# A review of Indochinese species of *Coenochilus* Schaum, 1841 (Coleoptera: Scarabaeidae: Cetoniinae) with descriptions of two new species

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**Abstract.** Indochinese species of the genus *Coenochilus* Schaum, 1841 are reviewed. Two new species, *Coenochilus clinteroceroides* sp. nov. and *Coenochilus phongi* sp. nov. are described, illustrated and compared with related taxa. Taxonomical key to all known Indochinese representatives of *Coenochilus* is given. Distributional areas of species are discussed and new country or provincial records are presented.

## INTRODUCTION

The cremastochiline genus *Coenochilus* was established by Schaum in 1841. The genus currently accommodates 79 species, mainly distributed in Africa. The distribution area of 29 Oriental species encompasses Pakistan, India, Bhutan, Nepal, Burma, Thailand, Laos, Cambodia, Vietnam, China, Japan, Malaysia, Indonesia and the Philippines. Seven recently known species is known from the Indo-Chinese area. Due to the usual species distributional model, Thailand and China are included, even though these countries have historically never belonged to Indo-China. For this reason, the present study is focused on species distributed in Thailand, Laos, Cambodia, Vietnam and China. The group is represented by *Coenochilus apicalis* Westwood, 1874; *Coenochilus bifoveolatus* Fairmaire, 1888; *Coenochilus curtipes* Westwood, 1874; *Coenochilus striatus* Westwood, 1874; *Coenochilus thailandicus* Maruyama et al., 2011; *Coenochilus tonkinensis* Moser, 1910 and *Coenochilus uncinatipes* Moser, 1915.

The historically oldest species occurring in the Indo-China Region were described by Westwood (1874), by Fairmaire (1888) and by Moser (1910). After Arrow (1910), the latest, comprehensive study about Oriental *Coenochilus* was published by Hans Schein (1953). Since then, only two new Oriental species have been added: *Coenochilus thailandicus* Maruyama et al. (2011) from East Thailand and *Coenochilus hervillardi* Estienne, 2011 (not included in the present study) from Pakistani Baluchistan. As all the representatives of Oriental species of *Coenochilus* are rarely represented in most institutional or private collections, one sex remains unknown in several species. In the group of Indochinese species it is *C. bifoveolatus*, whose male stays undescribed. For this reason, *C. uncinatipes*, probably identical with *C. bifoveolatus*, cannot yet be synonymised.

Two new species of *Coenochilus* will be described in the taxonomical part of the study. They were both collected in northeastern part of Laos: *Coenochilus clinteroceroides* sp.

nov., habitually imitating *Clinterocera* species, without any closely staying relatives, and *Coenochilus phongi* sp. nov., which is similar to *C. apicalis*. New distributional records with author's remarks are given in the faunistical part of the present paper.

#### **BIONOMY**

Not much is known about the life cycle of *Coenochilus* species. Both newly described species have been collected in underground nests of several species of Formicidae (indet.) together with several species of Paussinae spp. A large part of *Coenochilus phongi* sp. nov. adult specimens were collected by breaking cocoons, found around ant nests, two times in big amounts. Few specimens of both newly described species were collected at flight, flying low above the vegetation. Together with *Coenochilus* specimens, dozens of *Clinterocera raui* Paulian, 1961 were also found. The species have still been known only from northern part of Vietnam.

### MATERIAL AND METHODS

The study is based on the following numbers of species and specimens respectively: Coenochilus apicalis - 4 males, 6 females; Coenochilus bifoveolatus - 5 females; Coenochilus clinteroceroides - 7 males, 9 females; Coenochilus curtipes - 2 females; Coenochilus phongi - 47 males, 381 females; Coenochilus striatus - 18 males, 8 females; Coenochilus thailandicus - 2 males (one of it paratype); Coenochilus tonkinensis - 1 female. All the specimens are deposited in author s collection.

The following codens of institutional and private collections are used in the text:

BMNH Natural History Museum, London, United Kingdom;

KSCT Kaoru Sakai collection, Tokyo, Japan;

MNHN Muséum national d'Histoire naturelle, Paris, France;

NMPC National Museum, Praha, Czech Republic;

SJCP Stanislav Jákl private collection, Praha, Czech Republic;

ZMHB Museum fur Naturkunde, Humboldt-Universitat, Germany.

