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## A new species of the *Cretonotos transiens*-group (Lepidoptera: Arctiidae) from Sulawesi, Indonesia

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**Abstract.** A new species from Sulawesi (Celebes), *Cretonotos kishidai* Dubatolov & Holloway is described. It is characterized by the presence of a sclerotized spine-bearing band which envelops the aedeagus apex, presence of spining on the juxta, and small peniculi (finger-like processes) at the bases of the transtilla, which are longer than in the widespread Oriental *C. transiens* (Walker, 1855) and shorter than in *C. wilemani* Rothschild, 1933 from the Philippines. The holotype of the new species is deposited in the Siberian Zoological Museum of the Institute of Animal Systematics and Ecology, Novosibirsk, Russia. Study of a topotype of *C. transiens vacillans* (Walker, 1855) showed that it is a senior synonym of *C. t. orientalis* Nakamura, 1976. *C. ananthakrishanani* Kirti et Kaleka, 1999 is synonymized with the nominotypical subspecies of *C. transiens* (Walker, 1855). The lectotype of *C. transiens* (Walker, 1855) is designated in the BMNH collection from “N. India, Kmorah” (misspelling of “Almorah”).

**Keywords.** Tiger-moth, Arctiidae, Arctiinae, *Cretonotos*, *Cretonotos transiens*-group, new species, Sulawesi, Indonesia.

### 1. INTRODUCTION

The genus *Cretonotos* Hübner, [1819] 1816 consists of a set of unrevised Afrotropical species (GOODGER & WATSON 1995) and seven species from South Asia and neighbouring territories. Two species are distributed throughout the whole Oriental region: *C. transiens* (Walker, 1855) and *C. gangis* (Linnaeus, 1763), the latter reaches its limits in Northern Australia, South Iran and North-Eastern Arabia (1 ♂, 1 ♀, United Arab Emirates, 1 km W Marbad, 25°20'N 56°07'E, 28.III – 5.IV 2006, leg. M. Fibiger & C. Gielis, ex Zoological Institute (St.-Petersburg, Russia) collection). Two species are much more localized within the Oriental Region: *C. fasciatus* (Candèze, 1927) was described from Cambodia, *C. wilemani* (Rothschild, 1933) inhabits the Philippines. To these must now be added *C. kishidai* sp. n. from Sulawesi. Two species are known from Western Arabia: *C. albidior* Wiltshire, 1986 and *C. leucanioides* Holland, 1893. *C. arabicum* (Hampson, 1896) from South-Western Asia has been assigned to a new genus *Creataloum* Dubatolov, 2004. The *Cretonotos* species from Asia fall into two main groups defined by the forewing pattern and male genitalia structure; these could be treated as subgenera. Species of the nominotypical subgenus have light wings with a dark streak along the posterior vein of the cell, and have long needle-like cornuti on the vesica: *C. gangis*, *C. albidior*, *C. leucanioides* and, taking into account the forewing pattern only, *C. fasciatus*. The *C. transiens* group might be referred

to subgenus *Phissama* Moore, 1860, the species having forewings without a streak along the posterior vein of the cell, and having short, drawing-pin-like cornuti on the vesica that are sometimes fused into bands.

