presented.

Key words Lepidoptera, Noctuidae, Xylenini, *Estagrotis*, revision, new genus and subgenus, new species, Himalaya, Nepal, China.

Introduction

Since 1975 when NYE first applied the generic name *Estagrotis* to the species *Gortyna cuprea* (MOORE, 1867), seven new species were added through papers dealing with Himalayan Noctuidae, but no publication has been dedicated solely to this genera. The first of these papers by HACKER and RONKAY (1993) examined male and female genitalia of the four species of *Estagrotis* known at that time and noted their close relation to *Himalistra* HACKER & RONKAY, 1993. Subsequent papers included a paper by HREBLAY and RONKAY in 1995, which denominated *Estagrotis* as the sister genus of *Himalistra* with five species belonging to three different lineages and 1998 papers by GYULAI & RONKAY and HREBLAY & RONKAY, which eventually provided a checklist of the genus with eight species and two subspecies. Providing convincing support for positions taken in these papers was made difficult by a lack of available specimens including males or females of some species.

Recent collecting expeditions to the mountainous areas of China's Sichuan and Yunnan provinces (2009-2013) provided much needed "*Estagrotis*" material, including six species new to science. Analysis of these specimens including their genitalia has improved our knowledge about this genus which had previously been considered to be exclusively Himalayan. A complete revision is provided which recognizes separate lineages classified into four genera and two subgenera intermediate between *Himalistra* and *Altipolia* PLANTE, 1985, but closer to the latter genus. *Himalistra*, *Altipolia*, *Estagrotis*, *Chinagrotis*, *Dilagrotis* and *Plantagrotis* form a generic complex under *Dasyptolia* GUENEE, 1852. It is hoped that this work will encourage further exploration of the primarily late autumnal Himalayan Noctuidae fauna.

Materials and methods

The moths were collected at night using ultraviolet lights. Numerous genitalia dissections following the technique of Lafontaine (2004) were mounted in euparal on slides. The abdominal integuments were cut lengthwise, descaled, and also mounted on slides. A Wild M3Z microscope and Canon EOS 350D camera were used to prepare images.

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Abbreviations of depositories

AFM – collection of Alessandro FLORIANI (Milan, Italy)
BBT – collection of Balázs BENEDEK (Törökbalint, Hungary)
PGM – collection of Péter GYULAI (Miskolc, Hungary)
HSV – collection of Helmut SEIBALD (Vienna, Austria)
GBG/ZSM – Gottfried BEHOUNEK (Grafing, Germany) / Zoologische Staatssammlung, München (Germany)
MNHU – Museum für Naturkunde der Humboldt Universität zu Berlin (Germany)
NRCV – Nature Research Centre (Vilnius, Lithuania)
HNHM – Hungarian Natural History Museum, Budapest (Hungary)
BMNH – British Museum of Natural History, London (England)
TESRI – Taiwan Endemic Species Research Institute, Taipei (Taiwan)

Systematic part

Checklist for genera included:

Genus *Estagrotis* NYE, 1975

- *cuprea* (MOORE, 1867)
- *benescripta benescripta* HREBLAY & RONKAY, 1995
- *benescripta rai* HREBLAY & RONKAY, 1995
- *romani* BENEDEK & SALDAITIS **spec. nov.**

Genus *Chinagrotis* BENEDEK & SALDAITIS **gen. nov.**

- *tibori* (HREBLAY & RONKAY, 1998) **comb. nov.**
- *cinnamona* BENEDEK & SALDAITIS **spec. nov.**

Genus *Plantagrotis* BENEDEK & SALDAITIS **gen. nov.**

Subgenus *Plantagrotis* BENEDEK & SALDAITIS **subgen. nov.**

- *plantei* (HACKER & RONKAY, 1993) **comb. nov.**
- *zubacki* BENEDEK & SALDAITIS, **spec. nov.**
- *dvoraki* BENEDEK & SALDAITIS, **spec. nov.**
- *gemina* (HREBLAY & RONKAY, 1995) **comb. nov.**
- *roseosericea* (GYULAI & RONKAY, 1998) **comb. nov.**

Subgenus *Altagrotis* BENEDEK & SALDAITIS **subgen. nov.**

- *canescens* (HACKER & RONKAY, 1993) **comb. nov.**
- *canescens tibetana* (HREBLAY & RONKAY, 1995) **comb. nov.**
- *eno* BENEDEK & SALDAITIS, **spec. nov.**

Genus *Dilagrotis* BENEDEK & SALDAITIS **gen. nov.**

- *dilikoti* (HREBLAY & RONKAY, 1999) **comb. nov.**
- *stumpfi stumpfi* BENEDEK & SALDAITIS, **spec. nov.**
- *stumpfi plyta* BENEDEK & SALDAITIS, **subspec. nov.**

Genus *Estagrotis* NYE, 1975

Estagrotis NYE, 1975, The generic Names of Moths of the World, Volume 1, Noctuoidea (part): Noctuidae, Agaristidae, and Nolidae, page 188, objective replacement name for *Setagrotis* WARREN, 1912 (junior homonym of *Setagrotis* SMITH, 1890).
Type-species: *Estagrotis cuprea* (MOORE, 1867), type locality: India, West Bengal, Darjeeling.

