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Re-Examination: No True *Tabidia* Snellen, 1880 (Lepidoptera: Crambidae) in China, with Descriptions of Two New Genera and Three New Species

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Simple Summary

Based on morphological and molecular evidence, this study revises the crambid genus *Tabidia* Snellen, 1880, confirming that no true species of this genus are distributed in China. Two new genera, *Scintilla* **gen. nov.** and *Melanoleuca* **gen. nov.**, are established and assigned to the tribe Agroterini Acloque, 1897. Additionally, three new species are described within *Melanoleuca* **gen. nov.** This study clarifies the taxonomic boundaries of this group in China and provides a foundation for related systematic research.

Abstract

Many species within the genus *Tabidia* Snellen, 1880 exhibit significant differences in wing pattern and genital morphology, which are inconsistent with the definition of *Tabidia*, indicating that the genus is not monophyletic. To address this, the present study revises the taxonomy of the Chinese species previously placed in *Tabidia* based on wing morphological characteristics, differences in male and female genitalia, and phylogenetic relationships inferred from the mitochondrial *COI* gene and mitochondrial genomes. As a result, two new genera are established: *Melanoleuca* **gen. nov.** and *Scintilla* **gen. nov.** These new genera are confirmed to belong to the tribe Agroterini Acloque, 1897. Furthermore, three cryptic new species are discovered: *Melanoleuca luteamacula* **sp. nov.**, *Melanoleuca qianshanensis* **sp. nov.**, and *Melanoleuca yingshanensis* **sp. nov.** Based on the morphological characteristics of adult appearance and genitalia, an identification key to the species of these two new genera is provided. Illustrations of adult specimens and their genital structures are provided, along with a world catalog of the species for the three relevant genera: *Tabidia*, *Melanoleuca*, and *Scintilla*.

Keywords: cryptic species; *Melanoleuca* **gen. nov.**; phylogeny; revision; *Scintilla* **gen. nov.**; Spilomelinae; taxonomy

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1. Introduction

The genus *Tabidia* Snellen, 1880 belongs to the subfamily Spilomelinae (Lepidoptera: Crambidae). It was established by Snellen (1880) [1] with *Tabidia insanalis* as the type

species; however, its taxonomic placement at the tribal level remains unstudied [2]. To date, 13 species are known worldwide, primarily distributed in the Oriental and Australasian regions [3–16]. Apart from the original descriptions, taxonomic research on this genus has been limited globally, with most studies focusing on Chinese fauna. Du & Li (2014) revised the Chinese species of *Tabidia*, describing the new species *T. obvia* Du & Li, 2014 and redescribing *T. strigiferalis* Hampson, 1900 and *T. candidalis* (Warren, 1896) [15]. Recently, Wang et al. (2024) described *T. longatuba* Wang, Du & Xiao, 2024 [16]. Consequently, four species of *Tabidia* are currently recorded in China.

Significant differences in external appearance and genital morphology were observed among the species of this genus, indicating that it might not be monophyletic. This suspicion is supported by traditional morphological characteristics: Hampson (1896) mentioned in the generic diagnosis that males possess a tuft of large, decumbent scales on the dorsum at the base of the median vein on the forewing [5]. However, Du & Li (2014) found that this character is present only in some species, such as *T. insanalis* Snellen, 1880, *T. aculealis* (Walker 1866), and *T. craterodes* Meyrick, 1894, but is absent in *T. candidalis* (Warren, 1896), *T. fuscifusalis* Hampson, 1917, *T. strigiferalis* Hampson, 1900 and the newly described *T. obvia* Du & Li, 2014 [15].

To address these taxonomic uncertainties and test the hypothesis of non-monophyly, the present study conducted a comprehensive re-examination of the Chinese species previously assigned to *Tabidia*. We integrated evidence from adult morphology, genitalia structure, mitochondrial *COI* barcoding, and complete mitogenome phylogenetics. The primary aims of this work are to: evaluate the monophyly of *Tabidia* with respect to Chinese fauna; clarify the phylogenetic relationships and tribal placement of these taxa; and establish a robust taxonomic framework for this group in China. The findings are expected to provide a foundation for a future global revision of *Tabidia* and related genera.

2. Materials and Methods

2.1. Taxon Sampling

Specimens examined in this study were collected mainly with light traps in the Chinese provinces of Hubei, Anhui, Henan, and Yunnan. Legs were removed from freshly collected individuals for molecular analysis. We generated *COI* DNA barcode data for the Chinese species formerly assigned to *Tabidia*, in addition to sequencing the complete mitochondrial genomes of the type species of the two new genera: *Scintilla strigiferalis* (Hampson, 1900) **comb. nov.** (PQ821889) and *Melanoleuca luteamacula* **sp. nov.** (PQ631180). All newly produced sequences have been deposited in GenBank, with the mitogenomes accessible under the accession numbers provided above, and *COI* barcode sequences under accession numbers OR371985–OR371989, OR596415, OR596416, PQ801142, PQ801143, and PQ817972 (see Table 1 for further details). To complement the dataset, additional sequences of related genera were obtained from BOLD (http://www.boldsystems.org, accessed on 22 September 2025) and GenBank (https://www.ncbi.nlm.nih.gov/genbank/, accessed on 22 September 2025) for phylogenetic reconstruction. Detailed collection information, BOLD sample IDs, and GenBank accession numbers are listed in Tables 1 and 2. The holotype and paratype specimens of the new species described in this work are deposited in the Biological Specimen Museum, Huanggang Normal University, Huanggang, China (HGNU).

Table 1. List of taxa used for reconstructing the *COI*-based phylogeny.

Tribe	Species	Location	NCBI and BOLD Accession No.
Outgroup	*Ostrinia nubilalis* (Hübner, 1796)	Italy, South Tyrol	TLMF Lep 17359
Outgroup	*Ostrinia furnacalis* (Guenée, 1854)	Australia, Queensland	ANIC Gen No. 001009
Unplaced	*Daulia arizonensis* Munroe, 1957	United States, Arizona	HM406212
Wurthiini	*Cotachena alysoni* Whalley, 1961	China, Shanxi	Pyr000807
Agroterini	*Agrotera basinotata* Hampson, 1891	Australia, Queensland	HQ952613
Unplaced	*Tabidia insanalis* Snellen, 1880	Papua New Guinea, Madang	USNM ENT 00204919
Unplaced	*Tabidia insanalis* Snellen, 1880	Papua New Guinea, Madang	USNM ENT 00704561
Agroterini	*Melanoleuca luteamacula* **sp. nov.**	China, Hubei, Wuxue	PQ801143
Agroterini	*Melanoleuca qianshanensis* **sp. nov.**	China, Anhui, Qianshan	OR371989
Agroterini	*Melanoleuca yingshanensis* **sp. nov.**	China, Hubei, Yingshan	PQ801142
Agroterini	*Melanoleuca yingshanensis* **sp. nov.**	China, Jiangxi, Guanshan	PQ817972
Agroterini	*Melanoleuca longatuba* (Wang, Du & Xiao, 2024) **comb. nov.**	China, Hubei, Yingshan	OR371985
Agroterini	*Melanoleuca longatuba* (Wang, Du & Xiao, 2024) **comb. nov.**	China, Hubei, Wuxue	OR371986
Agroterini	*Melanoleuca longatuba* (Wang, Du & Xiao, 2024) **comb. nov.**	China, Hubei, Wuxue	OR596416
Trichaeini	*Prophantis adusta* Inoue, 1986	China, Hubei	Pyr000776
Unplaced	*Pycnarmon cribrata* (Fabricius, 1794)	China, Hubei	Pyr000683
Agroterini	*Patania concatenalis* (Walker, 1866)	China, Hainan	KU143840
Agroterini	*Scintilla obvia* (Du & Li, 2014) **comb. nov.**	China, Hubei, Yingshan	OR371988
Agroterini	*Scintilla strigiferalis* (Hampson, 1900) **comb. nov.**	China, Anhui, Lujiang	OR371987
Agroterini	*Scintilla strigiferalis* (Hampson, 1900) **comb. nov.**	China, Anhui, Huoshan	OR596415
Agroterini	*Nagiella hortulatoides* Munroe, 1976	China, Yunnan	PQ463665
Nomophilini	*Mecyna tricolor* (Butler, 1879)	China, Tianjin	Pyr001404
Wurthiini	*Mimetebulea arctialis* Munroe & Mutuura, 1968	China, Hubei	Pyr000232
Nomophilini	*Diasemia accalis* (Walker, 1859)	China, Guizhou	Pyr001026
Unplaced	*Tabidia inconsequens* (Warren, 1896)	Australia, Queensland	10ANIC-10498
Herpetogrammatini	*Herpetogramma stramineata* (Hampson, 1912)	Costa Rica, Guanacaste	JQ605852
Herpetogrammatini	*Metoeca foedalis* (Guenée, 1854)	Australia, Queensland	HQ952650
Unplaced	*Tabidia defloralis* (Snellen, 1883)	Indonesia, Kalimantan Timur	RMNH.INS.19697
Herpetogrammatini	*Herpetogramma platycapna* (Meyrick, 1897)	Malaysia, Bangi	KC881245
Herpetogrammatini	*Herpetogramma luctuosalis* (Guenée, 1854)	China, Hubei	Pyr000626

2.2. Morphological Methods

Genitalia were dissected and prepared following the protocol established by Li and Zheng (1996) [17]. Morphological terminology conforms to the standards outlined by Maes (1995) [18] and Kristensen (2003) [19]. Adult and genitalia images were captured using a Canon EOS 70D camera (Canon Inc., Tokyo, Japan) equipped with an EF 180mm f/3.5L USM macro lens and a Nexcope NE930 microscope (Yongxin Optics Co., Ltd., Ningbo, China), respectively. Image refinement was performed using Adobe Photoshop® 2020 (Adobe Inc., San Jose, CA, USA).

2.3. DNA Barcoding Acquisition

Genomic DNA was extracted from the legs of dried adult specimens using the TIANamp Genomic DNA Kit (DP304, Tiangen Biotech Co., Ltd., Beijing, China). A 658 bp fragment of the cytochrome c oxidase subunit I (COI) gene was amplified with the primers

LepF1 and LepR1 [20]. PCR products were sent to Tianyi Huayu Gene Co., Ltd., (Wuhan, China) for bidirectional Sanger sequencing using the same primers. The PCR program included an initial denaturation at 95 °C for 3 min; 35 cycles of 95 °C for 30 s, 55 °C for 30 s, and 72 °C for 1 min, with a final extension at 72 °C for 5 min.

2.4. Mitogenome Extraction, Assembly, and Annotation

Total genomic DNA was isolated from specimen legs using a DNA extraction kit (CWBIO, Jiangsu Cowin Biotech Co., Ltd., Taizhou, China). Sequencing libraries with an average insert size of 350 bp were prepared using the Nextera XT DNA Library Preparation Kit (Illumina, San Diego, CA, USA) and sequenced on the Illumina NovaSeq 6000 platform (Illumina, San Diego, CA, USA). Raw reads were processed with the NGS QC Toolkit (National Institute of Plant Genome Research, New Delhi, India) [21] to obtain high quality clean data. Assembly was performed de novo using SPAdes v3.14.1 (Center for Algorithmic Biotechnology, St. Petersburg State University, St. Petersburg, Russia) [22]. The complete mitochondrial genome was annotated with MITOS (http://mitos.bioinf.uni-leipzig.de, developed by the research team at Leipzig University, Leipzig, Germany, among others). Quality metrics including sequencing depth, GC content, Q20, and Q30 were assessed. Experimental procedures were conducted by Tianyi Huayu Gene Co., Ltd., (Wuhan, China) (https://www.tyhygene.com/).