### 2. TAXONOMY

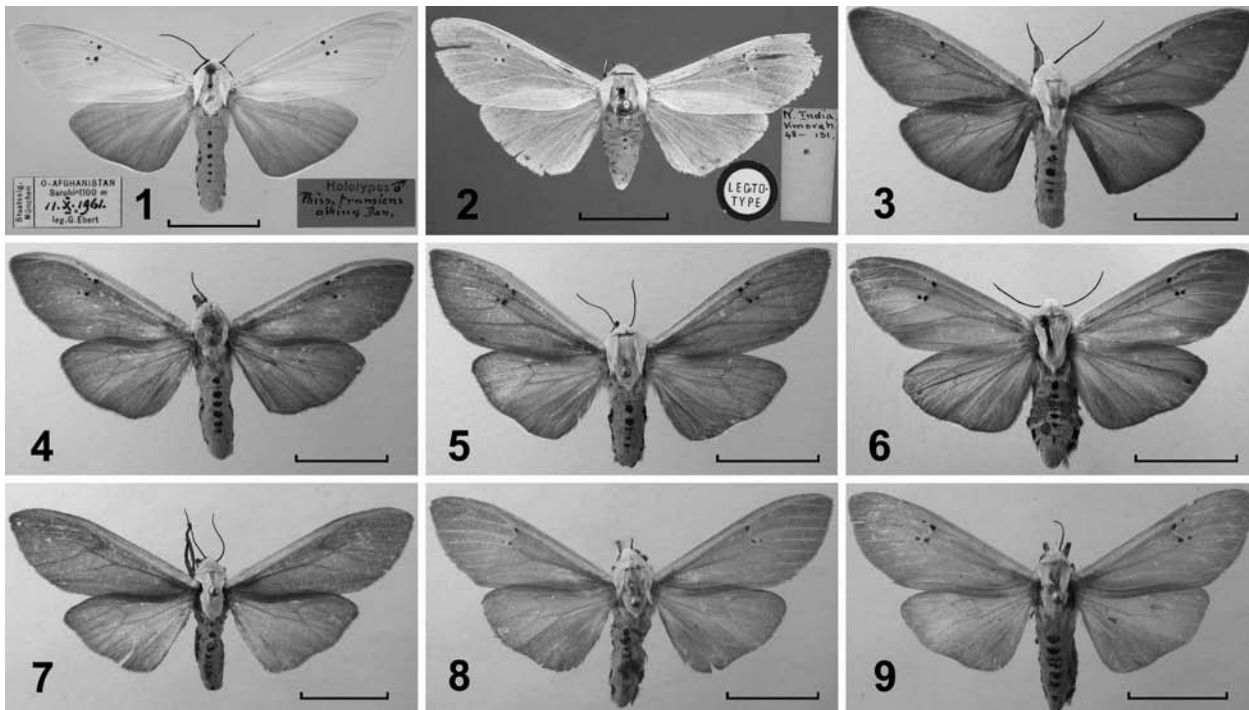
NAKAMURA (1976) reviewed the latter group and recognised two species. On the basis of male genital structure, he divided *C. transiens* (Walker, 1855) into four subspecies, and described a sibling species, *C. philippinense* Nakamura, 1976, from the Philippines. HOLLOWAY (1988) and INOUE (1988) independently found an older name for the latter, *C. wilemani* Rothschild, 1933, which was originally described as a distinct species. HOLLOWAY (1988) also found that there was a further taxon of this group on the Indonesian island of Sulawesi, but did not describe it at the time. After a careful study of *Cretonotos* specimens kindly sent by Mr Y. Kishida to the collection of Siberian Zoological Museum of the Institute of Animal Systematics and Ecology, Novosibirsk, Russia (SZMN), it became apparent that the new taxon from Sulawesi has several striking characters of the male genitalia that distinguish it from both *C. transiens* and *C. wilemani*. It should therefore be described as a new species.

However, a female specimen from Sulawesi was included in the type series of *C. transiens*, along with other females from North India, Sylhet, and East Indies. A lectotype of *C. transiens* has yet to be designated. HAMPSON (1901) treated a specimen from Sylhet as “type” of *C. transiens*, but neither syntype with these data (from the Sowerby collection) was rediscovered during our investigations. So, there are two female syntype specimens from North India, Almorah, from the Stevens collection, and they belong to the nominotypical *C. transiens* subspecies sensu NAKAMURA (1976). Therefore, in the interests of stability, one of these females from North India, Almorah (handwritten on the label as “N. India, Kmorah”), is hereby designated as the LECTOTYPE (Fig. 2). Similarly, the type series of *Aloa isabellina* Walker, 1855 included male and female specimens from Sylhet, North India and East Indies. These localities, taken at face value, are shared with *transiens*, but the concept of ‘East Indies’ is very imprecise and may involve parts of southeast Asia and Indonesia where other races occur; in fact, the type material so labelled for both taxa was from the Archdeacon Clerk collection, and the one syntype of *transiens* located from this source is labelled as from Moulmein in southern Burma (Myanmar). Therefore, in the interests of stability, we des-

