

## Three new species in the genus *Notata* Hampson, 1891 from New Guinea (Lepidoptera: Erebidae, Arctiinae, Lithosiini)

Rob de Vos

Naturalis Biodiversity Center, Darwinweg 2, 2333 CR Leiden, The Netherlands  
email: rob.devos@naturalis.nl

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**Abstract:** Three new species in the genus *Notata* Hampson, 1891 from New Guinea have been discovered and are described: *Notata lambertsae* **spec. nov.**, *N. sinnemai* **spec. nov.** and *N. aurifimbria* **spec. nov.** The adults and genitalia are depicted. The probability of even more new species for New Guinea is discussed.

**Rangkuman:** Ditemukan tiga spesies baru dari genus *Notata* Hampson, 1891 dari New Guinea dan dideskripsi sebagai berikut: *Notata lambertsae* **spec. nov.**, *N. sinnemai* **spec. nov.** dan *N. aurifimbria* **spec. nov.** Hewan dewasa dan alat genitalianya dideskripsi dengan gambar. Juga didiskusikan peluang ditemukannya lebih banyak spesies baru di New Guinea. [translation by Daawia Suhartawan]

**Key words:** new species, New Guinea, Papua, *Notata*

### Introduction

The originally monotypic genus *Notata* Hampson, 1891 was created for the species *Notata parva* Hampson, 1891 which has a wide distribution from India to Borneo and the smaller Sunda Islands and from Taiwan to The Philippines. Males are easily identified by their yellow narrow forewings and dark brown oval (androconial) patches at underside of the forewings corresponding with an equal patch on the upperside of the hindwings.

Lucas (1892) described *Diphtheraspis modicus* from Queensland, Australia, as the type species of *Diphtheraspis* Meyrick, 1892, and Edwards (1996) listed this species in the Checklist of Lepidoptera of Australia as belonging to *Notata*, downgrading *Diphtheraspis* Meyrick, 1892 as junior synonym of *Notata* Hampson, 1891. De Vos & Van Mastrigt (2007) described *Notata zumkehri* being the first species of this genus from New Guinea, found in the Central Mountain Range, and which shows distinct similarities with the type species *parva*, though the yellow colour being replaced by white and grey and with a much wider hindwing.

During expeditions of the Papua Insects Foundation to the Arfak Mountains (Papua Barat, Indonesia) in 2011 and 2014 similar specimens were collected but they did not exactly match with *zumkehri* which was the only known species from New Guinea. Instead of the white and grey of *zumkehri* they were yellowish-white or silky white and with even broader hindwings. The genitalia of *Notata* at first sight all look very much the same and at first are a bit disappointing when expecting distinct differences. But a closer study of the genitalia does reveal some distinguishing characters. Male genitalia all have a long and slender curved

distal process of the cucullus and a less sclerotized distal part of the sacculus, covered with setae. At the base of the long distal process, between cucullus and sacculus, is a short process with a diagnostic form for the species. Female genitalia are characterized by a relatively small bursa copulatrix with in the anterior half a band or field densely covered with star-shaped signa or spiculae. Secondly the ductus seminalis and bulla seminalis are strongly developed, widely connected at the right side to the cervix bursae. Both characters are diagnostic for the species. Judged by colours, pattern, wing shape and the genitalia, three new species could be distinguished: *Notata lambertsae* **spec. nov.**, *N. sinnemai* **spec. nov.** and *N. aurifimbria* **spec. nov.** Females were matched by logic interpreting the mutual collection event and forewing colours.

The identity of some collected *Notata* female specimens from other localities in New Guinea still is too uncertain to determine or to confirm to belong to a new species. When males from these localities become available in the future they hopefully could be matched with those unidentified females. An exception is the only known female of *Notata aurifimbria* **spec. nov.** which is different patterned than females of other species.