2.5. Phylogenetic Analysis

Based on *COI* sequences, a phylogenetic tree was constructed, including 51 species across 51 genera from 7 tribes (excluding unplaced taxa) within Spilomelinae, using *Ostrinia nubilalis* and *O. furnacalis* as outgroups (Table 1). The *COI* gene tree was reconstructed using Bayesian Inference (BI) in PhyloSuite v1.2.3 (developed by the research team led by Dong Zhang at Lanzhou University, in collaboration with Fujian Agriculture and Forestry University and the Institute of Hydrobiology, Chinese Academy of Sciences, China) [23,24]. The analysis was performed with MrBayes v3.2.7 (developed by Ronquist et al.) [25] under the GTR+I+G+F model for 2 million generations, with the first 25% of samples discarded as burn-in. Numbers in Figure 1 at nodes indicate Bayesian posterior probabilities. Habitus images of some *Tabidia* species were obtained from the BOLD database with permission. Pairwise genetic distances based on the *COI* sequences were calculated using the Kimura 2-parameter (K2P) model in MEGA v11.0.13 [26].

For mitogenome based phylogeny, 13 protein coding genes (*ND2*, *COX1*, *COX2*, *ATP8*, *ATP6*, *COX3*, *ND3*, *ND5*, *ND4*, *ND4L*, *ND6*, *CYTB*, *ND1*) and two rRNA genes (rrnS, rrnL) were used. Eight pyraloid species served as outgroups. Additional mitogenomes of crambid taxa, particularly from Spilomelinae, were retrieved from GenBank (Table 2). Maximum likelihood phylogenies were reconstructed using IQ-TREE v2.2.0 [27] under the Edge-linked partition model. Branch support was evaluated with 5000 ultrafast bootstrap replicates [28], along with the approximate Bayes test [29] and the Shimodaira–Hasegawa-like approximate likelihood-ratio test [30]. All analyses were performed using PhyloSuite v1.2.3 [23,24]. Phylogenetic visualization was performed using Chiplot (https://www.chiplot.online/) [31].

Table 2. List of taxa used for reconstructing the phylogeny based on mitochondrial genome sequences.

Family	Subfamily	Species	GenBank Acc. No.	References
Pyralidae	Pyralinae	*Pyralis farinalis* (Linnaeus, 1758)	MN442120	[32]
		Aglossa dimidiatus Haworth, 1809	MW542312	[33]
		Endotricha olivacealis (Bremer, 1864)	MZ823344	[34]
	Epipaschiinae	*Orthaga olivacealis* (Bremer, 1864)	MZ823349	[34]
		Lista haraldusalis (Walker, 1859)	KF709449	[35]
	Phycitinae	*Dioryctria yiai* Mutuura & Munroe, 1972	MN658208	[36]
		Plodia interpunctella (Hübner, 1813)	KP729178	[37]
		Ephestia elutella (Hübner, 1796)	MG748858	[38]
Crambidae	Glaphyriinae	*Evergestis junctalis* (Warren, 1892)	KP347976	[39]
		Hellula undalis (Fabricius, 1781)	KJ636057	[40]
	Odontiinae	*Pseudonoorda nigropunctalis* (Hampson, 1899)	MW732139	[41]
		Heortia vitessoides (Moore, 1885)	MW732138	[41]
		Dausara latiterminalis Yoshiyasu, 1995	MW732137	[41]
	Scopariinae	*Eudonia angustea* Curtis, 1827	KJ508052	[42]
	Crambinae	*Chilo infuscatellus* Snellen, 1890	OR288533	[43]
		Pseudargyria interruptella (Walker, 1866)	KP071469	[44]
		Parapediasia teterrellus (Zincken, 1821)	MK122627	Unpublished
		Crambus perlellus Scopoli, 1763	OL350848	[45]
	Schoenobiinae	*Scirpophaga incertulas* (Walker, 1863)	KF751706	Unpublished
	Acentropinae	*Parapoynx crisonalis* (Walker, 1859)	KT443883	[46]
		Cataclysta lemnata (Linnaeus, 1758)	MT410858	Unpublished
		Paracymoriza prodigalis (Leech, 1889)	JX144892	[47]
		Elophila interruptalis (Pryer, 1877)	KC894961	[48]
	Pyraustinae	*Ostrinia furnacalis* (Guenée, 1854)	ON645200	[49]
		Sitochroa verticalis (Linnaeus, 1758)	OK235314	Unpublished
		Loxostege aeruginalis (Hübner, 1796)	MN635734	[45]
		Eumorphobotys eumorphalis (Caradja, 1925)	OR459845	[50]
		Circobotys aurealis (Leech, 1889)	OR459846	[50]
		Demobotys pervulgalis (Hampson, 1913)	OR459847	[50]
		Crypsiptya coclesalis (Walker, 1859)	OR459848	[50]
	Spilomelinae	*Omphisa fuscidentalis* (Hampson, 1896)	ON644345	[51]
		Leucinodes orbonalis Guenée, 1854	PP493058	[50]
		Tylostega tylostegalis (Hampson, 1900)	OQ472993	Unpublished
		Scintilla strigiferalis (Hampson, 1900) **comb. nov.**	PQ821889	This study.
		Nagiella inferior (Hampson, 1899)	MF373813	[52]
		Haritalodes derogata (Fabricius, 1775)	KR233479	[53]
		Melanoleuca luteamacula **sp. nov.**	PQ631180	This study.
		Patania balteata (Fabricius, 1798)	OQ472989	Unpublished
		Notarcha quaternalis (Zeller, 1852)	OQ472988	Unpublished
		Spoladea recurvalis (Fabricius, 1775)	KJ739310	[54]
		Herpetogramma luctuosalis (Guenée, 1854)	OQ472987	Unpublished
		Prophantis adusta Inoue, 1986	OL753689	Unpublished
		Nomophila noctuella (Denis & Schiffermüller, 1775)	KM244688	[55]
		Syllepte taiwanalis Shibuya, 1928	OQ472992	Unpublished
		Pycnarmon lactiferalis (Walker, 1859)	KX426346	[56]
		Marasmia exigua (Butler, 1879)	MN877384	[57]
		Cnaphalocrocis patnalis (Bradley, 1981)	OL449028	[58]
		Maruca vitrata (Fabricius, 1787)	KJ623250	[59]
		Sinomphisa plagialis (Wileman, 1911)	MZ823346	[34]
		Conogethes punctiferalis (Guenée, 1854)	KX150457	[60]
		Pygospila tyres (Cramer, 1779)	ON939556	Unpublished
		Parotis amboinalis (Swinhoe, 1906)	OR195444	Unpublished
		Cydalima perspectalis (Walker, 1859)	KX762287	[52]
		Polythlipta liquidalis Leech, 1889	OQ439905	[61]
		Tyspanodes hypsalis Warren, 1891	KM453724	[62]
		Glyphodes pyloalis Walker, 1859	PP050457	Unpublished
		Omiodes indicata (Fabricius, 1775)	MG770232	[63]
		Palpita hypohomalia Inoue, 1996	MG869628	Unpublished
		Botyodes principalis Leech, 1889	MZ823351	[34]

3. Results

3.1. Phylogenetic Analysis Based on COI

A phylogenetic tree was constructed using available *COI* sequences (Table 1, Figures 1 and 2). *Tabidia insanalis* (the type species of *Tabidia*) clustered with *Agrotera barcealis* (Agroterini). *Tabidia inconsequens* clustered with *Patania concatenalis* (Agroterini). The species now assigned to *Scintilla* **gen. nov.** (*S. strigiferalis* and *S. obvia*) formed a monophyletic clade. The species assigned to *Melanoleuca* **gen. nov.** (excluding *M. candidalis* (Warren, 1896) **comb. nov.** for which data was unavailable) also formed a monophyletic clade. The *Scintilla* **gen. nov.** and *Melanoleuca* **gen. nov.** clades were located on branches distinct from those containing *T. insanalis* and *T. inconsequens*.

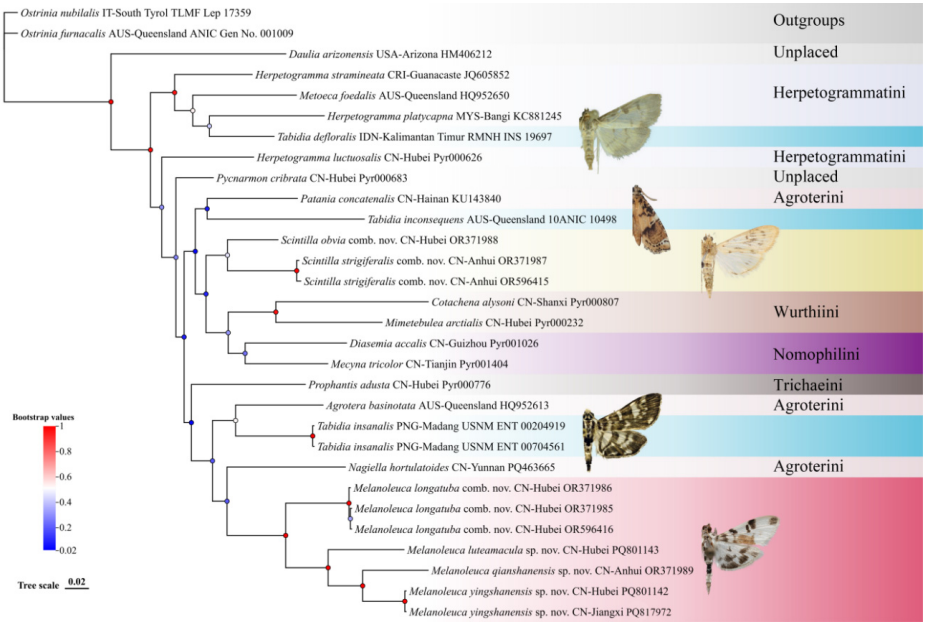


Figure 1. Phylogenetic relationships among *Scintilla* **gen. nov.**, *Melanoleuca* **gen. nov.**, *Tabidia*, and related genera, inferred from *COI* sequences using Bayesian Inference (BI).

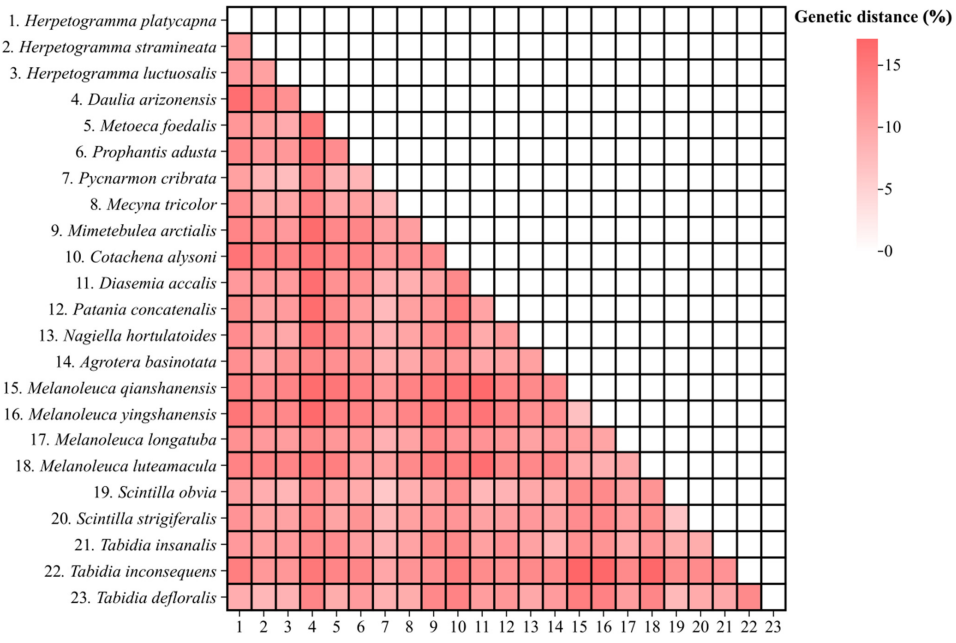


Figure 2. Kimura 2-parameter genetic distances (as percent) calculated between *Scintilla* **gen. nov.**, *Melanoleuca* **gen. nov.**, *Tabidia*, and related genera.