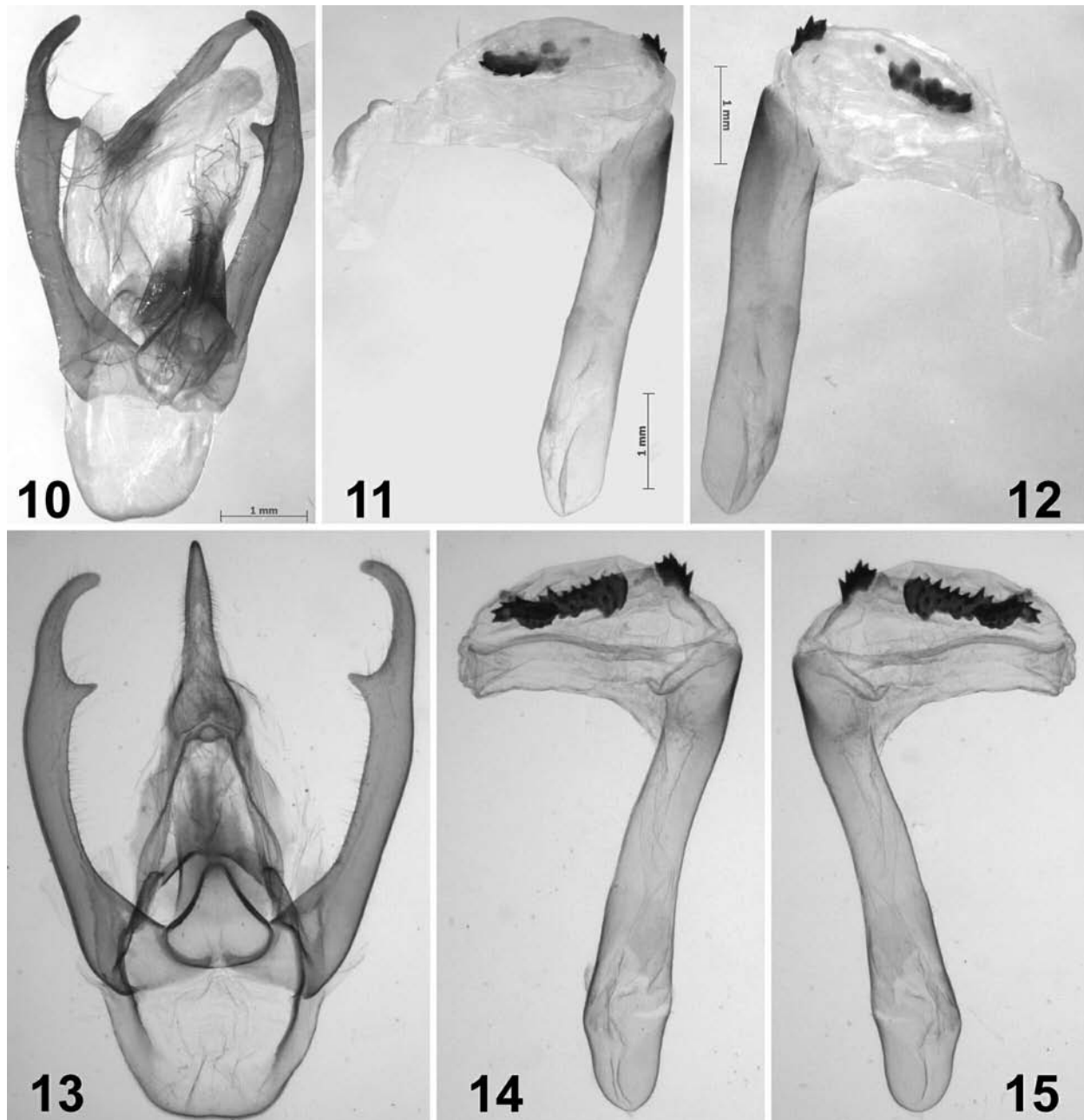
ignate the Sylhet male specimen of *isabellina* as LECTOTYPE. It is possible that North India and East Indies syntypes of *transiens* were also listed as syntypes of *isabellina*, given that only six syntypes of the taxa together have been located.

The discovery of the new species from Sulawesi led us to review geographic variation in male genitalia for the whole *C. transiens* group. For this, we use the terminology of NAKAMURA (1976) for the ornamentation of the aedeagus vesica.