#### Checklist of *Notata* Hampson, 1891

*parva* Hampson, 1891 (figs 1-2, 12, 16-17, 24-25)

*tenuilinea* (Hampson, 1914)

*modicus* (Lucas, 1892) (figs 3-4)

*zumkehri* De Vos & Van Mastrigt, 2007 (figs 5-6, 13, 18-19, 26-27)

*lambertsae* **spec. nov.**

*sinnemai* **spec. nov.**

*aurifimbria* **spec. nov.**

#### Abbreviations

BMNH – Acronym for preparations in Natural History Museum, London

Fwl – Forewing length (measured from wingbase to apex)

KSP – Koleksie Serangga Papua (Papua Insects Collection), Waena, Papua, Indonesia (former collection of Henk van Mastrigt)

NHM – Natural History Museum, London, UK

RMNH – Collection of Naturalis Biodiversity Center, Leiden, The Netherlands (former Rijksmuseum voor Natuurlijke Historie)

RMNH.INS. – Acronym for unique collection numbers of specimens and slides in RMNH

USNM-ENT – Smithsonian National Museum of Natural History

#### Systematical part

***Notata lambertsae* spec. nov.** (figs 7-8, 14, 20-21, 28-29)

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**Holotype:** RMNH.INS.1282814: ♂, Indonesia, Papua Barat, Birdshhead Peninsula, Arfak Mountains, Demaisi, 1637 m, 1°10'S – 133°53'E, 14.xi.2011, at light, Papua Insects Foundation.

**Paratypes** (3 ♂♂, 3 ♀♀): RMNH.INS.1282815, 1282840, KSP65140 (3 ♂♂) and RMNH.INS.1282809, 1282810, 1282822, KSP65141 (4 ♀♀): same as holotype.

**Diagnosis:** Male with forewings yellowish bone-white, very broad hindwings with large oval chocolate brown androconial patch without shimmer. Apex of hindwing slightly angled. Female same colour as male but without the androconial patches and normal shaped pale hindwings.

**Description:** Fwl. ♂ 8.3-9.5 mm, ♀ 9.2-9.4 mm. Male with head, very short palpa and base of antennae bone-white, antennae distally fading to grey, thorax with patagia and tegulae of the same colour. Abdomen grey, anal tuft with genitalia with long bone-white scales. Legs pale brown-yellow. Forewing rather broad and short, of normal lithosiine shape. Ground colour bone-white, marginally gradually more yellowish. Underside of forewing bone-white but marginal fading to grey and in the cell a large oval chocolate brown androconial patch which shines through the upperside of the forewing. Hindwing very broad, almost round but with a slightly angled apex. Ground colour grey but white edged around the large oval chocolate brown androconial patch at the upperside. Underside of hindwing with a broad grey-brown margin and a white base, in the cell, under the upperside's androconial patch, grey-brown.

Female with head, short palpa, thorax and abdomen bone-white, antennae basal half bone-white, distally grey. Legs pale brown-yellow. Forewings normal shaped, rather short, entirely bone-white, marginally fading to yellowish. Hindwings off-white, paler than the forewings, no pattern. Underside identical to upperside.

**Male genitalia:** [RMNH.INS.1282815] Uncus beak-shaped, broadly based, apex narrow with a sharp point. Tegumen wide and robust. Vinculum with a short flattened saccus. Valvae of the typical *Notata* structure, costa of cucullus straight with a regularly curved distal process, at its base with a stronger sclerotized ridge, and with a rather sharp apex which does just not reach the apex of the sacculus (in comparison: in *sinnemai* the costa of cucullus not straight, long distal process, with blunt apex, passing the apex of sacculus). Smaller distal process on cucullus digitiform, projecting straight distally (in *sinnemai* thumb-shaped and curved). Sacculus with basal sclerotized flap narrower than in *sinnemai*, median sclerotized flap rather narrow and reaching the smaller distal process on cucullus, sacculus distally slightly sclerotized with the distal part almost squarish (in *sinnemai* broader and more triangular). Aedeagus small, basally broad, curved in the middle and distally narrow. Vesica with finely scobinated fields, no larger cornuti visible.

**Female genitalia:** [RMNH.INS.1282809] Antrum very small, hardly visible, ductus bursae straight forming a thick sclerotized tube running into a wrinkled globular cervix bursae which has a wide connection at the right to the ductus seminalis, running in a large globular bulla seminalis. At the left the cervix is widely connected to a small globular bursae which has a broad curved band of densely arranged spiculae-shaped signa (in *sinnemai* this band is positioned in the middle and much less densely arranged with spiculae-shaped signa), and with some scobination in the middle of the bursa.

**Distribution:** The species is with certainty known from the northern Arfak Mountains, Papua Barat, Indonesia.

There are two females (RMNH.INS.1282801 and 1282803) collected in Lelambo, Jayawijaya Mountains (Central Mountain Range) that externally look very similar but the genitalia are different and the wide gap between the Arfak Mountains and the Jayawijaya Mountains, with all their isolated habitats, do all together indicate to be very cautious with interpreting without having seen males from this area.