3.2. Mitogenome Characteristics

The complete mitochondrial genomes of the type species *Scintilla strigiferalis* (Hampson, 1900) **comb. nov.** and the type species *Melanoleuca luteamacula* **sp. nov.** were sequenced and assembled (Figure 3, Supporting Information, Tables S1 and S2). The mitogenome of *S. strigiferalis* was a circular molecule of 15,351 bp, with a GC content of 19.3% and a gene repertoire of 13 PCGs, 22 tRNAs, and 2 rRNAs. The mitogenome of *M. luteamacula* was 15,443 bp in length, with a GC content of 19.5%, and contained the same set of 37 genes. The gene order in both mitogenomes was identical to the inferred ancestral arrangement for Lepidoptera. The A+T-rich control region was located between rrnS and trnM, measuring 360 bp (A+T content: 95.8%) in *S. strigiferalis* and 334 bp (A+T content: 94.9%) in *M. luteamacula*.

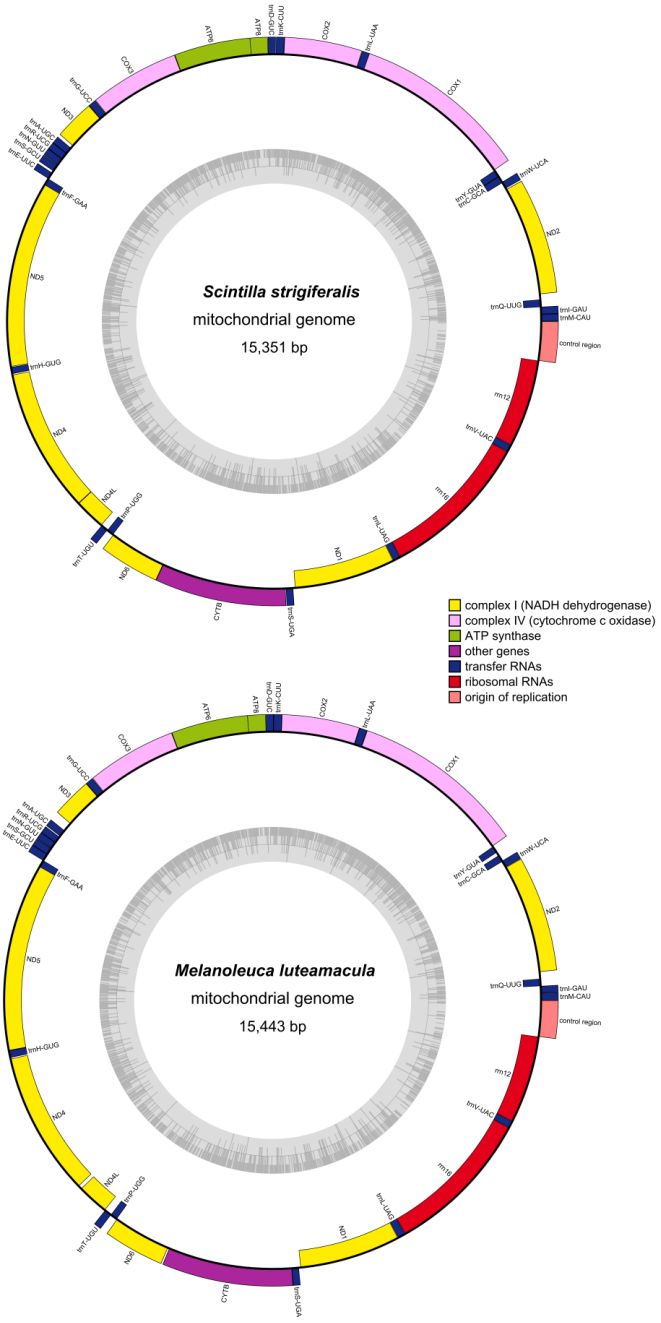


Figure 3. Visualization of the mitochondrial genomes of *Scintilla strigiferalis* (Hampson, 1900) **comb. nov.** and *Melanoleuca luteamacula* **sp. nov.**

3.3. Phylogenetic Analysis Based on Mitogenomes

A higher-level phylogenetic tree was reconstructed using mitochondrial genome data (Tables 2, S1 and S2, Figures 3 and 4). Within Crambidae, the eight subfamilies were divided into two major clades. Within Spilomelinae, the nine tribes formed a topology as follows: Lineodini + Agroterini + (((Hymeniini + Herpetogrammatini) + (Trichaeini + Nomophilini)) + (Spilomelini + Unplaced) + Margaroniini).

The type species of the two new genera, *Scintilla strigiferalis* (Hampson, 1900) **comb. nov.** and *Melanoleuca luteamacula* **sp. nov.**, were both placed within the tribe Agroterini. Their relationship to other Agroterini was recovered as: (*S. strigiferalis* + (*Nagiella inferior* + *Haritalodes derogata*)) + (*M. luteamacula* + (*Patania balteata* + *Notarcha quaternalis*)). *Tylostega tylostegalis* formed a separate branch outside the core Agroterini clade in our analysis.

Geographically, the revised genus *Tabidia* exhibits a tropical Asia-Australasia pattern with no confirmed records in China, while *Scintilla* **gen. nov.** and *Melanoleuca* **gen. nov.** are primarily distributed within East Asia (Figure 5). Notably, the three new *Melanoleuca* species described herein are endemic to specific mountainous regions of Central, Southwestern, and Eastern China (Figure 6).

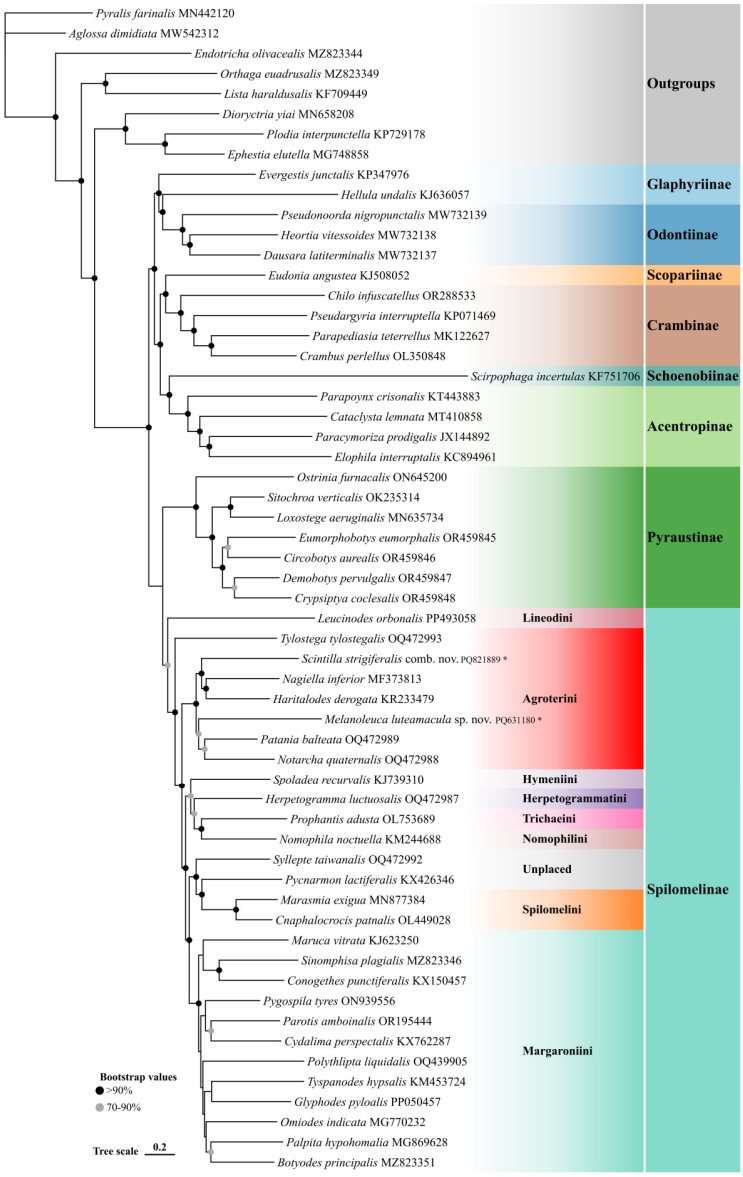


Figure 4. Maximum likelihood phylogeny based on complete mitochondrial genomes, illustrating the positions of *Scintilla* **gen. nov.** and *Melanoleuca* **gen. nov.** within Crambidae.

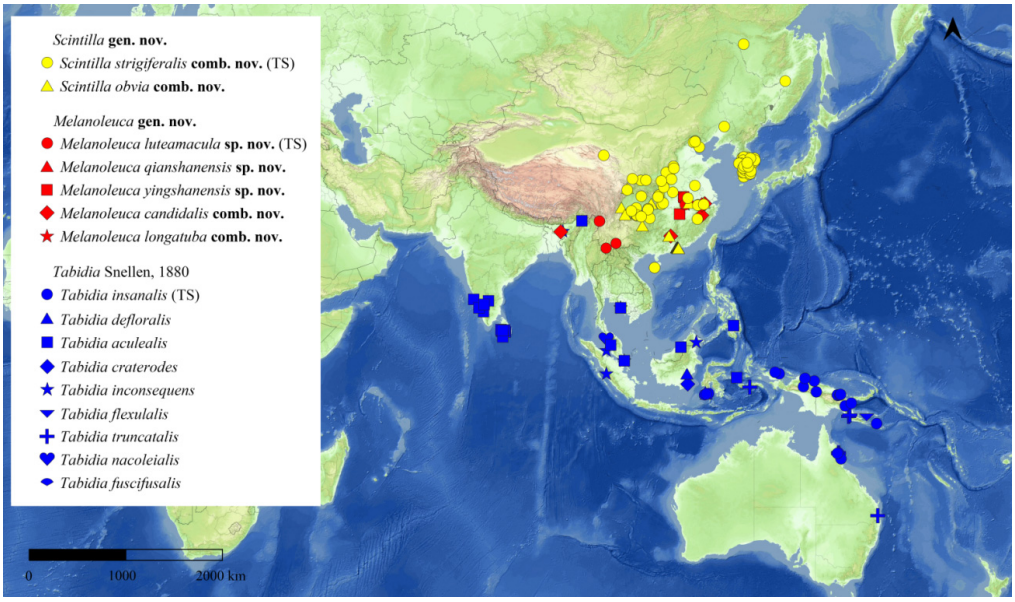


Figure 5. Distribution of *Scintilla* **gen. nov.**, *Melanoleuca* **gen. nov.**, and *Tabidia*. Yellow, red, and blue symbols represent two species of *Scintilla*; five species of *Melanoleuca*, and nine species of *Tabidia*, respectively.