First of all, it was found that the male genitalia of a *C. t. vacillans* (Walker, 1855) topotype specimen from Hong Kong do not differ from those of *C. t. orientalis* Nakamura, 1976 from Thailand in the structure of the fused cornuti plate M1-M2-M3-M4-B of NAKAMURA (1976), the shape of which can vary significantly even in geographically close populations; it differs from *C. t. koni* Miyake, 1909 from Taiwan and South Japan, which has the cornuti plate disrupted into several cornuti M1, M2, M3, M4. Moreover, two continental subspecies, the nominotypical *C. t. transiens* and *C. t. vacillans*, differ only slightly from each other, the former from the Himalayas and India hav-



**Figs 1–9.** *Cretonotos*, adult moths. **1.** *C. transiens albina*, holotype, Afghanistan, Sarobi, 1100 m, 11.X 1961, G. Ebert leg. **2.** *C. transiens*, lectotype and its labels, “N. India, Kmorah”. **3.** *C. t. transiens*, India, E Sikkim, 20 km SE of Gangtok, Phidim Rain Forest, h = 1600 m, VII 2002, O. Yu. Ammosov leg. **4.** *C. t. vacillans*, Vietnam, Cao Bang, Mt. Pia Oak, h = 1700 m, III 2002, native collector leg. **5.** *C. t. sundana*, Indonesia, Bali, Tamblingan, VI 2004, native collector leg. **6.** *C. t. koni*, Japan, Okinawa, Naha, P. Schmidt leg. **7.** *C. wilemani*, Philippines, Negros Is., Mt. Canlaon, native collector leg. **8–9.** *C. kishidai*, Indonesia, Sulawesi, Tondano, VII 1988, native collector leg. **8.** Holotype. **9.** Paratype. **2.** Female. **1, 3–8.** Males.



**Figs 10–15.** Male genitalia of *Cretonotos*. **10–12.** *C. t. transiens*, India, E Sikkim, 20 km SE of Gangtok, Phidim Rain Forest, h=1600 m, VII 2002, O. Yu. Ammosov leg. **13–15.** *C. t. albina*, Afghanistan, Sarobi, 14.X 1961, G. Ebert leg. **10, 13.** General view. **11, 14.** Aedeagus, left side. **12, 15.** Aedeagus, right side.

ing a more uneven cornuti plate M1-M2-M3-M4-B. So, the list of the *C. transiens*-group taxa is as follows:

***Cretonotos transiens* (Walker, 1855)** (Figs 1–6)

South-East Asia from India to China, South Japan, Borneo and Lombok. Records of *C. transiens* from the Philippines in HOLLOWAY (1976, 1988) are likely to have arisen

from misplaced specimens of *C. wilemani* in the series of *C. transiens* in BMNH; these were recognised as misidentified subsequently, and one is the Philippines specimen included amongst those listed by WALKER (1856) in his redescription of *vacillans* (see below). A further search of supplementary drawers has not yielded any Philippines specimens that are definitely *C. transiens*, so this record must be treated as suspect.



**Figs 16–21.** Male genitalia of *Cretonotos*. **16–18.** *C. t. vacillans*, Hong Kong, Kan Sui Chan, 31.XII 2005, J. Lee leg. **19–21.** *C. t. vacillans*, Thailand, Chanthaburi Province, Khao-Whitehakut National Park, by light at headwaters, 6.I 2006, O. E. Kosterin leg. **16, 19.** General view. **17, 20.** Aedeagus, left side. **18, 21.** Aedeagus, right side.