**Etymology:** The species is named in honour of Miss Sandra (Alexandra Maria) Lamberts (Egmond aan Zee, The Netherlands), who as photographer accompanied the 2011 expedition of the Papua Insects Foundation to the Arfak Mountains, and during which the holotype was collected. She made thousands of great pictures that are used for the website [papua-insects.nl](http://papua-insects.nl). She is a passionate lover of nature and insects who travelled to all kind of nature reserves all around the world.

***Notata sinnemai spec. nov.*** (figs 9-10, 15, 22-23, 30-31)

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**Holotype:** RMNH.INS.1282838: ♂, Indonesia, Papua Barat, Birdshead Peninsula, Arfak Mountains, Mokwam, 1510 m, 1°06'S – 133°54'E, 6-10.xi.2011, at light, Papua Insects Foundation.

**Paratypes** (3 ♂♂, 1 ♀): RMNH.INS.1282839, 1282861, 1282812: 2 ♂♂, 1 ♀, Indonesia, Papua Barat, Birdshead Peninsula, Arfak Mountains, Demaisi, 1645 m, 1°10'S – 133°53'E, 24.x.2014, at light, S. & J. Sinnema, F. Groenen & P.J. Zumkehr; KSP65142: 1 ♂, Indonesia, Papua Barat, Birdshead Peninsula, Arfak Mountains, Demaisi, 1637 m, 1°10'S – 133°53'E, 14.xi.2011, at light, Papua Insects Foundation.

**Diagnosis:** Male with forewings off-white. Androconial patches smaller than in *lambertsae*, pale brown with golden shimmer. Hindwings with rounded termen and apex, no angle. Female white with dark brown abdomen and hindwing with faint dark grey ternal patch.

**Description:** Fwl. ♂ 8.3-8.8 mm, ♀ 9.4 mm. Male with head, very short palpa, and thorax white. Antennae basal half white, distal half black. Abdomen with dark grey scales, anal tuft off-white. Legs bone-white. Forewing rather narrow, white. At the underside of forewing white, clouded with grey-brown, at costa and apex more grey-brown. In the cell a brown oval androconial patch with a golden shimmer, this patch being smaller than in *lambertsae* and shines through the upperside of the forewing, more stronger than it does in *lambertsae*. Hindwings almost circular, without angled apex. Ground colour grey, in the cell a brown oval andronial patch with a golden shimmer, which is smaller than in *lambertsae*.

Female with head, very short palpa, and thorax pure white. Antennae basal half white, distal half dark brown. Abdomen with dark brown scales, anal tuft grey-white. Legs bone-white. Forewings of normal lithosiine shape, silky white. Underside of forewing white with marginally and at costa clouded pale grey-brown. Hindwings white, in tornus with a faint dark grey patch.

**Male genitalia:** [RMNH.INS.1282839] Uncus pear-shaped, broadly based, apex narrow with a sharp point. Tegumen wide and robust. Vinculum with a short flattened saccus. Valvae of the typical *Notata* structure, costa of cucullus basal half straight, at base of distal process

broadened with a strongly sclerotized curved ridge, and curved to a long slender process with a blunt apex which just passes the apex of the sacculus. Smaller distal process of cucullus thumb-shaped and curved. Sacculus with basal sclerotized flap rather broad (in *lambertsae* narrower), median sclerotized flap broad, triangular shaped and not reaching the thumb-shaped smaller distal process on cucullus (in *lambertsae* this flap is narrow and reaching the smaller distal process). Sacculus distally broad and slightly sclerotized, more or less triangular. Aedeagus small, bottle-shaped, vesica with large finely scobinated fields and one small thorn-shaped cornutus.

**Female genitalia:** [RMNH.INS.1282812] Antrum like a collar at the beginning of the sclerotized tube of the ductus bursae (which is slightly broader than in *lambertsae*). Ductus bursae continued by the small wrinkled oval cervix bursae which has at the right side a wide connection to the broad ductus seminalis with a large globular bulla seminalis. At the left the cervix is broadly connected to the smaller globular bursa copulatrix which has in the middle a broad band of widely rather messy arranged spiculae-shaped signa, and has a slightly scobinated bottom.

**Distribution:** The species is found in the northern part of the Arfak Mountains, Papua Barat, Indonesia, at altitudes of 1500-1650 meter.

**Etymology:** The species is named in honour of Mr. Siep (Sijberen Gerben) Sinnema (Hemrik, The Netherlands), secretary of the Papua Insects Foundation, my friend and colleague, who is specialized in the Uraniidae of South East Asia. He accompanied the expeditions in 2011 and 2014 when the types of this species were collected.