Specimens of the newly described species are provided with one printed red label for HOLOTYPUS and yellow printed label for PARATYPUS. Every paratype label bears sex symbol and paratype collection number. Pairs of *Coenochilus phongi* sp. nov. will be deposited in BMNH, MNHN, KSCT, NMPC, ZMHB. One paratype of *Coenochilus clinteroceroides* will be deposited in BMNH, MNHN, NMPC. Other type specimens will be deposited in author's collection.

Label data are cited for the material examined, individual labels are indicated by a double slash (//), individual lines of every label by a single slash (/)

### TAXONOMY

# Coenochilus clinteroceroides sp. nov. (Figs. 1-5)

Type locality. NE LAOS, Hua Phan Province, Mt. Phu Pane, 1200-1900 m alt.

**Type material.** Holotype (3) labelled: NE LAOS, Huaphanne prov./ MT.PHU PANE, 1200-1900 m / Ban Saluei vill. env., 10.-22.V/20 12 N 103 59 E, 2011 / St. Jákl et Lao collectors leg. Paratype Nos. 1-3(33), Nos. 4-6 (9) labelled: same as holotype; paratype No. 7 (3) and Nos. 8-9 (9) labelled: same as holotype , but 10.-21.Vi. 2010; paratype No. 10 (3) and Nos. 11-14 (9) labelled: same as holotype, but 26.IV.-10.V. 2013; paratype No.15 (3) labelled: LAOS north, 13.-24.V. 1997 / 15 km NW Louang Namtha / N 21 07 E 101 21 / alt. 750 m/ E.Jendek & O. Sauša leg.

**Description of holotype.** Black, shining, general appearance wide and short, body size (excluding pygidium) 12.0 mm, maximum elytral width 4.8 mm.

Head. Black, without lustre. Frons with large and dense punctures, its diameters approximately circularly shaped, interspaces very narrow. Punctation of clypeus similar to punctation of frons. Narrowest at base of frons. Apical margin of clypeus rounded and gradually elevated. Antennae brownish with brownish to yellowish setation.

Pronotum. Shape completely circular, colouration black, lustre very mild. Punctation different than in head. Punctures simple, circular, interspaces approximately same as diameters of punctures. Density of punctation approximately same throughout total length. Setation absent.

Scutellar shield. Black, shining, general shape narrow with elongated apex. Sides and base with circular to oval punctures.

Elytra. Completely black, medially shining. Length 7.2 mm (excluding pygidium), maximum width 4.8 mm, ratio between elytra length and width giving generally short and wide appearance of insect. Each elytron with five longitudinal striolae lines. First, third and fifth interspaces with simple, fine punctures, second and fourth interspaces with horse-shoe shaped punctures. Rather flat, but third and fifth interspaces slightly elevated. Sutural ridge flat. Lateral sides with rather dense and medially large circular punctures. Apex covered with larger punctures and very narrow interspaces. Humeral calli indistinct, apical calli obtusely developed.

Pygidium. Black, shining, semioval, bearing horse-shoe shaped punctation.

Ventrum. Black, shining, with abundant punctation. Silver tomentum absent. Abdomen missing medial furrow, its constriction also indistinct. Each segment with horse-shoe shaped punctation, denser at sides. Metasternum black, slightly shining, its punctation denser than in abdomen. Mid part of metasternum with longitudinal furrow and more or less circular punctation. Punctation on sides horse-shoe shaped. Mesometasternal process narrow and small as in other representatives of *Coenochilus*. Prosternum black, with densely developed punctation to striolation. Mentum with ginger setation.

Legs. Femora, tibiae and tarsi black, without lustre. Femora with row of reddish setation placed on posterior margin. Length of legs moderate. Protibia tridentate. Pro- and mesotibia short and wide, metatarsi slightly elongated. Meso- and metatibia with one transversal carina



placed in posterior half. Metatibia simply developed, spur or declivity absent. Genitalia. Simple, small, with oval termination (Figs. 4-5).

Variability. Size range 10.8-12.9 mm, otherwise without important variations.