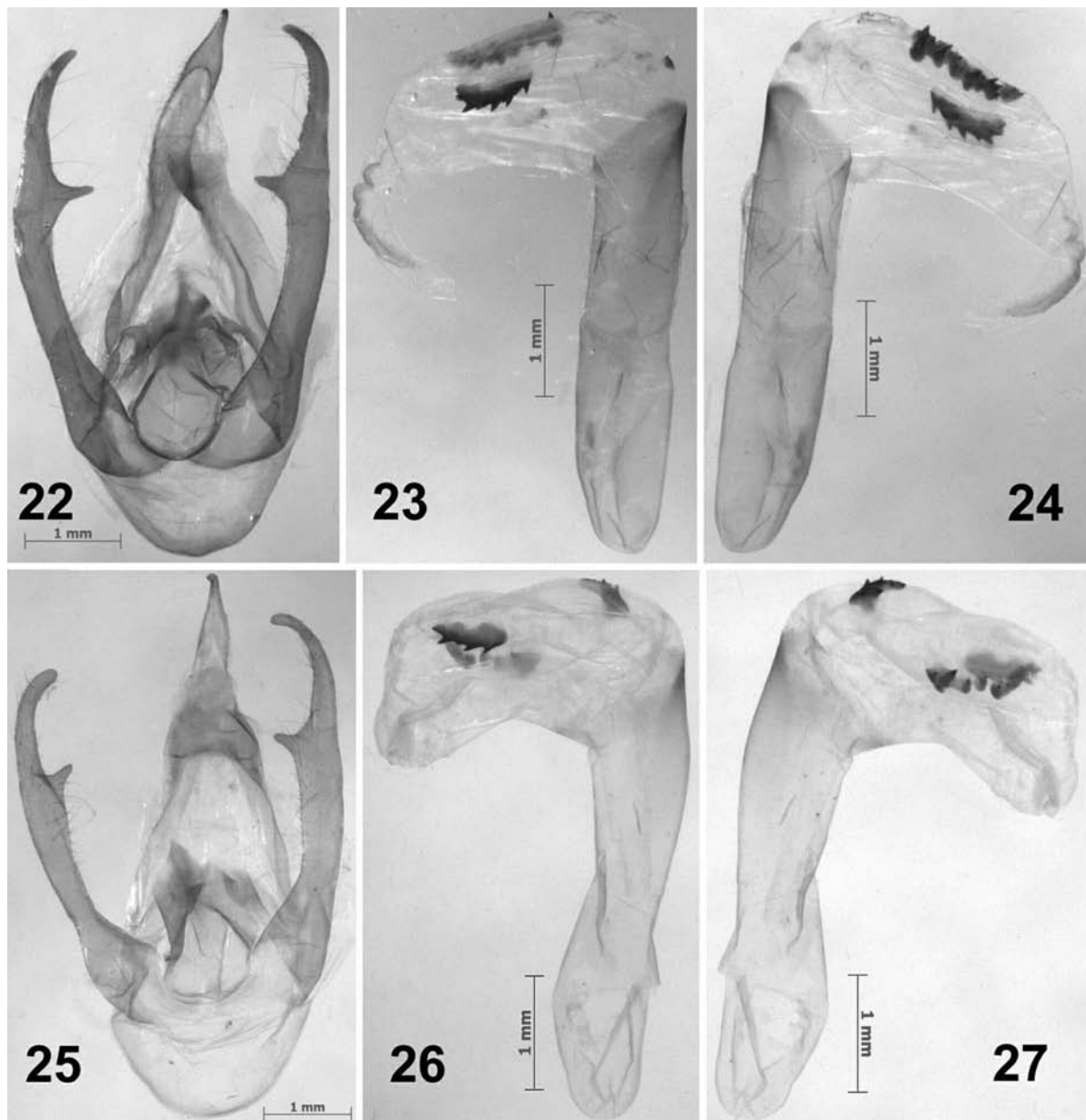
*C. t. albina* (Daniel, 1971); Ann. Naturh. Mus. Wien **75**: 654, t. 1, fig. 5 (*Phissana transiens albina*); type locality: “[O-Afghanistan] ... Sarobi” [Paktika: Sarowbi] (Fig. 1).

Afghanistan: Paktika, Nangarhar, Nuristan, Badakhshan (DANIEL 1971).

**Remarks.** According to the original description (DANIEL 1971) and the figure of the holotype (Fig. 1), this subspecies has the palest whitish-grey wings in males (forewing being noticeably lighter than hindwings) and

white wings in females. Male genitalia were stated by Daniel to be identical with the nominotypical subspecies; however, they are only similar (Figs 13–15). Cornuti patch M1-M2-M3-M4-B of right side of vesica is massive, regular in shape; cornuti patch O is large, like in the nominotypical subspecies.

*C. t. transiens* (Walker, 1855); List Specimens lepid. Insects Colln. Br. Mus. **3**: 675 (*Spilosoma transiens*); type locality: North India, Almorah, designated here from the lectotype (Figs 2–3).



**Figs 22–27.** Male genitalia of *Creatonotos*. **22–24.** *C. t. sundana*, Indonesia, Mentawai Isl., Siberut Isl., Bojakan, IX 2004, native collector leg. **25–27.** *C. t. koni*, Japan, Okinawa, Taha, P. Schmidt leg. **22, 25.** General view. **23, 26.** Aedeagus, left side. **24, 27.** Aedeagus, right side.