Diagnosis. The genus *Estagrotis* consists of three species of varying colors which share very similar external and genital characters distinguishing them from related genera: antennae of males shortly bipectinate and ciliate, those of the females filiform; thorax robust; forewing moderately broad, triangular with characteristically acute apex; cilia finely crenulate. The ground colors are intensive orange on *cuprea*, shiny light chocolate brown on *benescripta* and reddish-brown on *romani* **spec. nov.** Wing patterns sharp, distinct, basal dash absent on *cuprea* and *romani*, nearly completely reduced on *benescripta*. Crosslines well-marked, double with large remarkable orbicular stigma and reniform, except on *romani*. The male and female genitalia of the species are all very similar, indicative of an intermedial phylogenetical position between *Altipolia* and *Himalistra*.

The long, elongated uncus, the elongated, hood-like tegumen, the presence of the medial process on the fulcrum, the elongated valvae, the configuration of the harpe and the broad carinal plate are all reminiscent of *Altipolia*, while the short and broad aedeagus, the short and broad shape of the vesica which is covered by fine spiculi closely resemble *Himalistra*. The short ovipositor and the wide, gently arched ostium bursae of the female genitalia are very similar to those of *Altipolia*, however, the corrugated and entirely strongly sclerotized ductus bursae approximate those of *Himalistra*.

Bionomics and distribution. The genus is essentially Southern Himalayan as *cuprea* is known from Nepal and Sikkim, *benescripta* is recorded only from Nepal and *romani* has recently been discovered in the isolated and remote mountain chains of Southwest Myanmar. *E. cuprea* appears as a very frequent autumnal Noctuidae species inhabiting the monsoon forest belt at lower and middle elevations, between 2000-2600 m, while *benescripta* inhabits the upper forest regions dominated by *Rhododendron* between 2900-3200 m. Adults are strongly attracted to lights, and worn females captured in February document the overwintering of *cuprea* and *romani*. The early stages and food plant are unknown.

***Estagrotis cuprea* (MOORE, 1867)**

(Plate 1, figs 1, 2; gen. fig. 1)

Gortyna cuprea (MOORE, 1867), Proc. zool. Soc. Lond., 1867: 50, plate 6. fig. 8. Syntypes: ♂, India, West Bengal, Darjeeling, (MNHU, Berlin).

Material examined: ♂, Nepal, Gandaki, Lamjung Himal, 4 km N of Yangzakot, 2450 m, 22. xi. 2011, leg. Balázs BENEDEK, slide No. JB2200♂, ♀, C. Nepal, Janakpur, Dolakha area, Thulopatal district, Salle village, 2250-2400 m, 5-8. ii. 2011, leg. Balázs BENEDEK, slide No. JB1826♀ (coll. BBT).

***Estagrotis benescripta benescripta* HREBLAY & RONKAY, 1995**

(Plate 1, figs 3, 4)

Estagrotis benescripta HREBLAY & RONKAY, 1995, Acta zool. Hung. 41: 244, figs 16, 17, 40, 43, type locality: West Nepal, Annapurna Himal, Holotype ♂, in coll. HNHM, Budapest.

***Estagrotis benescripta rai* HREBLAY & RONKAY, 1995**

(Plate 1, figs 5, 6; gen. fig. 2)

Estagrotis benescripta rai HREBLAY & RONKAY, 1995, Acta zool. Hung. 41: 245, figs 19, 20, 41, 44, 47, type locality: East Nepal, Taplejung area, Holotype ♂, in coll. HREBLAY, deposited in HNHM Budapest.

Material examined: Holotype ♂, Nepal, Taplejung area, Mt. Pathibhara, 3155 m, 13-14. x. 1994, slide No. MH6919♂, Paratype ♀, Nepal, Taplejung area, Mt. Pathibhara, 3155 m, 13-14. x. 1994, slide No. MH6920♀ (coll. HREBLAY in HNHM).

***Estagrotis romani* BENEDEK & SALDAITIS spec. nov.**

(Plate 1, fig 7, 8; gen. fig. 3)

Holotype: ♀, Myanmar, west, Chun State, Mt. Victoria, 2350 m, 1. ii. 2005, leg. LÖFFLER, slide No. JB2244♀ (coll. HSV).

Paratype: 2 ♀♀, Myanmar, west, Chun State, Junction, Mt. Victoria, 2600 m, 2. ii. 2005, leg. LÖFFLER, slide No. Gyp1878♀ (coll. BBT & PGM).