**Sexual dimorphism.** Size 11.1-14.0 mm. Females very similar to males, except for the shape of the abdomen, which is distinctly more arched.

**Differential diagnosis.** Coenochilus clinteroceroides sp. nov. belongs to species with absence of the ventral silver tomentation and unarmed male metatibia. The species has tridentate protibiae in both sexes, which is a character unknown among Indo-Chinese species. In size it is the second smallest species (only Coenochilus thailandicus is slightly smaller) among species occurring in the region considered. By the complex of above mentioned characters, the newly described species can be easily distinguished from its congeners, mainly from Coenochilus thailandicus, Coenochilus tonkinensis and Coenochilus striatus.

**Distribution.** NE Laos, Hua Phan Province, Mt. Phu Pane, 1200-1900 m alt.

**Etymology.** Based on the resemblance between the new species and representatives of *Clinterocera* Motschulsky, 1857.

**Remarks.** Due to extreme characters of *Coenochilus clinteroceroides* sp. nov., the species might belong to an undescribed subgenus or genus. Some characters of the insect are closer to *Clinterocera* (for example shape of the labrum), but some other characters such as tridentate protibia, absence of the abdominal impression or rather stout body shape, suggest that it is closer to *Coenochilus*. The newly described species might also be a transitional species between both genera mentioned. For a more correct diagnosis, I prefer to leave this task to possible future revision of whole genus or at least revision of all the representatives of Oriental *Coenochilus*.

# Coenochilus phongi sp. nov. (Figs. 6-10)

Type locality. NE Laos, Hua Phan Province, Mt. Phu Pane, 1200-1900 m alt.

**Type material.** Holotype ( $\circlearrowleft$ ) labelled: NE LAOS, Huaphanne Prov. / MT. PHU PANE, 1200-1900 m/ Ban Saluei vill. env., 10.-22.V. / 20 12 N 103 59 E, 2011 / St.Jákl et Lao collectors leg. Paratype No.1 ( $\circlearrowleft$ ) and paratypes Nos. 2-4 ( $\circlearrowleft$ ) labelled: same as holotype, but 26.IV.-10.V. 2013, paratypes Nos. 5-45 ( $\circlearrowleft$ ) and Nos. 46-378 ( $\circlearrowleft$ ) labelled: same as holotype, but 5.-25.V. 2014.

**Description of holotype.** Black with mild lustre, body typically elongated, size (excluding pygidium) 16.1 mm, maximum elytral width (widest in posterior half) 6.5 mm.

Head. Black, shining. Frons and clypeus with rugosely deep and dense punctation to striolation. Posterolateral margins of frons with few short reddish setae, rest of surface with fine, very short microsetation. Apical margin of clypeus medially incised, not elevated. Antenna reddish, stalk (especially scape) with rather long reddish setation, club with fine and short brownish to reddish setation.

Pronotum. Black with moderately developed lustre. Shape almost circular, in front of posterolateral margins with very shallow, but distinctly developed emargination. All sides bordered. Midline in posterior half present. Punctation several times thinner than in head. Punctures diameters rather large, but simple, circularly developed, its size similar to interspaces. Punctation of sides denser. Setation not present.



Scutellar shield. Black, shining, sharply triangular with slightly elongated apex. Sides with few simply developed punctures.

Elytra. Black, shining, flat. Elevated, longitudinal parts (ribs) very indistinct, longitudinal striolae lines also missing or very vague. Punctation very dense except that on sutural ridge and apical and humeral calli. Disc with very abundant, fine, shallow irregularly running striolation. Punctation of sides thinner, here with irregularly shaped punctures combined

with fine striolation. Apical calli absent, humeral calli indistinctly developed. Sutural ridge flat, shining, simply, finely punctured, in posterior half wider compared to anterior half. Setation of elytra missing.

Pygidium. Black, covered with long, abundant, reddish setation. Base and sides finely striolated, apex almost glabrous.

Ventrum. Black, shining. With long reddish setation with exception of fourth segment,. Middle impression wide, but shallow. Constriction of abdomen very sharp. Each segment with simple, but rather deep wavy shaped punctures. Metasternum with several times denser punctation and setation, the punctures mixed: semicircular and horse-shoe shaped. Reddish setation of metasternum dense and long, present throughout total length. Prosternum and mentum also covered with reddish setation (its colouration darker in mentum) and dense punctation.