***Notata aurifimbria* spec. nov.** (figs 11, 32-33)

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**Holotype:** RMNH.INS.1282799: ♀, Indonesia, Irian Jaya, Baliemvalley, Jiwika, 1600 m, at light, 21.x.1993, A.J. de Boer, A.L.M. Rutten & R. de Vos.

**Diagnosis:** Forewings and hindwings of female silky white, fringes grey with golden shimmer.

**Description:** Fwl. ♀ 9.7 mm. Head and thorax bone-white. Antennae basally bone-white, distally suffused dark brown. Abdomen buff. Legs bone-white. Forewing silky white, fringes grey with golden shimmer. Hindwings white, near apex slightly suffused with grey, accentuating the veins. Fringes grey with golden shimmer. Underside white, forewings marginally and at costa suffused with grey.

Male unknown.

**Female genitalia:** [RMNH.INS.1282799] Similar to *sinnemai*. Ductus bursae a sclerotized straight tube and rather broad, antrum at the beginning of this tube collar shaped. Oval cervix bursae rather smooth, at the right side broadly connected to the ductus seminalis with a large globular bulla seminalis. The cervix at the left side broadly connected to the globular bursa copulatrix which has a broad down-curved band of orderly arranged spiculae-shaped signa just below the middle of the bursa (in *sinnemai* this band is in the middle and messy arranged signa), at the bottom of the bursa with tiny scobination.

**Distribution:** The species has been found in the Baliem Valley, Papua, Indonesia, in the village Jiwika, at an altitude of about 1600 meter.

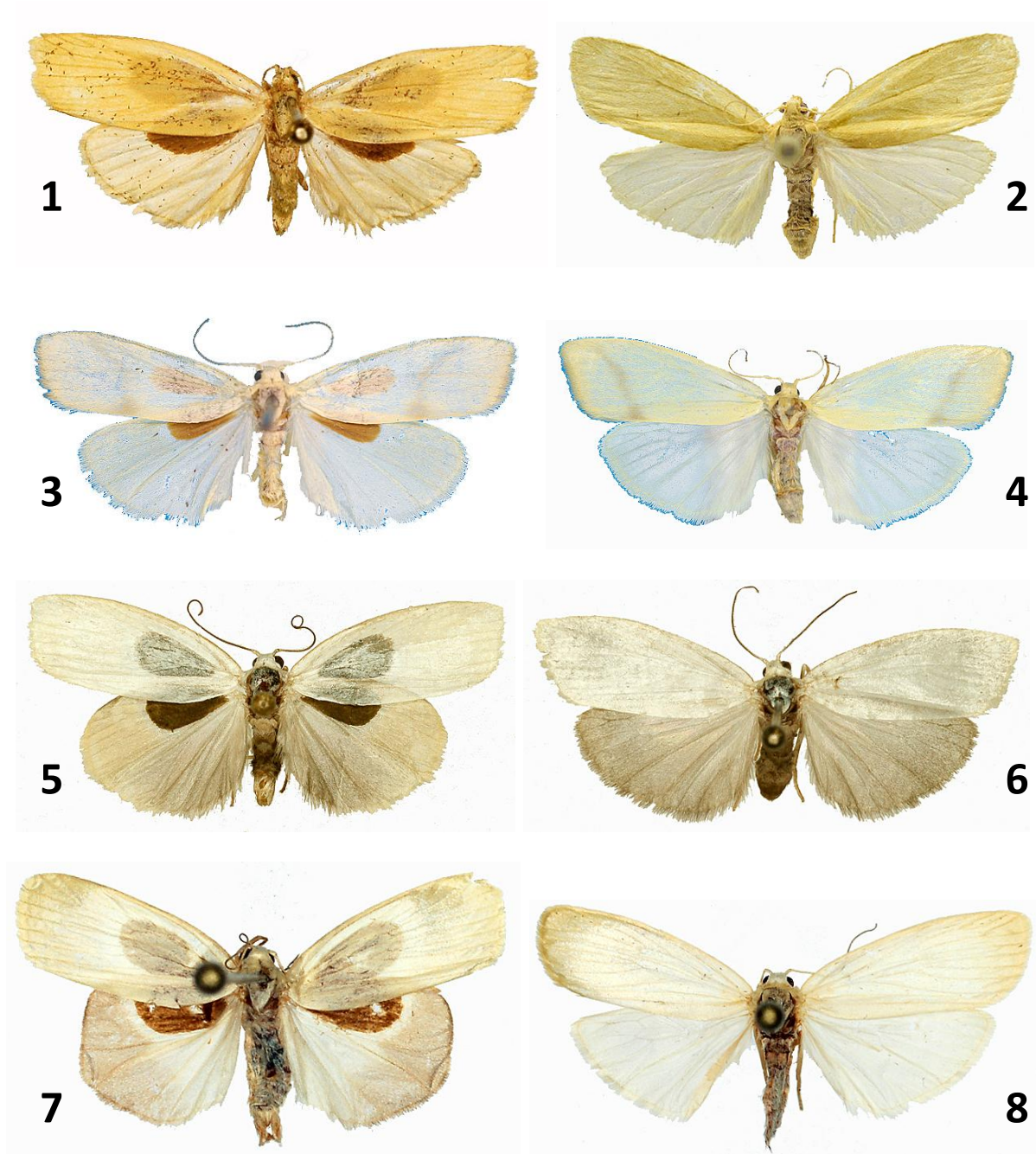
**Etymology:** The species name refers to the golden shimmer on the grey wing fringes.