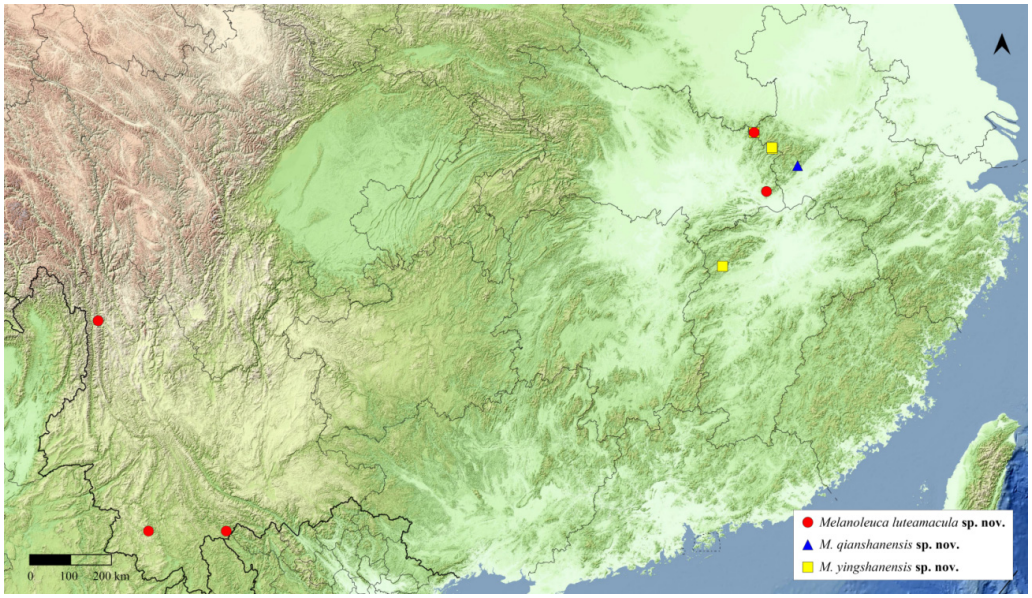


Figure 6. Type locality map of three new species in the genus *Melanoleuca* **gen. nov.**

3.4. Taxonomic Treatment of Scintilla Wang & Xiao, **gen. nov.**

Scintilla Wang & Xiao, **gen. nov.** [星火野螟属]
https://zoobank.org/90DECB15-9FB8-466F-928E-020F4832BEC0

Type species. *Scintilla strigiferalis* (Hampson, 1900) **comb. nov.**, redescription of the habitus and genitalia was provided by Du & Li (2014) [15].

Generic Characters. Adult (Figures 7A,C and 8A): Body yellowish. Frons rounded. Labial palpus upturned and curved, third segment long, acuminate. Maxillary palpus minute, filiform. Male antenna ciliate ventrally. Wings pale yellow ground, scattered fine light brown striae. Forewing CuA_2 origin near 3/4 distal discal cell, CuA_1, M_3, M_2 separate from discal cell posterior angle; Rs_4 straight, well separated from Rs_2+Rs_3; Rs_1 approx to Rs_2+Rs_3. Hindwing CuA_1, M_3, M_2 from discal cell posterior angle; M_1 from discal cell anterior angle; Rs from distal 1/4 of Sc+R.

Male Genitalia (Figure 10A,B): Uncus and gnathos both reduced to a lip-like form; valvae well developed.

Female Genitalia (Figure 10C): Papillae anales narrow. Ductus bursae short and broad, wrinkled.

Distribution. This genus is mainly distributed in China, South Korea, and Russia.

Etymology. The genus name *Scintilla* is derived from the Latin word *scintilla*= spark, and refers to the spark like striped patterns on the wings.

Remarks. Phylogenetic trees constructed based on mitochondrial genomes revealed that *Scintilla strigiferalis* (Hampson, 1900) **comb. nov.** clusters within the clade of the tribe Agroterini Acloque, 1897. Furthermore, this species conforms to the diagnostic characters of Agroterini as described by Mally et al. (2019) [64], namely: labial palps upturned and third labial palpomere directed dorsally; uncus with a broad base; head chaetae simple and undivided; and the ratio of saccus length to sacculus breadth greater than one. Therefore, we place this genus in the tribe Agroterini.

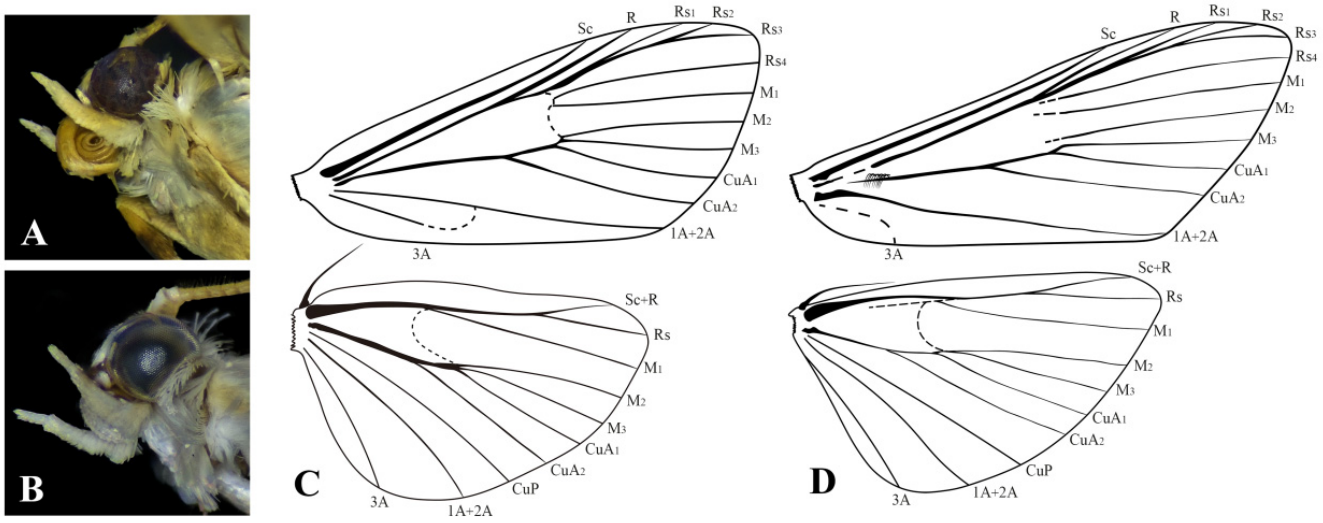


Figure 7. Head and wing venation of the type species of *Scintilla* **gen. nov.** and *Melanoleuca* **gen. nov.** (**A**). Head of *Scintilla strigiferalis* (Hampson, 1900) **comb. nov.**, male; (**B**). Head of *Melanoleuca luteamacula* **sp. nov.**, male; (**C**). Wing venation of *Scintilla strigiferalis* (Hampson, 1900) **comb. nov.**, male; (**D**). Wing venation of *Melanoleuca luteamacula* **sp. nov.**, male.

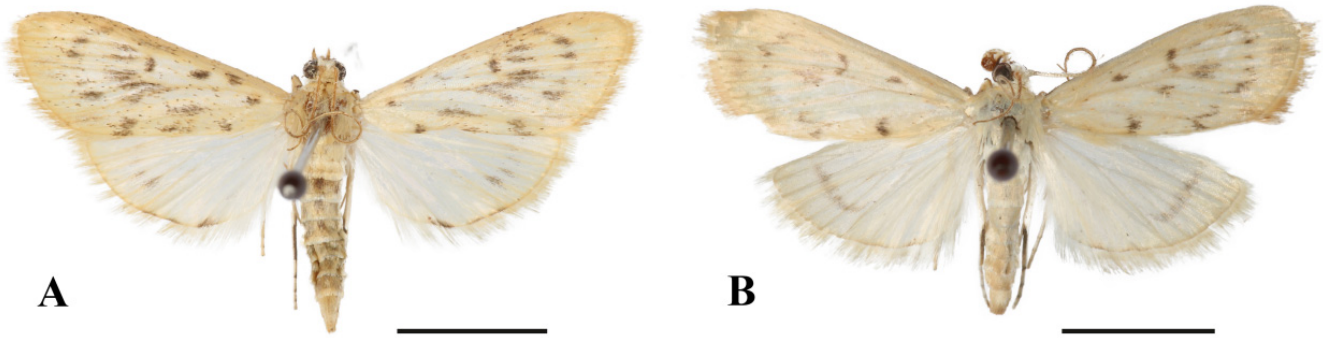


Figure 8. Habitus of *Scintilla* species (**A**). *Scintilla strigiferalis* (Hampson, 1900) **comb. nov.**, female; (**B**). *Scintilla obvia* (Du & Li, 2014) **comb. nov.**, male. Scale bars: 1 cm.

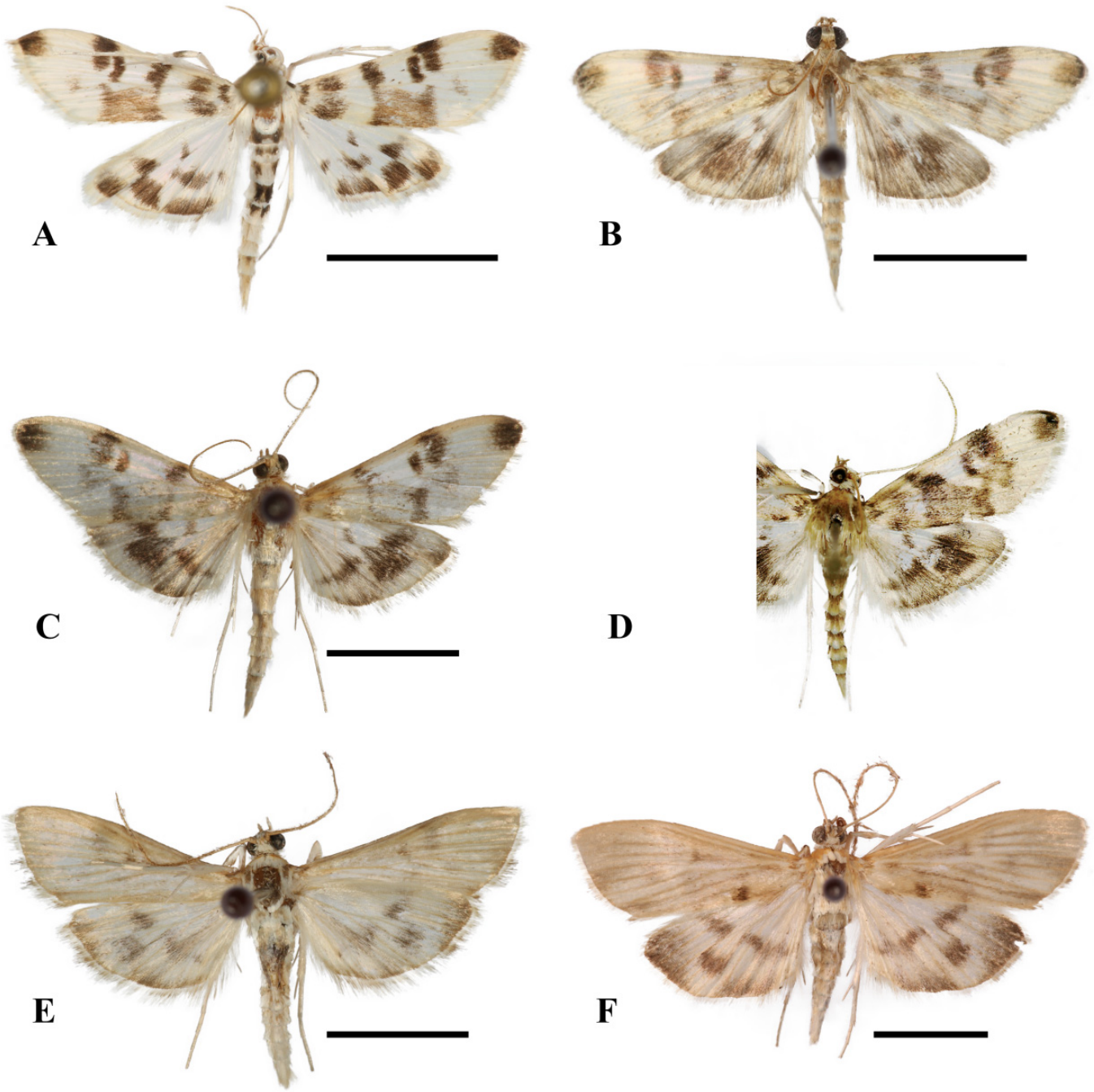


Figure 9. Habitus of *Melanoleuca* species (**A**). *Melanoleuca luteamacula* **sp. nov.**, holotype; male; (**B**). *Melanoleuca qianshanensis* **sp. nov.**, holotype; male; (**C**). *Melanoleuca yingshanensis* **sp. nov.**, holotype; male; (**D**). *Melanoleuca candidalis* (Warren, 1896) **comb. nov.**, male (after Du & Li, 2014); (**E**). *Melanoleuca longatuba* (Wang, Du & Xiao, 2024) **comb. nov.**, holotype, male; (**F**). *Melanoleuca longatuba* (Wang, Du & Xiao, 2024) **comb. nov.**, paratype, female (after Wang et al., 2024). Scale bars: 0.5 cm.