Legs. Femora, tibiae and tarsi black. Femora and tibiae with abundant setation, posterior half of meso- and metacoxae with brush of reddish setation. Protibia short, wide, robust, tridentate. Meso- and metatibia slightly curved, in its posterior half with transversal carina. Apex of meso- and metatibiae with spurs on inner sides (declivities) oriented backwards approximately at angle of 45°. Spur of mesotibia much smaller than that of metatibia.

Genitalia. Species with parameres narrowing gradually, its apical fifth parallel (Figs. 9-10).

Variability. Very variable in size (13.6-17.8 mm), otherwise without important variations.

**Sexual dimorphism.** Abdominal depression absent in females, shape of abdomen more arched. Declivities of meso- and metatibia absent. In other aspects similar to males. Due to relatively numerous specimens available, females also exert considerable variability in size 13.2-18.2 mm.

**Differential diagnosis.** The newly described species shares most similarities with *Coenochilus apicalis* Westwood, 1874 (Figs. 11-15) occurring in Thailand, Cambodia and Laos, but it still stays rather far and can be easily separated by following characters: I. body of the newly described species wider and shorter compared to *C. apicalis*, which is narrower, with elongated body; II. the pronotal punctation of the new species is more expressed, its midline deep in posterior half, running over half the length, in *C. apicalis* the pronotum has thinner punctuation and midline rather vague and short; III. the elytra of new species are without longitudinal, impunctate, elevated ribs, but there are two discal, more or less glabrous, elevated ribs on each elytron in its congener; IV. declivities of meso- and metatibia in new species are rounded apically, but there is a sharply pointed apex in *C. apicalis*; V. legs (especially front legs) are more robust and shorter in the newly described species (in both sexes) compared to *C. apicalis*; VI. the abdominal impression of males is rather wide and shallow in the newly described species, but wider and deep in its congeners; VII. male parameres are elongated and terminated by parallel apical fifth in *C. phongi*, but short, more robust and more or less elliptic in *C. apicalis*.

Distribution. NE Laos, Hua Phan Province, Mt. Phu Pane.

**Etymology.** Named after my friend and assistant in field, Mr. Phong (Ban Saluei village, NE Laos).

# TAXONOMICAL KEY TO INDO-CHINESE SPECIES OF *COENOCHILUS* (INCLUDING SPECIES FROM THAILAND, CAMBODIA, LAOS, VIETNAM AND CHINA)

Tibiae and femora short, robust and thickened, tarsi unusually reduced. Pronotum very sharply narrowing to base. Dorsal punctation very deep. Large species 19-22 mm. India, Burma, Thailand....... 2(3)Tibiae and femora normally developed. Pronotum moderately narrowing to base. Dorsal punctation deep Small species, with body size of 10-14 mm. Meso- and metatibia of males without declivities on apical, inner side. Ventral side with or without silver or ochre tomentum. 4(7) Ventral side with silver tomentum. Each elytron with two narrow ribs (excluding slightly elevated sutural ridge). Protibia bidentate. 5 (6) Posterolateral margin of pronotum with rather deep emargination. Elytra moderately shining, both ribs of each elytron narrow, elevated, simply punctured. Thailand, Cambodia. 6 (5) Posterolateral margin of pronotum with only indistinctly developed emargination. Elytra with strong lustre. Elytra ribs narrow, elevated, shining, impunctate. Japan, China, Vietnam, Laos. 7 (4) Ventral side missing silver tomentum. Elytra ribs flat, indistinct or missing. Protibia bidentate or tridentate. Protibia bidentate. Ribs of elytra present, but wide and obtuse. Apical margin of clypeus deeply incised. 8 (9) 9 (8) Protibia tridentate. Ribs of elytra wide, but almost indistinct, very obtuse. Apical margin of clypeus rounded and gradually elevated. Bigger species, body size of 15-24 mm. Males with inner declivity on meso- and metatibia apical margin. 11 (12) Very large species, 20-24 mm. Elytra finely punctured, striolation present only in lateral sides and outer parts of disc. China, Vietnam, Laos. 12 (11) Species with size range of 15-19 mm. Elytra finely, but very densely, irregularly striolated. 13 (14) Legs short and robust. Ribs of elytra missing, posterior part of pronotum midline deep and long, widest point of pronotum in the middle of total length. Inner declivity of meso- and metatibia (in males) rounded. 14 (13) Legs longer. Elytra ribs present, but rather flat, posterior part of pronotum midline reduced and shallow, widest point of pronotum in posterior half. Inner declivity of meso- and metatibia (in males) very sharply 