### **Acknowledgements**

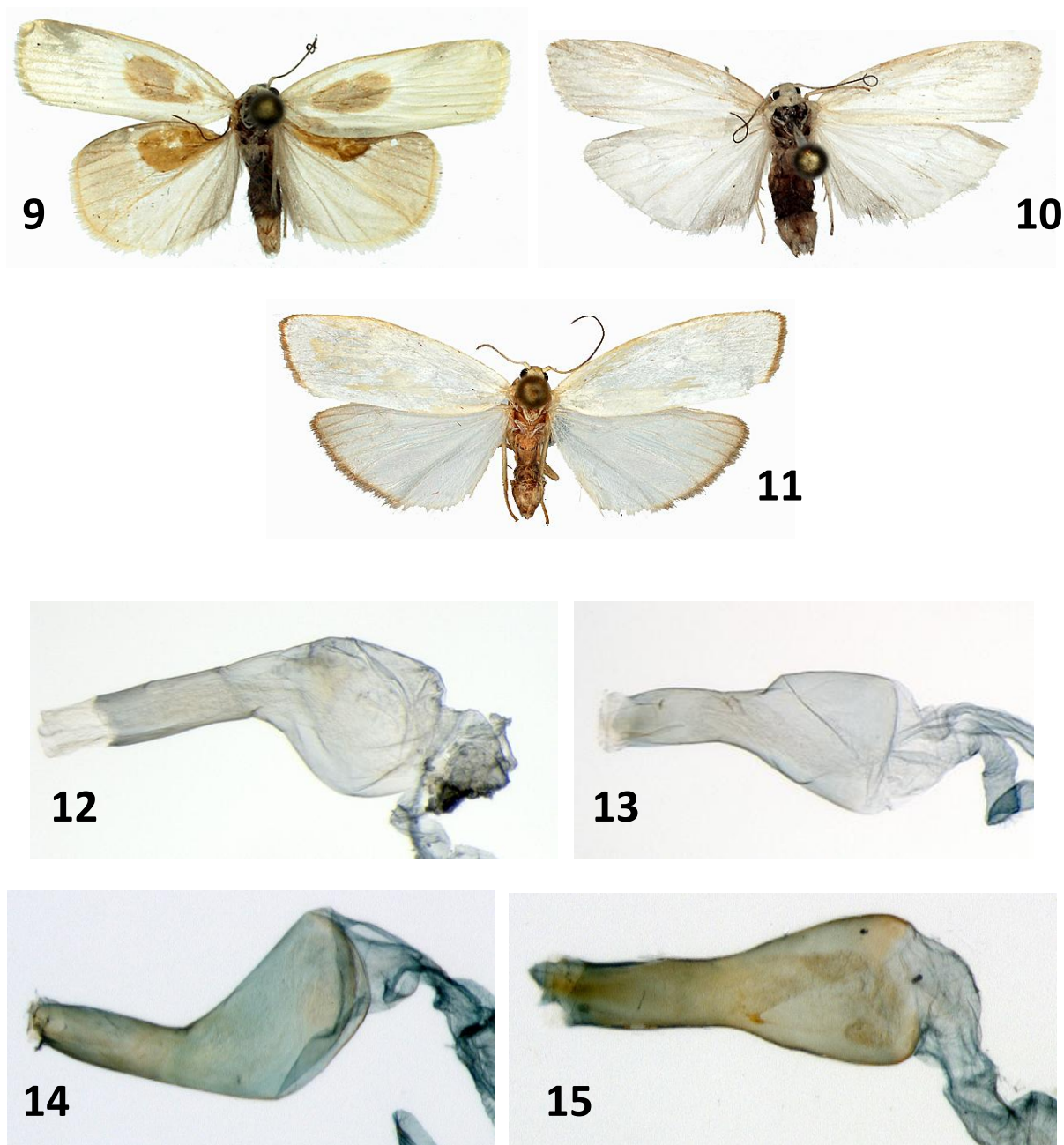
I am grateful for the help of the following persons and institutions: Alberto Zilli (Natural History Museum, London) for preparing and photographing the female genital slide of *Notata parva*; Margaret Rosati and Scott Miller (Smithsonian National Museum of Natural History) for respectively the photograph and permission to use the photograph of the female of *Notata parva* (sample USNM-ENT 00980606); David Britton and You Ning Su (Australian Museum, CSIRO) for respectively the photograph and permission to use the photographs of *Notata modicus*; and finally but not least the Uyttenboogaart-Eliassen foundation (NEV, The Netherlands) for financing the travels to the collections and to Indonesia.