=*Aloa isabellina* Walker, 1855; List Specimens lepid. Insects Colln. Br. Mus. **3**: 705–706; type locality: Sylhet, designated here from the lectotype.

=*Creatonotos ananthkrishanani* Kirti et Kaleka, 1999, **syn. nov.**; Entomon **24** (2): 137–140, figs 1–11; type locality: “Uttar Pradesh: Mussorrie”.

India, North Pakistan (a photo of a male specimen from the Indus Canyon, 50 km E of Peshawar in Mr. V. Gurko’s collection (Tchernovtsy, Ukraine) has been studied).

**Remarks.** *C. ananthkrishanani* Kirti et Kaleka, 1999 was described from the North-West Himalayas, Mussorrie, on the basis of differences in wing venation from *C. transiens* and misinterpreted minute differences in male genitalia. Moreover, the authors mistakenly considered there to be two cornuti groups in *C. transiens* and three groups in *C. ananthkrishanani* (Fig. 36), but they never everted vesicas in both taxa. Presence of three cornuti groups is characteristic for the whole *C. transiens*-complex. The specific status of *C. ananthkrishanani* is therefore unjustified. The nominotypical subspecies vary from the darkest



**Figs 28–34.** Male genitalia of *Cretonotos*. **28–30.** *C. wilemani*, Philippines, Negros Is., Mt. Canlaon, native collector leg. **31–33.** *C. kishidai*, holotype, Indonesia, Sulawesi, Tondano, VII 1988, native collector leg. **34.** – *C. kishidai*, paratype, Indonesia, Celebes [Sulawesi], Loda, Paloe, 4000', V 1937, J. P. A. Kalis (Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn, Germany). **28, 31.** General view. **29, 32, 34.** Aedeagus, left side. **30, 33.** Aedeagus, right side.

brown forewings in the specimens from Sikkim to the pale brown forewings in the specimens from North India and North Pakistan, whilst in male genitalia (Figs 10–12, 35: 2) it is similar to the next subspecies, differing in the irregular shape of elongate cornuti patch M1-M2-M3-M4-B of right side of vesica; cornuti patch O is large.

*C. t. vacillans* (Walker, 1855); List Specimens lepid. Insects Colln. Br. Mus. **3**: 685 (*Amphissa vacillans*); type locality: “Hong Kong” (Fig. 4).

=*Cretonotos transiens orientalis* Nakamura, 1976, **syn. nov.**, Tyô to Ga **27** (3): 116, fig. 1 (3), 3 (5); type locality: “Fang, Thai” [Thailand].

China: Heilongjiang (Tili, Pingdin Mt., SZMN; according to the general species distribution, this outlying northern locality needs confirmation), Shanxi, Shaanxi, Shandong, Anhui, Henan, Jiangsu, Zhejiang, Fujiang, Jiangxi, Hubei, Hunan, Guangdong, Hainan, Guanxi, Guizhou, Sichuan, Yunnan (FANG 2000), East and South Tibet (FANG

1982, 1987); Indochina, Peninsular Malaysia, Sumatra, Borneo.

**Remarks.** This subspecies is paler than the nominotypical one (taking into account specimens from Sikkim), cornuti patch M1-M2-M3-M4-B on the vesica right side is not massive, equal in width, but varies in length, cornuti patch O is also large (Figs 16–21, 35: 5). The original description of *vacillans* was based on a single (therefore holotype) male. However, WALKER (1856: 1702) later described *Aloa vacillans*, referring to three specimens: a “typical” female from N. India; var. beta, a male of *wilemani* from the Philippines; var. gamma, the holotype Hong Kong male of the original *vacillans*. This may be a further indication that Walker did on occasion “recycle” his type material!

*C. t. sundana* Nakamura, 1976, Tyô to Ga 27 (3): 116, fig. 1 (2), 3 (4); type locality: “Mégamenden, Java” (Fig. 5).

Indonesia: Siberut (Bojakan, SZMN), Java, Bali (Tamblingan, SZMN), east to Lombok.

**Remark.** This island subspecies does not differ from the typical subspecies in wing colouration, but it has reduced cornuti patches M1-M2-M3-M4-B and O on vesica (Figs 22–24, 35: 4).