**Remarks.** As I was not able to examine any male specimen of *Coenochilus bifoveolatus*, I follow the opinion of Schein (1953), whose conclusion was that *Coenochilus uncinatipes* Moser, 1915 is probably identical with *Coenochilus bifoveolatus* Fairmaire, 1888, but a male of latter species has to be captured prior to proving the synonymy.

## FAUNISTICS WITH UPDATED LIST OF INDO-CHINESE SPECIES OF COENOCHILUS

## Coenochilus apicalis Westwood, 1874 (Figs. 11-15)

Material examined: 1 ♂- LAOS, Luang Namtha/prov. Muang Sing vill./8.-17.3. 2000/P.Kulík lgt (new country record); 2 ♂♂ - NW Thailand/Mae Hong Son/Bansilang, 1200m/J.Horák lgt; 1 ♀- NW Thailand, 1991/Chom Thong, 24.-27.4./18 26 N 98 41 E/L.Dembický leg; 1 ♀ - THAILAND N./Chiang Dao Hill Resort/19 5579 N 990766 E/600m, 28.IV.-5.V. 2011/S. Murzin lgt; 1 ♀ - Thailand, Chiang Mai/Mae Rim/Mae Sa, 400-450 m alt./4. VIII. 2001/Kentaro Okajima leg; 1 ♀ - THAILAND/Chiang Rai, V.2000/WIANG PAPAO env./local collector leg; 1 ♂ - Laos, Xieng Khouang pr./route no.6, 60 km N of/Phongsavan, 1.-10.IV./2010, local collectors lgt; 1♀ - CAMBODIA W. Trapeang Rung/in Cardamon Mts. H - 5m/28.01.-4.02. 2010, S. Murzin leg.



Figs. 11-15. *Coenochilus apicalis* Westwood, 1874: 11- habitus dorsal aspect, male; 12- habitus ventral aspect, male; 13- habitus lateral aspect, male; 14- aedeagus; 15- aedeagus lateral aspect.

## Coenochilus bifoveolatus Fairmaire, 1888

**Material examined:**  $1 \subsetneq - N$  VIETNAM, 21 27 N 105 39 E/70 km NW of Hanoi, Tam Dao/3.-7.VI.1996, 900-1200m/P. Spáčil leg;  $1 \subsetneq - N$  VIETNAM, 21 27 N105 39 E/70 km NW of Hanoi, Tam Dao/11.-17.V. 1996, 900-1200 m/P. Spáčil leg;  $1 \subsetneq - N$ E LAOS, Huaphanne pr./MT. PHU PANE, 1050-1800m/Ban Saluei v., 10.-22.V./2011, St. Jákl et lao collector leg **(new country record)**;  $1 \subsetneq -$  Laos N, 1.-9.5. 2002, 1100 m/OUDOMXAI 17 km NEE/Vít Kubán leg

## Coenochilus clinteroceroides sp. nov.

Material examined: 1  $\circlearrowleft$  (holotype) - NE LAOS, Huaphanne prov./MT. PHU PANE, 1200-1900m/Ban Saluei vill. env., 10.-22.V./20 12 N 103 59 E, 2011/St. Jákl et lao collectors leg; 3  $\circlearrowleft$  and 3  $\circlearrowleft$  (paratypes) - same as holotype; 1  $\circlearrowleft$  and 2  $\backsim$  (paratypes) - NE LAOS, Hua Phanne Prov./MT. PHU PANE, 1200-1900m/Ban Saluei vill. env., 10.-21.VI./20 12 N 103 59 E, 2010/St. Jákl et lao collectors leg; 1  $\circlearrowleft$  and 4  $\backsim$  (paratypes) - NE LAOS, Hua Phan Prov./MT. PHU PANE, 1200-1900m/Ban Saluei vill. env., 26.IV.-10.V./20 12 N103 59 E, 2013/ St. Jákl et lao collectors leg; 1  $\circlearrowleft$  (paratype) - LAOS north, 13.-24.V. 1997/15 km NW Louang Namtha/N 21 075 E 101 21/alt. 750m/E. Jendek & O. Sauša leg.