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**Figs 1-8.** *Notata* species: **1.** *Notata parva* Hampson, 1891, ♂, Bali, Indonesia, RMNH; **2.** *N. parva* Hampson, 1891, ♀, Sabah, Borneo, Malaysia, USNM-ENT 00980606, Margaret Rosati; **3.** *N. modicus* (Lucas, 1892), ♂, Queensland, Australia, CSIRO, David Britton; **4.** *N. modicus* (Lucas, 1892), ♀, Queensland, Australia, CSIRO, David Britton; **5.** *N. zumkehri* De Vos & Van Mastrigt, 2007, holotype ♂, Pass Valley, Papua, Indonesia, RMNH; **6.** *N. zumkehri* De Vos & Van Mastrigt, 2007, paratype ♀, Walmak, Papua, Indonesia, RMNH; **7.** *N. lambertsae* **spec. nov.**, holotype ♂, Demaisi, Papua Barat, Indonesia, RMNH.INS.1282814; **8.** *N. lambertsae* **spec. nov.**, paratype ♀, Demaisi, Papua Barat, Indonesia, RMNH.INS.1282809.



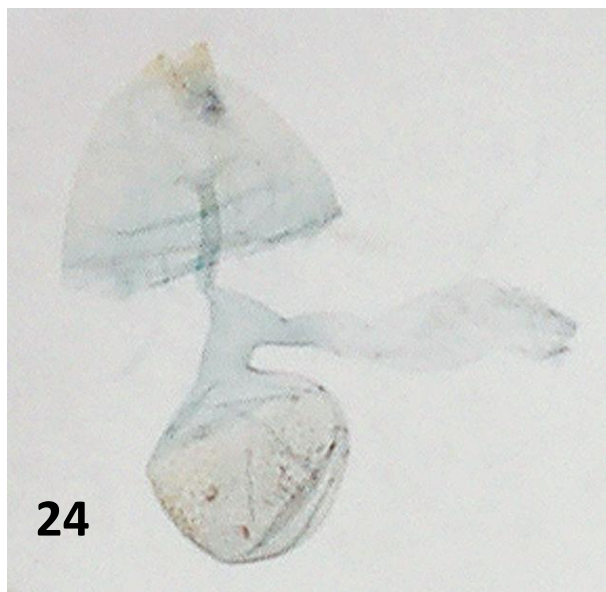
**Figs 9-11.** *Notata* species: **9.** *Notata sinnemai* **spec. nov.**, holotype ♂, Mokwam, Papua Barat, Indonesia, RMNH.INS.1282838; **10.** *N. sinnemai* **spec. nov.**, paratype ♀, Demaisi, Papua Barat, Indonesia, RMNH.INS.1282812; **11.** *N. aurifimbria* **spec. nov.**, holotype ♀, Jiwika, Baliem Valley, Papua, Indonesia, RMNH.INS.1282799.

**Figs 12-15.** Aedeagi of male *Notata* species: **12.** *Notata parva*, RV1194; **13.** *N. zumkehri*, RV1191; **14.** *N. lambertsae*, RMNH.INS.1282815; **15.** *N. sinnemai*, RMNH.INS.1282839.