*C. t. koni* Miyake, 1909, **stat. rev.**; Bull. Coll. Agric. Univ. Tokyo 8 (2): 169 (*Cretonotus Koni*); type locality: “Mt. Arisan in Formosa” (Fig. 6).

Taiwan, Japan: Yonagumi, Iriomote, Ishigaki, Miyako, Okinawa, Okinoerabu, Amami, Yaku (NAKAMURA 1976; INOUE 1982).

**Remarks.** According to NAKAMURA (1976) this subspecies is characterized by the very light rosy tone of head, patagia, tegulae, thorax and forewings; cornuti patch M1-M2-M3-M4 is divided into separate small cornuti groups, while cornuti patch O is not reduced (Figs 25–27, 35: 3).

#### *Cretonotos wilemani* (Rothschild, 1933)

Ann. & Mag. Nat Hist. (10) 11: 183–184 (*Cretonotus wilemani*); type locality: “Palali, 2000 ft., Benguet, Klondyke, 800 ft., Benguet, Luzon, ..., Kolambugan, Lanao Plains, Mindanao, ...; Luzon...” (Fig. 7).

=*Cretonotos philippinensis* Nakamura, 1976, Tyô to Ga 27 (3): 113–114, fig. 1 (4), 3 (6); type locality: “Subasta, Mindanao Is.”

Philippines: from Luzon to Mindanao.

**Remarks.** The species is characterized by absence of black dots at forewing discocellular veins, presence of the largest peniculi or finger-like processes at base of the transtilla, which is wide and the most strongly sclerotized in the whole group (Figs 28–30, 35: 6).

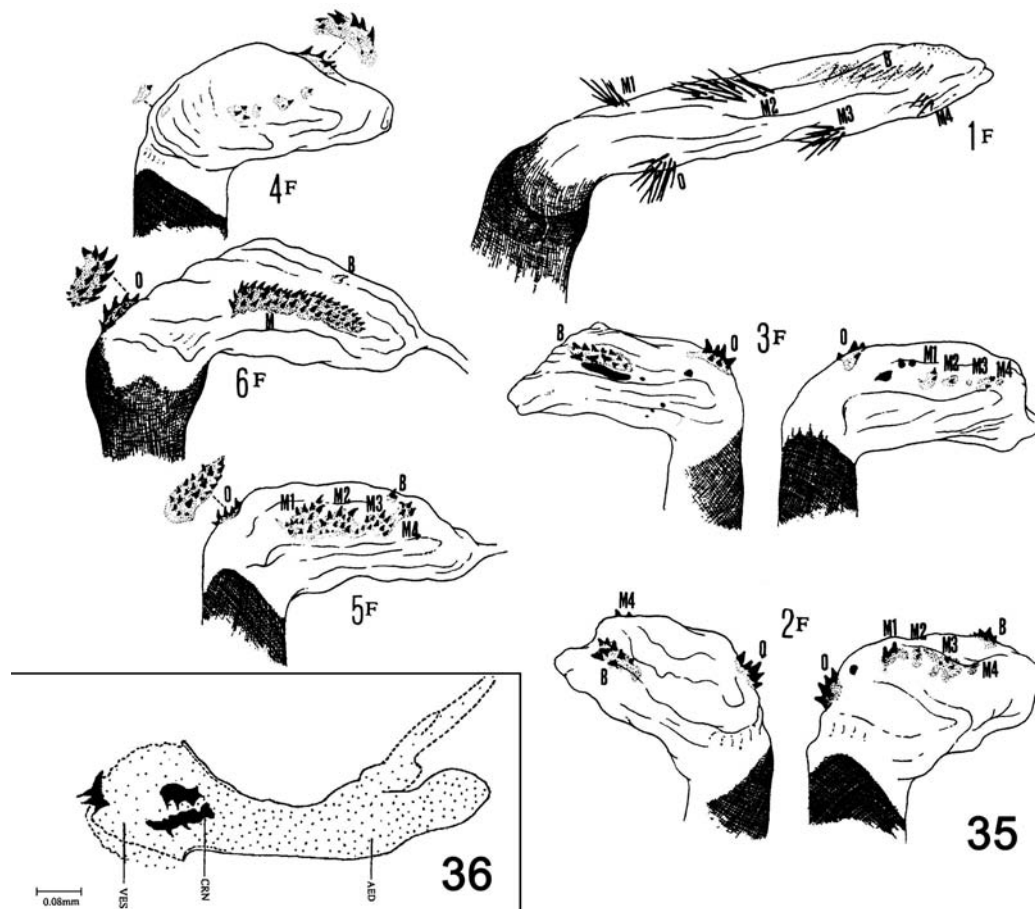
#### *Cretonotos kishidai* Dubatolov & Holloway, sp. nov. (Figs 8–9)