Diagnosis. The new species (Plate 1, fig 7, 8) is easily distinguishable from its congeners by its reddish-brown ground coloration and more finely marked wing patterns. The female genitalia (gen. fig. 3) is similar to those of *cuprea* (gen. fig. 1), but the papillae anales are slightly narrower, the dorsal plate of the ostium bursae is stronger and the ductus bursae is also somewhat narrower.

Description. Wingspan 35 mm, length of forewings 17 mm; female antennae filiform; head, front and thorax blackish, finely mixed with light scales; ground colour of forewing smooth reddish-brown with very fine dusting of light, sandy-brown scales; ante- and postmedial fascia double, sinuous, gently marked with light brownish scales; subterminal and terminal fascia single, yellowish; termen finely crenulated; reniform stigma large, oblong, medially narrower, filled with light yellowish and fine gray scales or with ground color; orbicular stigma large, elliptical, framed with light brown and filled with ground color; claviform indistinct, blackish, cilia long, darker, same color as thorax; hindwing dirty ash-grey with some yellowish gloss; terminal fascia yellow; cilia light reddish-brown.

The male is unknown.

Female genitalia (Fig. 3). Papillae anales elongated, conical in shape; ovipositor short; apophyses anteriores and apophyses posteriores short; ostium bursae wide, finely arched; ventral plate nearly separated into two parts with deep medial incision; ductus bursae moderately long, corrugated and entirely heavily sclerotized; cervix bursae well separated, elongate-conical in shape; corpus bursae large, elongated.

Bionomics and distribution. The species is known from the type locality only, nothing is known about the early stages and the food plant.

Etymology. The owner of the Holotype specimen wishes to dedicate this name to Mr. Roman EDER (Vienna, Austria).

Genus *Chinagrotis* BENEDEK & SALDAITIS gen. nov.

Type-species: *Chinagrotis tibori* (HREBLAY & RONKAY, 1998), Moths of Nepal, Part 5, page 197, plate 151, fig. 13, type locality: Taiwan, Prov. Nantou.

Diagnosis. The genus consists of two externally similar species that can be separated from related genera by their larger size (wingspan 43–45 mm) and broader forewings with acute apices. The antennae of both sexes are filiform and on males of *tibori* are finely ciliate; thorax unicoloured, ground colour of forewing is tobacco-brown with indistinct reniform and orbicular stigma; basal dash black; crosslines remarkable, double, sinuous (*tibori*) or strongly waved (*cinnamona*). The general characters of the male genitalia considering the presence of the medial process on the fultura (especially long on *tibori*), the broad shape of the valvae and the flattened configuration of the harpe indicate the relationship of *Chinagrotis* with *Altipolia*, but the wide, spatulate uncus (it resembles those of the genus *Dilagrotis*, see below) and the narrow, arm-like extended penicular lobes are autapomorphic characters of the genus. The aedeagus is medium long, the vesica is moderately broad, tubular, strongly curved at middle, the basal segment armed with various type of cornuti and a terminal segment with two, large, opposing brush-like cornuti fields. The female genitalia (only the *tibori* females are known) have larger but less sclerotized papillae anales compared to related genera and the configuration of the ostium plate and the cervix bursae (see the description of *tibori* female genitalia below) are also unique within the generic complex.

Distribution. *C. tibori* is endemic to the island of Taiwan, while its sister species, *cinnamona* has been recorded in the mountains of mainland China's Sichuan and Yunnan Provinces. Both species inhabit higher ecozones around or over 3000 metres. The early stages and the food plant are unknown.

***Chinagrotis tibori* (HREBLAY & RONKAY, 1998) comb. nov.**

(Plate 2, figs 1, 2; gen. fig. 4)

Estagrotis tibori (HREBLAY & RONKAY, 1998), Moths of Nepal, Part 5, page 197, plate 151, fig. 13, type locality: Taiwan, Prov. Nantou.

Holotype ♂, in coll. HREBLAY, deposited in HNHM Budapest.

Material examined: Holotype ♂, Taiwan, Nantou Co., Hohuanshan, 3002 m, 14. xi. 2006, ♀, same place but 05. xii. 2007, H.H. Lin leg., slide Nos MH7942♂, ESRI-SW010♀ (in coll. TESRI).

Female genitalia. Papillae anales large, membranous, conical in shape; apophyses anteriores and apophyses posteriores short, weak; ostium plate large, medially segmented, heavily sclerotized and rectangular in shape; ductus bursae relatively long, sclerotized, distal part broader, proximal part corrugated with granulose surface; cervix bursae well developed, forming a large, separated saccular process, its middle segment strongly sclerotized and corrugated; corpus bursae relatively small, membranous, elliptical in shape.

***Chinagrotis cinnamona* BENEDEK & SALDAITIS spec. nov.**

(Plate 2, fig. 3; gen. fig. 5)

Holotype: ♂, China, W. Sichuan, road Ya'an/Kangding, Erlang Shan Mt., h-3200 m, 07. x. 2010, N29°51.941", E102°17.022", SALDAITIS leg. slide No.JB1617♂ (coll. GBG/ZSM).