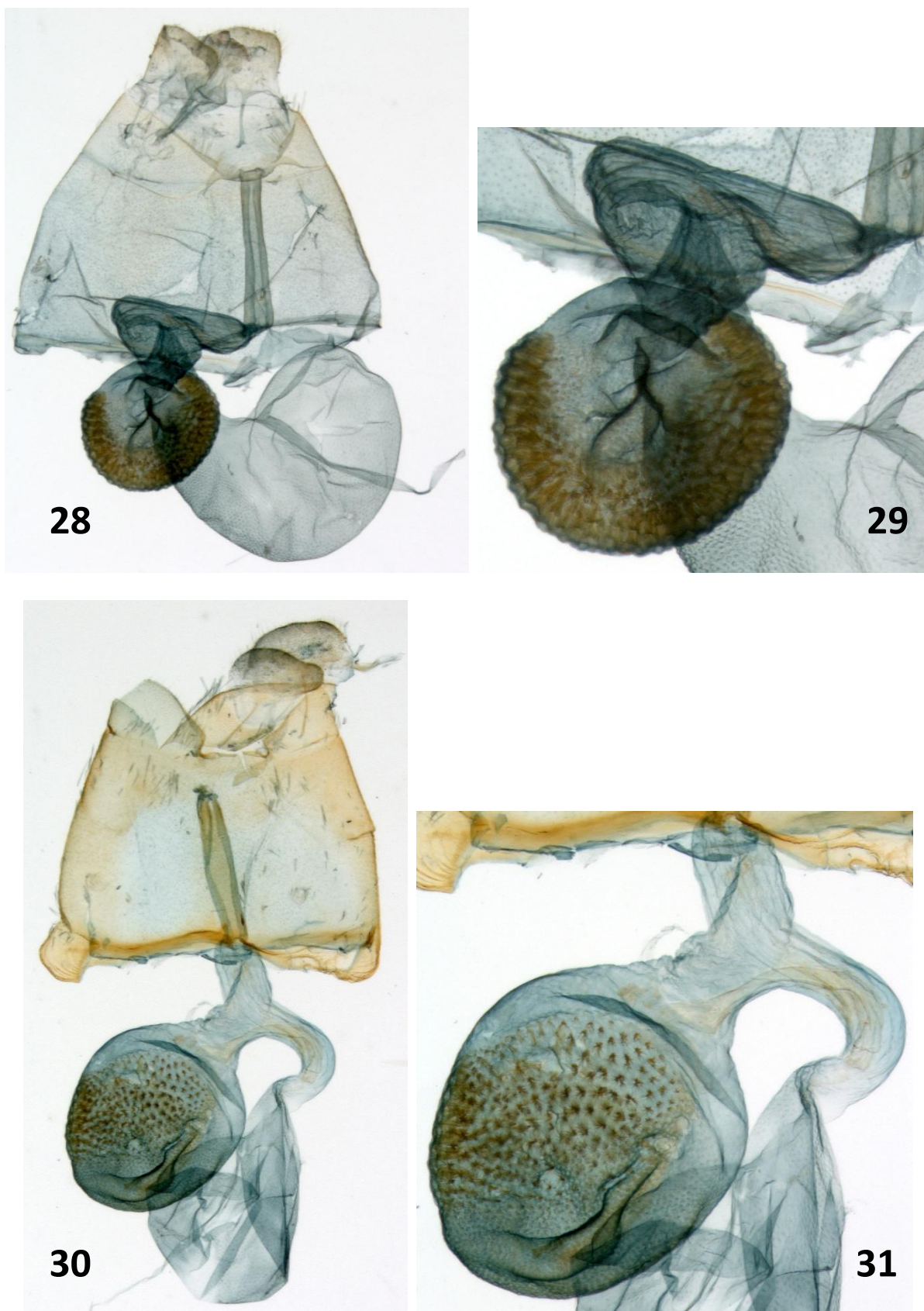




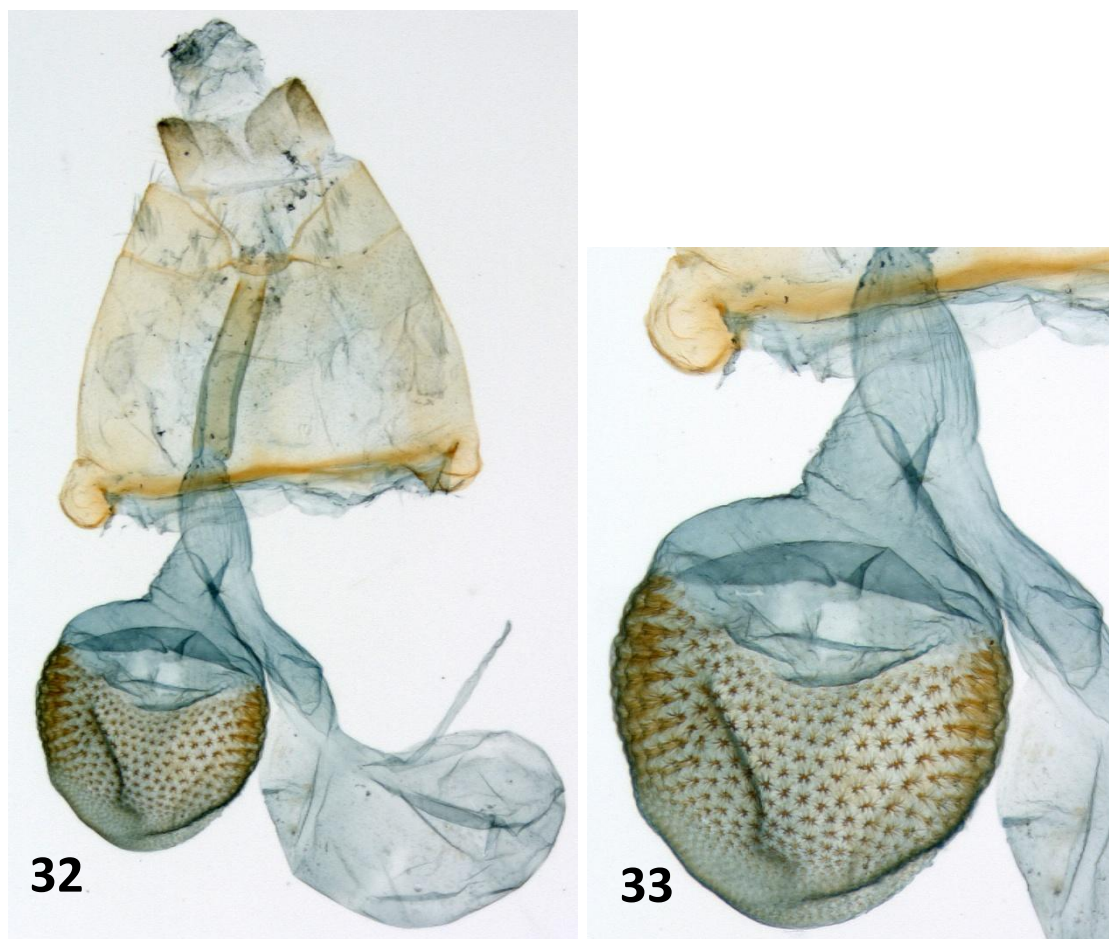
**Figs 16-23.** Male genitalia of *Notata* species, arrow points at small distal process on cucullus: **16.** *Notata parva*, genital armature, RV1194; **17.** *N. parva*, distal part of left valve, RV1194; **18.** *N. zumkehri*, genital armature, RV1191; **19.** *N. zumkehri*, distal part of left valve, RV1191; **20.** *N. lambertsae*, genital armature, RMNH.INS.1282815; **21.** *N. lambertsae*, distal part of left valve, RMNH.INS.1282815; **22.** *N. sinnemai*, genital armature, RMNH.INS.1282839; **23.** *N. sinnemai*, distal part of left valve, RMNH.INS.1282839.



**Figs 24-27.** Female genitalia of *Notata* species: **24.** *Notata parva*, genital, BMNH5010; **25.** *N. parva*, detail of bursa, BMNH5010; **26.** *N. zumkehri*, genital, RV1192; **27.** *N. zumkehri*, detail of bursa, RV1192.



**Figs 28-31.** Female genitalia of *Notata* species: **28.** *Notata lambertsae*, genital, RMNH.INS.1282809; **29.** *N. lambertsae*, detail of bursa, RMNH.INS.1282809; **30.** *N. sinnemai*, genital, RMNH.INS.1282812; **31.** *N. sinnemai*, detail of bursa, RMNH.INS.1282812.



**Figs 32-33.** Female genitalia of *Notata aurifimbria*: **32.** Genital, RMNH.INS.1282799; **33.** Detail of bursa, RMNH.INS.1282799.