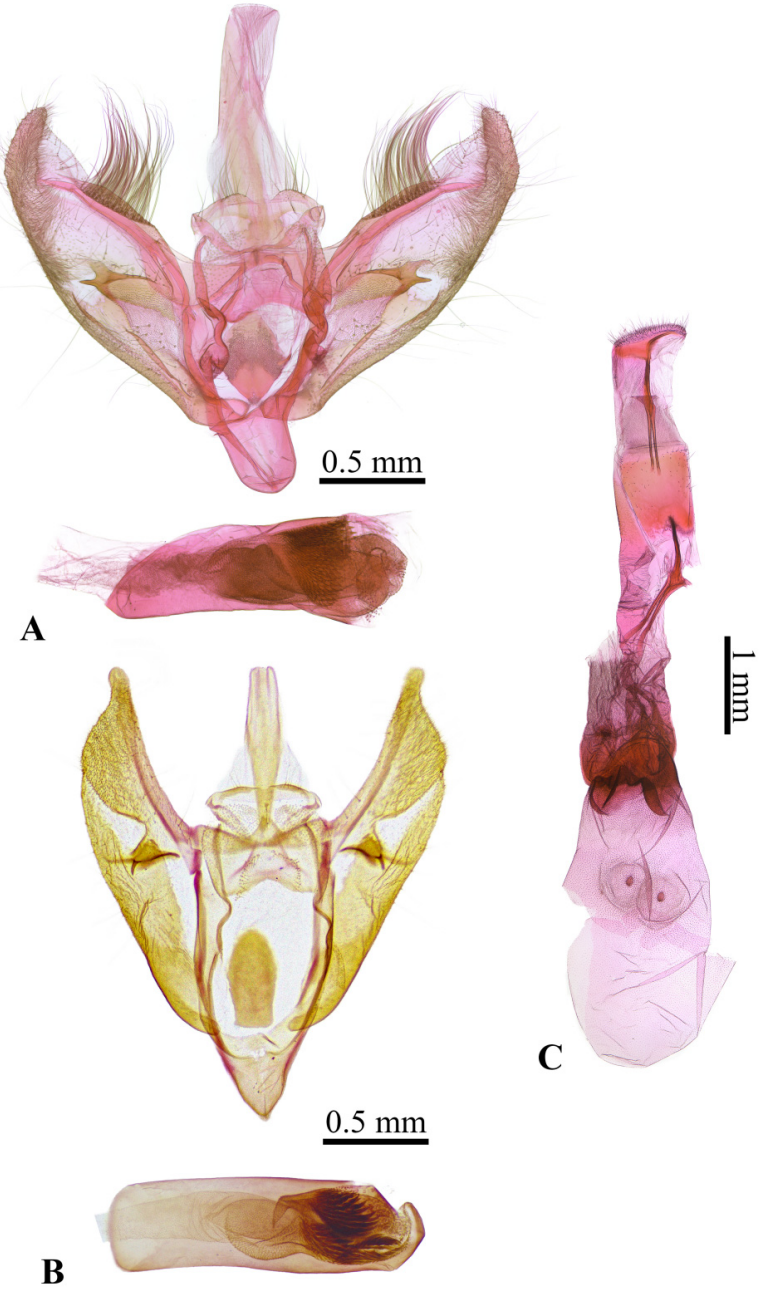


Figure 10. Genitalia of *Scintilla* species (**A**). *Scintilla strigiferalis* (Hampson, 1900) **comb. nov.**, male, genitalia slide no. Lep3599; (**B**). *Scintilla obvia* (Du & Li, 2014) **comb. nov.**, genitalia slide no. WJX25love-16-1; (**C**). *Scintilla strigiferalis* (Hampson, 1900) **comb. nov.**, female, genitalia slide no. Lep 3600. Scale bars: 0.5 mm (**A**,**B**); 1 mm (**C**).

Key to *Scintilla* gen. nov. species based on morphology of habitus and genitalia (After Du & Li, 2014, [15])

1. Subterminal line of hindwing interrupted and indistinct; posterior margin of valva with basal 2/3 arched, bearing a developed bundle of long hairs at middle; costa distally curved toward anterior margin.....*Scintilla strigiferalis* **comb. nov.**
2. Subterminal line of hindwing uninterrupted and distinct; posterior margin of valva slightly concave, without bundle of long hairs; costa slightly concave.....*Scintilla obvia* **comb. nov.**

3.4.1. *Scintilla strigiferalis* (Hampson, 1900) **comb. nov.** [细星火野螟]

Figures 7A,C, 8A, 10A,C and 13A
Tabidia strigiferalis Hampson, 1900, *Tr. Ent. Soc. Lond.* 48: 386, pl. III, f. 30.
Tabidia strigiferalis Hampson, 1900, *Entomol. Fennica* 25: 57–64, Figures 1c and 3a,b.

Note. Description of the habitus and genitalia was provided by Du & Li (2014) [15].

Material examined. 2 ♂♂, Potangyan Reservoir, Baihu Town, Lujiang County, Hefei City, Anhui Province, China, 31.2711° N, 117.3608° E, alt. 73.81 m, 2022-VIII-01, Jiaxin Wang, Peng Yu leg., specimen no. P42.1, genit. prep. Lep2131, Lep3599, molecular no. C4; 1 ♀, Baimajian, Dahuaiping Town, Huoshan County, Lu'an City, Anhui Province, China, 31.1377° N, 116.1877° E, alt. 794.41 m, 2023-VIII-09, Jiaxin Wang, Peng Yu leg., specimen no. H67, genit. prep. Lep3600, molecular no. H67.

Distribution: China (Heilongjiang, Jilin, Liaoning, Tianjin, Hebei, Shaanxi, Gansu, Henan, Anhui, Hubei, Chongqing, Sichuan, Guizhou, Zhejiang, Fujian, Guangdong, Hainan, Shandong, Shanxi, Inner Mongolia, Guangxi), Korea, Russia.

3.4.2. *Scintilla obvia* (Du & Li, 2014) **comb. nov.** [显星火野螟]

Figures 8B, 10B and 13B
Tabidia obvia Du & Li, 2014, *Entomol. Fennica* 25: 57–64, Figures 1d and 3c,d.

Note. Description of the habitus and genitalia was provided by Du & Li (2014) [15].

Material examined. 1 ♂, Dahe Bridge, Longtan Gorge Rafting, Wujia Mountain, Yingshan County, Hubei Province, China, 31.0727° N, 115.8274° E, alt. 262.81 m, 2022-VIII-10, Jiaxin Wang, Peng Yu leg., specimen no. P87.6, genit. prep. Lep2132, molecular no. C6; 2 ♂♂, Huangshadi, Piaoba Village, Mugan Town, Daguan County, Zhaotong City, Yunnan Province, China, 2023-VII-22, Rentao Xu, Mingxu Han leg., specimen no. WJX25love-16-1, genit. prep. WJX25love-16-1.

Distribution. China (Gansu, Hubei, Chongqing, Sichuan, Guizhou, Zhejiang, Guangdong, Hong Kong).

3.5. Taxonomic Treatment of Melanoleuca Wang & Xiao, **gen. nov.**

Melanoleuca Wang & Xiao, **gen. nov.** [熊猫野螟属]
https://zoobank.org/E39C0107-2FB6-4796-BABE-7F2A5E380312

Type species. *Melanoleuca luteamacula* **sp. nov.,** here designated.

Generic Characters. Adult (Figures 7B,D and 9): Body yellowish white or white. Forehead rounded. Labial palpus upturned and curved, third segment long, tapering. Maxillary palpus minute, filiform. Male antennae with cilia on ventral surface. Wings yellowish white or white, with dark maculae scattered on base. Forewing origin of CuA_2 near 2/3 of distal middle chamber, CuA_1, M_3 and M_2 each arising from hind angle of middle chamber; bases of M_2 slightly separated from CuA_1 and M_3; Rs_4 slightly curved, clearly separated from Rs_2 + Rs_3; Rs1 close to Rs_2+3. Hindwing CuA_1, M_3 and M_2 each arising from hind angle of middle chamber; M_1 arising from anterior angle of middle chamber; Rs arising from 3/10 of distal Sc+R.

Male genitalia (Figure 11): Valva lingulate. Costa more sclerotized. No clasper. Base of saccus narrow. Phallus without cornuti.