**Material.** Holotype – male, Indonesia, Sulawesi, Tondano, VII 1988, native collector leg., received from Y. Kishida. Preserved in SZMN coll. (<http://szmn.sbras.ru>). Paratypes: 1 ♂, the same data (SZMN); 2 ♂ (BMNH genitalia slides 2313, 2314), 1 ♀ (BMNH slide 2311), Koelawi, Paloe [Palu], 3100', W. Celebes, March 1937, J. P. A. Kalis (BMNH); 1 ♂ (BMNH slide 2312), Loda, Paloe [Palu], W. Celebes, 4000', May 1937, J. P. A. Kalis (BMNH); 3 ♂, the same data (Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany); 1 ♀ (syntype of *transiens*), Celebes [Menado], [Madame Ida] Pfeifer coll. (BMNH). There are large numbers of specimens of *C. kishidai* in BMNH from the localities listed for the paratypes, but we have restricted these to dissected specimens and to the syntype of *transiens*.

**Description.** Male forewing length 21.0–22.5 mm, wing expanse 41.0–46 mm. Wings dark grey, the forewing with lighter costal margin and veins on the external part of the wing. There are three or four black dots around the discocellular veins, two inside the cell being larger. Head and thorax whitish, abdomen dorsally yellow with one dorsal and two lateral rows of black spots; ventrally it is grey.

**Male genitalia** (Figs 31–34). Uncus elongate, horn-like. Valvae narrow, elongate, slightly curved inwards, with two distal processes: the apex and a lateral spur. Juxta longer than wide, its apical lateral sides covered with small spines. Transtilla at both bases with distinct finger-like processes (peniculi). Aedeagus straight, widened at apex, where it is enveloped by a sclerotized spine-bearing band (hypertrophied cornuti patch O); this band is sometimes disrupted ventrally (Fig. 34). Vesica with two elongate sclerotized cornuti patches M and B, between them there is one more small round sclerotization B on the opposite side of the vesica.

**Female forewing.** Length 22.0–23.0 mm, wing expanse 43.0–49.0 mm, the syntype of *transiens* being at the upper boundary of this range. Forewings light grey with lighter veins in external part of the wing. There are four black dots around the discocellular veins, two inside the cell being larger; the external anterior one is the weakest. Hindwings whitish with dark scales on veins; those on the cubital stem are darkest.



**Figs 35–36.** 35. Vesica structure of the *Cretonotos* species, by Nakamura (1976). 1. *C. gangis*, 2. *C. t. transiens*, 3. *C. t. koni*, 4. *C. t. sundana*, 5. *C. t. orientalis* (= *vacillans*), 6. *C. t. philippinense* (= *wilemani*). O, M1, M2, M3, M4, B – cornuti patches. 36. Aedeagus structure (vesica only slightly everted) of *C. ananthakrishanani*, from original description by KIRTI & KALEKA (1999). AED – aedeagus, CRN – cornuti, VES – vesica.

**Remarks.** The presence of a sclerotized spine-bearing band, which envelops the aedeagus apex, distinguishes the new species from both *C. transiens* and *C. wilemani*, where it is absent. Moreover, these two species lack the spining of the juxta characteristic of the new species. The presence of small peniculi (finger-like processes) at the bases of the transtilla is shared with *C. wilemani* (Figs 28, 31), though this species has them larger on a larger and more sclerotized transtilla. The valves also differ across the three species, extending beyond the uncus in *C. transiens*, but falling short of it in *C. kishidai* and *C. wilemani*; the lateral spur is short and in the most basal position in *C. transiens*, but nearer the apex of the valve and longer in *C. kishidai*, where distinct bilateral asymmetry occurs, the right valve being longer, with the apical process longer beyond the lateral spur. In *C. wilemani* the lateral spur is small and very close to the apex.

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