## Coenochilus curtipes Westwood, 1874

Material examined: 1 ♀ - NE INDIA, W ARUNACHAL PRADESH/8 km S of Jamiri, SESSA vicinity/ 27 07 N 92 34 E, 300-400m/L. Dembický lgt, 26.5.-4.6. 2005 (new country record).

## Coenochilus phongi sp. nov.

**Material examined:** 1  $\circlearrowleft$  (holotype) - NE LAOS, Huaphanne Prov./MT. PHU PANE, 1200-1900 m/Ban Saluei vill. env., 10.-22.V./ 20 12 N 103 59 E, 2011/St. Jákl et lao collectors leg; 1  $\circlearrowleft$ , 3  $\circlearrowleft$  (paratypes) - NE LAOS, Hua Phanne Prov./MT. PHU PANE, 1200-1900m/Ban Saluei vill. env., 26.IV.-10.V./20 12 N 103 59 E, 2013/St. Jákl et lao collectors leg; 45  $\circlearrowleft$   $\circlearrowleft$  332  $\hookrightarrow$  NE LAOS, Hua Phanne Prov./MT. PHU PANE, 1200-1900m/Ban Saluei vill. env., 5.-25.V./ 20 12 N 103 59 E, 2014/ St. Jákl et lao collectors leg.

## Coenochilus striatus Westwood, 1874

Material examined: 1  $\circlearrowleft$ - China, centr. Fujian, 20.V.-27.VI./TIANTAISHAN for. Park/1100-1200m, 25 43 N 117 17 E/Jaroslav Turna leg, 2011; 2  $\circlearrowleft$ and 2  $\diamondsuit$ - China centr., Guangdong prov./YUNJISHAN, 700-1300m/Nat. Res., 24 06-07 N 114 10 E/Jatua leg, 13.-23.VI.2013; (new provincial record) 1  $\circlearrowleft$  - China, W Guangxi prov./SANJIAOSHAN, 1140m/23 17 N 106 33 E/Jatua leg, 3.-27.VI. 2013; 4  $\diamondsuit$  $\diamondsuit$ - N Vietnam, Tam Dao N.P./Tam Dao env./13.-26.VI. 2011, 900-1200m/N 21 2738 E 105 3828/E. Jendek leg (new country record); 1  $\diamondsuit$ - VIETNAM N./Tam Dao, 900 m/16.-23.V. 1991/Strnad Jan lgt; 1  $\diamondsuit$ - Tam Dao/Virh Phu Prov./N. Vietnam/JUL. 2001; 4  $\circlearrowleft$  and 2  $\diamondsuit$  $\diamondsuit$ - LAOS-CE, 1.-18.V. 2001/Boli Kham Xai prov./18 21 N 105 08 E/BAN NAPE (8 km NE)/600m, Vít Kubán leg (new country record); 3  $\circlearrowleft$  and 4  $\diamondsuit$  $\diamondsuit$ - Laos C, Bolikhamsai pr./BAN NAPE, 7.-16.5. 2004/400m, 18 20 N 105 08 E/E. Jendek & O. Sauša leg

## Coenochilus thailandicus Maruyama et al., 2011

**Material examined:** 1 ♂ (paratype): THAILAND: Khao Yai N. P./Nakhon Ratchasima/27.IX. - 4.X. 2007, by PIT/ Maruyama & Katayama; 1 ♂: CAMBODIA: Phnom-Bokor Nat. Res., H - 550 m/ 10 3823 N 104 0540 E/25.XI. - 6.XII. 99, M. & S. Murzin (new country record).

## Coenochilus tonkinensis Moser, 1910

Material examined: 1 9: VIETNAM N, 1989/Tam Dao, 12.-24.V/Vinh Phu prov./Strnad Jan lgt.

## Coenochilus uncinatipes Moser, 1915

Material examined: none.

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