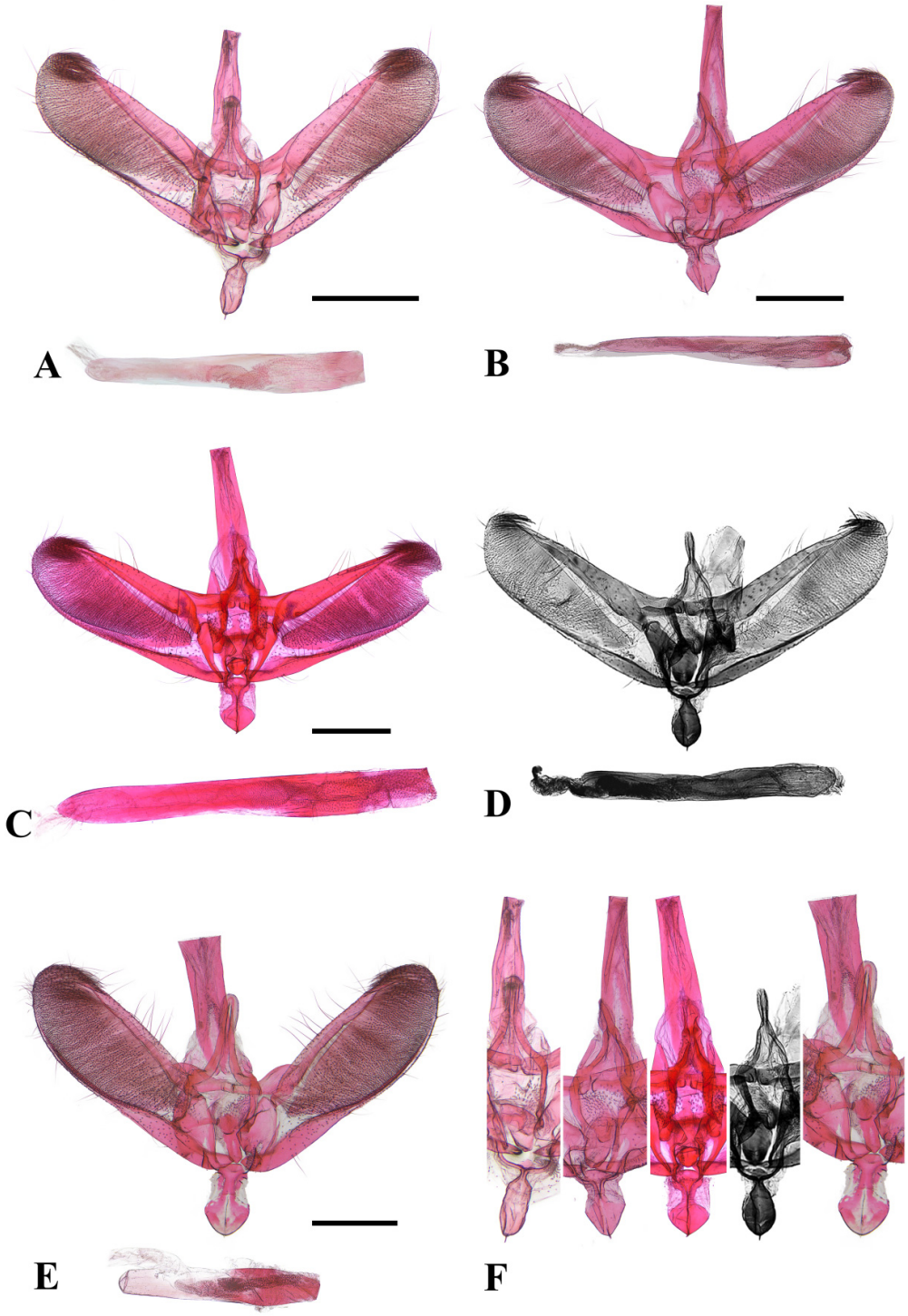


Figure 11. Male genitalia of *Melanoleuca* species (**A**). *Melanoleuca luteamacula* **sp. nov.**, holotype, genitalia slide no. Lep2347; (**B**). *Melanoleuca qianshanensis* **sp. nov.**, holotype, genitalia slide no. Lep2346; (**C**). *Melanoleuca yingshanensis* **sp. nov.**, holotype, genitalia slide no. Lep3598; (**D**). *Melanoleuca candidalis* (Warren, 1896) (after Du & Li, 2014); (**E**). *Melanoleuca longatuba* (Wang, Du & Xiao, 2024) **comb. nov.** holotype, genitalia slide no. Lep3048, (after Wang et al., 2024). (**F**). Comparative views of the medial structures in male genitalia, corresponding to figures (**A**–**E**). Scale bars: 0.5 mm (**A**–**C**,**E**).

Female genitalia (Figure 12): Papillae anales narrow. Ductus bursae slender and long. Corpus bursae without signum.

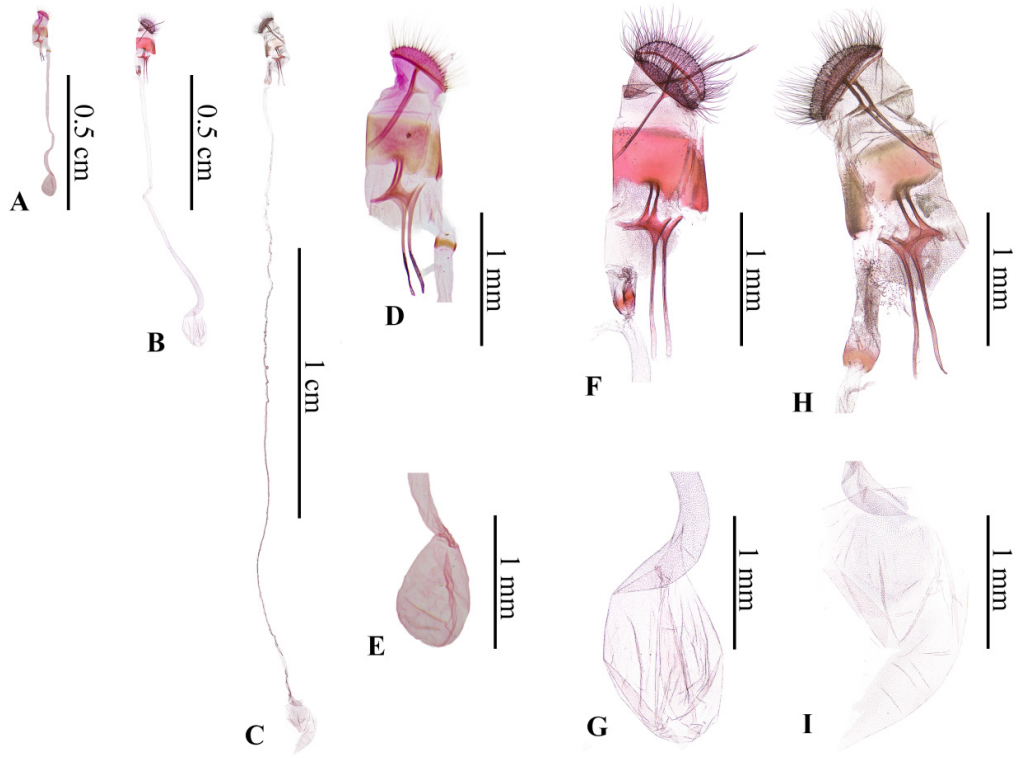


Figure 12. Female genitalia of *Melanoleuca* species (**A**,**D**,**E**). *Melanoleuca luteamacula* **sp. nov.**, paratype, genitalia slide no. WJX25love-34-2; (**B**,**F**,**G**). *Melanoleuca yingshanensis* **sp. nov.**, paratype, genitalia slide no. Lep2345; (**C**,**H**,**I**). *Melanoleuca longatuba* (Wang, Du & Xiao, 2024) **comb. nov.** paratype, genitalia slide no. Lep2200, (after Wang et al., 2024). Scale bars: 0.5 cm (**A**,**B**); 1 cm (**C**); 1 mm (**D**–**I**).

Distribution. This genus is mainly distributed in China and India.

Etymology. The generic name is derived from the Latin word *melano*-(black) and the Latin word *-leuca* (white), referring to the black markings on the wings of species in this genus, which resemble the black and white pelage of the giant panda, *Ailuropoda melanoleuca*.

Remarks. Phylogenetic trees constructed based on mitochondrial genomes revealed that *Melanoleuca luteamacula* **sp. nov.** falls within the clade of the tribe Agroterini Acloque, 1897. Moreover, it conforms to the characteristics of the tribe Agroterini as described by Mally et al. (2019) [64], namely the labial palps upturned and third labial palpomere directed dorsally; uncus with a broad base, head chaetae simple and unsplit; the ratio between saccus length and sacculus breadth more than one. Therefore, we assign this genus to the tribe Agroterini.

Key to *Melanoleuca* gen. nov. species based on morphology of habitus and genitalia

1. Body and wings yellowish white.....*Melanoleuca longatuba* **comb. nov.**
- Body and wings white.....2
2. lower third of median area fulvous.....*Melanoleuca luteamacula* **sp. nov.**
- lower third of median area black.....3
3. Hindwing with outer half interruptedly blackish..*Melanoleuca qianshanensis* **sp. nov.**
- Hindwing with outer third interruptedly blackish.....4
4. Distal half of juxta sharply projecting bilaterally; distal half of saccussubrhombic.....*Melanoleuca yingshanensis* **sp. nov.**
- Saccus oval and juxta oval.....*Melanoleuca candidalis* **comb. nov.**

3.5.1. *Melanoleuca luteamacula* Wang & Xiao **sp. nov.** [黄斑熊猫野螟]

http://zoobank.org/9C321A83-2584-4B02-908A-6CBDDC6FDFD4

Figures 7B,D, 9A, 11A, 12A,D,E and 14A

Type material. HOLOTYPE: 1 ♂, Huangbai Mountain Scenic Area, Changzhuyuan Township, Shangcheng County, Henan Province, China, 31.4341° N, 115.3559° E, alt. 587.01 m, 2020-VIII-19, Yunli Xiao, Yue Fu leg., specimen no. WJ22.5, genit. prep. Lep2347. PARATYPES: 1 ♂, Qinggao Village, Henggang Mountain, Yuchuan Town, Wuxue City, Huanggang City, Hubei Province, China, 30.1726° N, 115.6647° E, alt. 193.61 m, 2023-VIII-10, Jiaxin Wang, Peng Yu leg., specimen no. J2, molecular no. J2; 1 ♀, Nibai Village, Wadi Township, Yuanjiang County, Yunnan Province, China, 2024-VIII-07, Wanlu Liu leg., specimen no. NB203-6-6, genit. prep. WJX25love-34-2; 1 ♂, Biluo River, Baijixun Township, Weixi Lisu Autonomous County, Diqing Tibetan Autonomous Prefecture, Yunnan Province, China, 2024-VII-31, Yuanyuan Jin leg., genit. prep. WJX25love-7-1; 1 ♂, Nuge Village, Baijixun Township, Weixi Lisu Autonomous County, Diqing Tibetan Autonomous Prefecture, Yunnan Province, China, 2024-VII-30, Yuanyuan Jin leg. **Other material.** 1 ♀, Nuozhadu Town, Lancang Lahu Autonomous County, Pu'er City, Yunnan Province, China, 2024-IX-09, Wanlu Liu leg., specimen no. NZ2.R2-76, genit. prep. WJX25love-31-2; 1 ♂, Nibai Village, Wadi Township, Yuanjiang County, Yunnan Province, China, 2024-VIII-07, Wanlu Liu leg., specimen no. NB203-5-1, genit. prep. WJX25love-27-1; 1 ♀, Nuozhadu Town, Lancang Lahu Autonomous County, Pu'er City, Yunnan Province, China, 2024-VIII-30, Wanlu Liu leg., specimen no. NZ2.R1-86, genit. prep. WJX25love-30-2.

Diagnosis. This species is similar to *Melanoleuca candidalis* (Warren, 1896) **comb. nov.**, but can be distinguished by the presence of a squarish orange yellow patch between the posterior margin of vein CuA_1 and the subterminal line outside the antemedial line on the forewing, as well as distinct morphological features of the juxta and saccus in the male genitalia. In this species, the juxta is subcylindrical with a width about half of its length, and the saccus has a short narrow base with the remaining portion elongated cylindrical. In contrast, *Melanoleuca candidalis* **comb. nov.** possesses a squarish blackish brown patch in the same forewing region, and both its juxta and saccus are ovate in shape.

Description. Adult (Figures 7B,D, 9A and 14A): Wingspan 15.2–15.8 mm. Body white. Frons white mixed with ochreous yellow. Vertex with a white tuft. Antenna ochreous yellow; ventral pili length nearly equal to antennal diameter. Labial palpus: first segment white, second and third segments yellowish white. Maxillary palpus small, ochreous yellow. Proboscis brown, its base scaled with yellowish white. Patagium and tegula yellowish white. Thorax and abdomen: ventrally white, dorsally white mixed with ochreous yellow. Wings white; cilia white. Forewing: base and costal one-third slightly ochreous yellow, faintly mixed with greyish brown; antemedial line blackish brown, slightly excavate, with a black spot on the outer edge of its upper half; postmedial line blackish brown, with a large reniform black spot on the costa, protruding between veins M_2 and CuA_1, greyish brown and diffuse on the lower median part; a rounded black ovate spot at the apex. Hindwing: base scattered with long greyish brown piliform scales; outer third irregularly black on a white ground color, forming a small notch medially; distal discoidal stigma black. Legs white.

Male Genitalia (Figure 11A): Anales tube nearly cylindrical, apex truncate. Uncus irregular, with a ridged longitudinal carina from the base, tapering to two-thirds. Valva linguiform, densely setose with fine setae, terminal setae stronger. Costa of valva sclerotized, narrowing from base to apex. Transtilla sclerotized, separated medially. Sacculus sclerotized, slender except for a bulge at the basal 1/5. Saccus: basal one-fourth transversely small and ovate; from 1/4 to 1/2 narrow and stalk like; distal half nearly rhomboid, with a sharp spiniform process medially on the anterior margin. Juxta: distal half with sharply protruding lateral edges; basal half slightly narrower, nearly semicircular. Phal-

lus uniformly cylindrical, apex obliquely truncate, its length approximately 1.3 times the length of the valva.

Female Genitalia (Figure 12A,D,E): Apophysis anterioris about 1.5 times as long as apophysis posterioris, expanded and acutely projected in I-shaped at about basal 1/4. Ductus bursae slender and elongated, length approximately 4.5 times as long as apophysis anteriors. Corpus bursae oval; signum absent.

Etymology: The specific name is derived from the Latin word *lutea* (yellow) and the Latin word *macula* (patch), referring to the squarish orange yellow patch between the posterior margin of vein CuA_1 and the subterminal line outside the antemedial line on the forewing.

Distribution: China (Hubei, Henan, Yunnan).

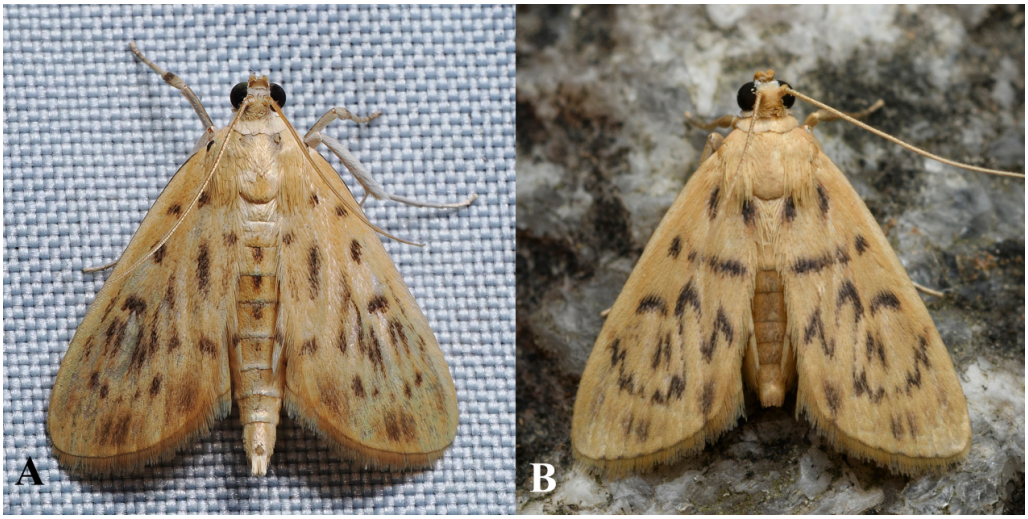


Figure 13. Living adults of *Scintilla* species (**A**) *Scintilla strigiferalis* (Hampson, 1900) **comb. nov.**, photographed by Xiao Shan in Wuhan, China. (**B**) *Scintilla obvia* (Du & Li, 2014) **comb. nov.**, photographed by Lawrence Hylton in Hong Kong, China.



Figure 14. Living adults of *Melanoleuca* species (**A**). *Melanoleuca luteamacula* **sp. nov.**, photographed by Gao Fan in Yunnan, China. (**B**). *Melanoleuca* sp., photographed by Li Jianbo in Zhejiang, China.

3.5.2. *Melanoleuca qianshanensis* Wang & Xiao, **sp. nov.** [潜山熊猫野螟]

http://zoobank.org/D199A326-1517-4C92-A271-ACF0AF5772D4

Figures 9B and 11B

Type material. HOLOTYPE: 1 ♂, Zhengguo Group, Tianzhu Village, Shuihou Town, Qianshan City, Anqing City, Anhui Province, China, 30.7271° N, 116.4389° E, alt. 638.41 m, 2022-VIII-16, Jiaxin Wang, Peng Yu leg., specimen no. P56.6, genit. prep. Lep2346, molecular no. D31.

Diagnosis. This species is similar to *Melanoleuca yingshanensis* **sp. nov.** and *Melanoleuca candidalis* (Warren, 1896) **comb. nov.**, but can be distinguished by distinct morphological differences in the juxta and saccus of the male genitalia. In this species, the juxta is ovate, and the

distal three-fifths of the saccus is nearly triangular. In contrast, the juxta of *Melanoleuca yingshanensis* has sharply protruding lateral edges in its distal half, and the distal half of the saccus is nearly rhomboid. Both the juxta and saccus of Melanoleuca candidalis are ovate in shape.

Description. Adult (Figure 9B): Wingspan 16.8 mm. Body white. Antenna dorsally scaled yellowish brown, ventrally brown with pili subequal to antennal diameter. Labial palpus yellowish brown, second segment distally slightly blackish brown. Maxillary palpus small, yellowish brown. Proboscis yellowish brown, base scaled yellowish white. Patagium white mixed greyish brown. Tegula white with long piliform scales. Thorax white. Abdomen white slightly tinged greyish brown. Forewing white, base irregularly greyish brown; antemedial line blackish brown, slightly excavate, with black spot on outer edge of upper half; distal discoidal stigma black reniform; postmedial line greyish brown, with large black spot on costa and perpendicularly excavate between M_2 and CuA_1, greyish brown on lower median part; ovate black spot at apex; cilia white except at apex mixed greyish brown. Hindwing white, outer half irregularly pale black on white ground, forming small notch medially; distal discoidal stigma black; terminal cilia white mixed greyish brown. Legs white slightly mixed greyish brown.

Male Genitalia (Figure 11B): Anales tube semitubular, ends connected, apex truncate. Uncus distally inflated, apex slightly narrow. Valva linguiform, densely setose with fine setae, terminal setae stronger. Costa of valva sclerotized. Costa of valva widening from near base to basal one-fourth, narrowing from one-fourth to apex. Transtilla sclerotized, separated medially. Saccus basal two-fifths narrow, distal three-fifths nearly triangular, with small dentiform process medially on anterior margin. Juxta nearly cylindrical, length about twice width. Phallus cylindrical, basal half slightly narrow, distal half slightly broad, slightly longer than valva.

Female. Unknown.

Etymology: The specific name is derived from the type locality, Qianshan City in Anhui Province, China.

Distribution: China (Anhui).

3.5.3. *Melanoleuca yingshanensis* Wang & Xiao, **sp. nov.** [英山熊猫野螟]

http://zoobank.org/21C8A12A-F570-4F86-83F9-5D5493651E46

Figures 9C, 11C and 12B,F,G

Type material. HOLOTYPE: 1 ♂, Longtan Gorge Power Station, Wujia Mountain, Yingshan County, Hubei Province, China, 31.0867° N, 115.8139° E, alt. 461.85 m, 2022-VIII-11, Jiaxin Wang, Peng Yu leg., specimen no. BP253, genit. prep. Lep3598, molecular no. WA1. PARATYPES: 1 ♀, Longtan Gorge Power Station, Wujia Mountain, Yingshan County, Hubei Province, China, 31.0867° N, 115.8139° E, alt. 461.85 m, 2022-VI-08, Jiaxin Wang, Peng Yu leg., specimen no. WJ22.4, genit. prep. Lep2345; 1♂, the second arc ditch down the path along Shigu Temple, Wujia Mountain, Yingshan County, Hubei Province, China, 31.1127° N, 115.7998° E, alt. 793.81 m, 2022-VIII-09, Jiaxin Wang, Peng Yu leg., specimen no. BP254; 1 ♂, Guanshan Nature Reserve, Jiangxi Province, China, 2017-VIII-26, Guangxin Wang, Wenjian Li leg., genit. prep. WJX25love-17-1.

Diagnosis. This species is similar to *Melanoleuca qianshanensis* **sp. nov.** and *Melanoleuca candidalis* (Warren, 1896) **comb. nov.**, but can be distinguished by distinct morphological differences in the juxta and saccus of the male genitalia. In this species, the juxta has sharply protruding lateral edges in its distal half, and the distal half of the saccus is nearly rhomboid. In contrast, the juxta of *Melanoleuca qianshanensis* is ovate, and the distal 3/5 of the saccus is nearly triangular. Both the juxta and saccus of *Melanoleuca candidalis* are ovate in shape.

Description. Adult (Figure 9C): Wingspan 19.5–20.1 mm. Body white. Frons white mixed with ochreous yellow. Vertex with white tuft. Antenna ochreous yellow; ventral pili

length subequal to antenna diameter. Labial palpus: first segment white, second and third segments yellowish white. Maxillary palpus small, ochreous yellow. Proboscis brown, scaled yellowish white basally. Patagium and tegula yellowish white. Thorax and abdomen: ventrally white, dorsally white mixed with ochreous yellow. Wings white; cilia white. Forewing: base and costal 1/3 slightly ochreous yellow, faintly mixed greyish brown; antemedial line blackish brown, slightly excavate; a black spot on outer edge of its upper half; postmedial line blackish brown, with large reniform black spot on costa, protruding between M_2 and CuA_1, greyish brown and diffuse on lower median part; a rounded black ovate spot at apex. Hindwing: base scattered with long greyish brown piliform scales; outer third irregularly black on white ground, forming a small notch medially; distal discoidal stigma black. Legs white.

Male Genitalia (Figure 11C): Anales tube nearly cylindrical, apex truncate. Uncus irregular, with a ridged longitudinal carina from base, tapering to 2/3. Valva linguiform, densely setose with fine setae, terminal setae stronger. Costa of valva sclerotized, narrowing from base to apex. Transtilla sclerotized, separated medially. Sacculus sclerotized, slender except for a bulge at basal 1/5. Saccus: basal 1/4 transversely small ovate; from 1/4 to 1/2 narrow stalk like; distal half nearly rhomboid, with a sharp spiniform process medially on anterior margin. Juxta: distal half with sharply protruding lateral edges; basal half slightly narrower, nearly semicircular. Phallus uniformly cylindrical, apex obliquely truncate, length approximately 1.3 times of valva.

Female Genitalia (Figure 12B,F,G): Apophysis anterioris about 1.5 times of apophysis posterioris, expanded and acutely projected in I-shaped at about basal 1/4. Ductus bursae slender and elongated, length approximately 7 times of apophysis anteriors. Corpus bursae small, elliptical; signum absent.

Etymology: The specific name is derived from the type locality, Yingshan County in Hubei Province, China.

Distribution: China (Hubei, Jiangxi).

3.5.4. *Melanoleuca candidalis* (Warren, 1896) **comb. nov.** [黑斑熊猫野螟]

Figures 9D and 11D

Aripana? candidalis Warren, 1896, *Ann. Mag. Nat. Hist.* (ser. 6) 18: 169.
Tabidia candidalis Hampson, 1898, *Proc. Zool. Soc. Lond.* 1898: 624.
Tabidia candidalis (Warren, 1896), *Entomol. Fennica* 25: 57–64, Figures 1b and 2a,b.

Note. Description of the habitus and genitalia was provided by Du & Li (2014).
Distribution. China (Zhejiang, Guangdong), India (Du & Li, 2014).

3.5.5. *Melanoleuca longatuba* (Wang, Du & Xiao, 2024) **comb. nov**. [长管熊猫野螟]

Figures 9E,F, 11E and 12C,H,I

Tabidia longatuba Wang, Du & Xiao, 2024, *Entomotaxonomia* (2024) 46(1): 55–60, Figures 1–3.

Material examined. HOLOTYPE: 1 ♂, Henggang Mountain, Yuchuan Town, Wuxue City, Hubei Province, China, 30.1725° N, 115.6644° E, alt. 193 m, 2022-VIII-24, Jiaxin Wang, Peng Yu leg., specimen no. IOZ(E)224468, genit. prep. Lep3048, molecular no. WJXC3, GenBank accession no. OR371986. PARATYPES: 1 ♀, Wujia Mountain, Dabie Mountain National Nature Reserve, Yingshan County, Hubei Province, China, 31.0725° N, 115.8272° E, alt. 262 m, 2022-VI-06, Jiaxin Wang, Peng Yu leg., specimen no. IOZ(E)224469, genit. prep. Lep2200, molecular no. WJXC2, GenBank accession no. OR371985; 1 ♂, Sanjiao Mountain, Xishui County, Hubei Province, China, 30.4989° N, 115.5589° E, alt. 444 m, 2022-VIII-24, Jiaxin Wang, Peng Yu leg., specimen no. IOZ(E)224470, molecular no. WJXK2, GenBank accession no. OR596416.

Note. Description of the habitus and genitalia was provided by Wang et al. (2024) [16].

Distribution. China (Hubei).

3.6. Taxonomic Treatment of Tabidia Snellen, 1880

Tabidia Snellen, 1880 [条纹野螟属]

Type species. *Tabidia insanalis* Snellen, 1880

Distribution. This genus is range extends from South Asia to Australia, with no records in China, exhibiting a tropical Asia–Australasia distribution pattern.

Generic Characters. Adult: Body white. Frons rounded. Labial palpus sickle shaped, curved, long, slender, and acutely pointed. Maxillary palpus small. Male forewing with a dorsally located group of recumbent large scales from base of median nervure. Hindwing termen slightly wavy with a distinct anal angle. Wing pattern with black banded or zigzag markings. Forewing origin of CuA_2 near base of median cell [1,5].

Remarks. Integrative evidence from morphology, DNA barcodes, and phylogenetic analyses of mitochondrial genomes indicates that the former concept of *Tabidia* requires division into two new genera. The three genera now recognized exhibit substantial diagnostic differences (Table 3). Furthermore, the species previously assigned to *Tabidia* do not form a monophyletic clade, justifying the taxonomic revision proposed here. This study clarifies that the true genus *Tabidia*, as redefined, is not distributed in China.

Following this revision, *Tabidia* comprises nine species (Table 4). However, this group remains non-monophyletic, as evidenced by distinct morphological disparities (Figure 15) and its polyphyly in phylogenetic trees (Figure 1) based on DNA barcodes. Due to limited specimen availability and molecular data, the taxonomic status of these nine species is provisionally maintained until more comprehensive morphological and molecular evidence becomes available.

Table 3. Comparison of diagnostic generic characters among *Scintilla* **gen. nov.**, *Melanoleuca* **gen. nov.**, and *Tabidia* Snellen, 1880.

Generic Characters	*Scintilla* gen. nov.	*Melanoleuca* gen. nov.	*Tabidia* Snellen, 1880
Body color	Pale yellowish	White	White
Frons	Rounded	Rounded	Rounded
Labial palpus	Upturned, curved; third segment long, tapering	Upturned, curved; third segment long, tapering	Sickle-shaped, curved, long, slender, acutely pointed
Maxillary palpus	Minute, filiform	Minute, filiform	Small
Male forewing	Without a group of large scales	Without a group of large scales	With a dorsal group of recumbent large scales from base of median nervure
Hindwing termen and anal angle	Smooth, rounded; no distinct anal angle	Smooth, rounded; no distinct anal angle	Slightly wavy; distinct anal angle
Wing pattern	Dark brown or black speckles or fine stripes	Brown or black blotches	Black banded or zigzag markings
Venation (Forewing CuA_2)	Origin near 3/4 distal of median cell	Origin near 2/3 distal of median cell	Origin near base of median cell

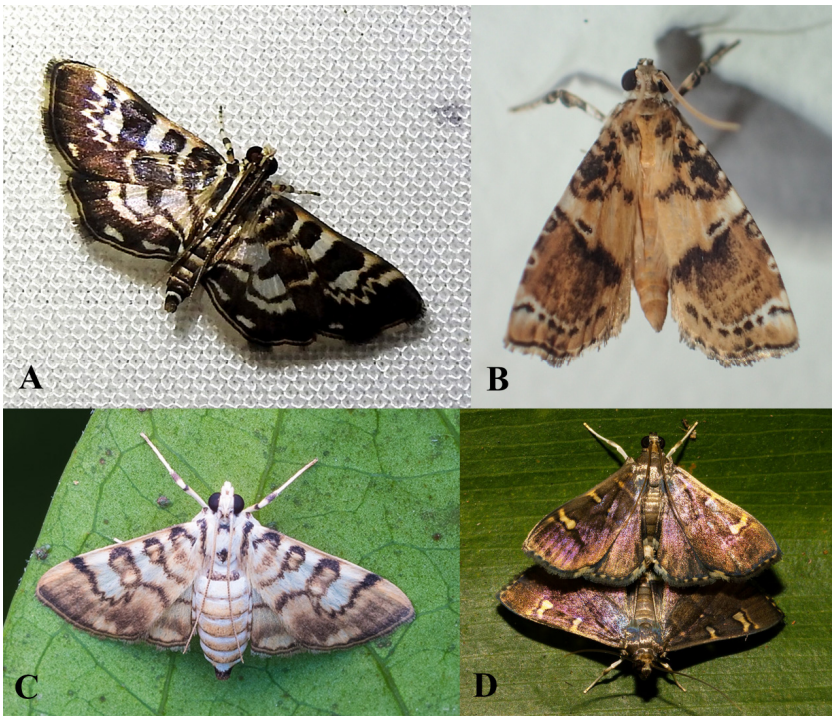


Figure 15. Living adults of *Tabidia* species (**A**) *Tabidia insanalis* Snellen, 1880, photographed by Anthony Kurek at Babinda Boulders, Queensland, Australia. (**B**) *Tabidia inconsequens* (Warren, 1896), photographed by Gérard Chartier in Thma Bang, Kaôh Kong, Cambodia. (**C**) *Tabidia aculealis* (Walker, 1866), photographed by Mohammed Hayath in Dadadahalli, Karnataka, India. (**D**) *Tabidia truncatalis* Hampson, 1899, photographed by David White in Wonga, Queensland, Australia.

Table 4. A species list of the three genera: *Scintilla* **gen. nov.**, *Melanoleuca* **gen. nov.**, and *Tabidia* Snellen, 1880.

Genus	Species	Type Locality
Scintilla Wang & Xiao, **gen. nov.**	*Scintilla strigiferalis* (Hampson, 1900) **comb. nov.** (TS)	Russia, Amur [Amurland], Khabarovsk [Chabarofka] [2,65]
	Scintilla obvia (Du & Li, 2014) **comb. nov.**	China, Hubei [15]
Melanoleuca Wang & Xiao, **gen. nov.**	*Melanoleuca luteamacula* Wang & Xiao, **sp. nov.** (TS)	China, Hubei; Henan; Yunnan
	Melanoleuca qianshanensis Wang & Xiao, **sp. nov.**	China, Anhui, Qianshan
	Melanoleuca yingshanensis Wang & Xiao, **sp. nov.**	China, Hubei; Jiangxi
	Melanoleuca candidalis (Warren, 1896) **comb. nov.**	India, Meghalaya, Khasi Hills [Khasias] [2,4]
	Melanoleuca longatuba (Wang, Du & Xiao, 2024) **comb. nov.**	China, Hubei, Wuxue [16]
Tabidia Snellen, 1880	*Tabidia insanalis* Snellen, 1880 (TS)	Indonesia, Sulawesi [Celebes], Balangnipa; Makassar; Maros [1]
	Tabidia defloralis (Snellen, 1883)	Indonesia, Sulawesi [Celebes], Maros; Bantaeng [Bonthain] [3]
	Tabidia aculealis (Walker, 1866)	Indonesia, Sula [2]
	Tabidia craterodes Meyrick, 1894	Indonesia, Pulo Laut [2]
	Tabidia inconsequens (Warren, 1896)	India, Meghalaya, Khasi Hills [Khasias] [2,4]
	Tabidia flexulalis Snellen, 1899	New Guinea, Dinner Island [Dinner-eiland] [2]
	Tabidia truncatalis Hampson, 1899	Indonesia, Maluku, Ambon Island [Amboina]. Papua New Guinea, Humboldt Bay; D'Entrecasteaux Islands, Fergusson Island. Australia, Queensland [2]
	Tabidia nacoleialis Hampson, 1912	Malaysia, Penang [2]
	Tabidia fuscifusalis Hampson, 1917	Sri Lanka [Ceylon], Ratnapura [2]

4. Discussion

4.1. Taxonomic Revision of Chinese Tabidia

Our integrated analysis, combining morphology, *COI* barcodes, and mitogenomic phylogeny, demonstrates that the Chinese species previously classified under *Tabidia* do not form a monophyletic group. This confirms the initial morphological suspicions regarding the heterogeneity of the genus. Consequently, we erect two new genera, *Scintilla* **gen. nov.** and *Melanoleuca* **gen. nov.**, to accommodate these species. This revision is robustly supported by distinct morphological characters and stable molecular phylogenetic relationships. The conserved mitogenome structures of both new genera, showing the ancestral lepidopteran gene order, are consistent with patterns commonly observed in Spilomelinae.

4.2. Systematic Placement of the New Genera

The phylogenetic trees, particularly the robust mitogenomic analysis, consistently place the type species of both *Scintilla* and *Melanoleuca* within the tribe Agroterini. This finding aligns with previous studies based on molecular data [66,67] or mitochondrial genomic data [34,41,57,63,68], further confirming the tribal classification framework within Spilomelinae. However, they do not form a single clade but are recovered in two distinct subclades within Agroterini. This structure strongly supports their recognition as separate, valid genera within this tribe, rather than being merged into a single genus or placed elsewhere. The position of *Tylostega tylostegalis* outside the core Agroterini clade in our analysis highlights the potential non-monophyly of Agroterini as currently defined and warrants further investigation. Furthermore, the taxonomic status of the "Unplaced" group comprising *Syllepte taiwanalis* and *Pycnarmon lactiferalis* remains complex [64,69], reflecting the need for further exploration of higher-level phylogeny within Spilomelinae.

4.3. Delimitation and Composition of the New Genera

The monophyly of *Scintilla* **gen. nov.** (comprising *S. strigiferalis* **comb. nov.** and *S. obvia* **comb. nov.**) and *Melanoleuca* **gen. nov.** (comprising *M. luteamacula* **sp. nov.**, *M. qianshanensis* **sp. nov.**, *M. yingshanensis* **sp. nov.**, *M. candidalis* **comb. nov.**, and *M. longatuba* **comb. nov.**) is well-supported. Each genus possesses a unique combination of stable diagnostic characteristics in morphology and molecular sequences that distinguish them from each other and from other Agroterini genera. Species of *Scintilla* **gen. nov.** are mainly distributed in China, South Korea, and Russia, while those of *Melanoleuca* **gen. nov.**, except for *M. candidalis* **comb. nov.**, which is also found in India, are currently known only from China.

4.4. The Status of Tabidia Sensu Stricto and Remaining Species

After the transfer of the Chinese species, *Tabidia* sensu stricto comprises nine species. Our preliminary evidence suggests that this core group may also be non-monophyletic. For instance, the *COI*-based phylogeny and external morphology indicate that *Tabidia defloralis* likely belongs to the tribe Herpetogrammatini, clustering with *Herpetogramma* and *Metoeca*. This finding suggests that the genus *Tabidia* requires a comprehensive global revision. As noted by Yuan et al. (2019) [70], using a single gene locus (like *COI*) for reconstructing higher-level phylogeny in Spilomelinae may have limitations. Future studies should employ multi-gene data and detailed morphological comparisons (as used in Matsui et al. 2023 [71]; Tang & Du 2023 [72]) to validate these inferences. The taxonomic status of the remaining species, primarily known from original descriptions and distributed in the Australasian region, cannot be clarified without further morphological study and molecular data. Based on current knowledge, no definitive records of *Tabidia* sensu stricto exist in China. The revised *Tabidia* sensu stricto is mainly distributed in the Australasian region, including Papua New Guinea and Australia and coastal areas of Indonesia.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/insects17020149/s1, Table S1: Mitogenomic organization of *Scintilla strigiferalis* (Hampson, 1900) **comb. nov.**; Table S2: Mitogenomic organization of *Melanoleuca luteamacula* **sp. nov.**; Data S1: Alignment of *COI* sequences used for phylogenetic analysis in this study; Data S2: Alignment of mitochondrial protein-coding and rRNA genes used for phylogenetic analysis in this study.

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Data Availability Statement: Data are contained within the article.

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